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A FLORA OF THE SANTA ANA MOUNTAINS, CALIFORNIA

Earl W. Lathrop and Robert F. Thorne

Introduction

The choice of the Santa Ana Mountains for a floristic study resulted from the authors' curiosity about a region that is relatively untouched, biologically speaking, and that is rather isolated from other ranges of southern California. The presence of the Cleveland National Forest, Trabuco District, within a large portion of this range and the resultant protection to watershed and biota which it provides, have allowed the vegetation and wildlife of this region to retain much of their original wildness despite their proximity to a large population center. Current concern for preservation of the environment requires detailed surveys of areas like the Santa Ana Mountains. It is hoped, therefore, that this flora will be of some help to the scientists and their students who have recently shown considerable interest in this range.

Although the main access to these mountains is over unpaved and rough Forest Service truck trails, many of which are behind locked gates during fire-season closure, the citizenry has crowded into this area for recreational purposes at an alarming rate. Thus it became imperative that this survey be completed before further disturbance eliminated part of the flora.

Location and Topography

The Santa Ana Mountains are located in southern California about 64 km southwest of Los Angeles, 16 km east of the city of Santa Ana, and about 32 km from the Pacific Ocean (Fig. 1). We have restricted our collections and records to the peaks, plateaus, and slopes of the Santa Ana Mountains and have, therefore, largely excluded plants restricted to the lowlands surrounding the mountains. The area and elevations considered to be within the Santa Ana Mountains in this flora are largely the same as those studied by Pequegnat (1951). His northern boundary was the Santa Ana River Canyon (elevation, 155 m). We have, for the sake of completeness, included the river bed and its rich lowland flora of aquatic, palustrine, riparian, and ruderal plants listed by Howell (1929) and by Pequegnat (1951), though our own field work was largely restricted to the highlands.

The range is delimited on the south by the southern foothills of Margarita and Rocky Peaks and by De Luz Canyon (Murrieta-De Luz Road of Fig. 2) at an average elevation of 275 m. The Temecula River, which is the only other stream besides the Santa Ana River able to cut across the crest of the range, forms a further natural boundary a short distance south of De

Fig. 1. Location map of the Santa Ana Mountains, California. Drawing by Henry A. Zuill.

Luz Canyon. The Peninsular Ranges, of which the Santa Ana Mountains are the northernmost extension, continue southward at this point.

The eastern boundary is marked by the lowlands of Temescal Canyon (average elevation, 305 m) and of Lake Elsinore (elevation, 390 m), and by the farming valleys of Murrieta and Temecula (average elevation, 320 m). The western boundary is delimited by the Santiago Reservoir (Irvine Lake) at an elevation of 320 m, Santiago Canyon (average elevation, 335 m), Plano Trabuco at 305 m elevation, and in general by the inner margin of the low Santa Ana Coastal Plain at the approximate elevation of 335 m. We have included here the Starr Ranch, recently surveyed by John Little (1977).

Part of the boundary lines of three counties, Riverside, Orange, and San Diego, run in an irregular pattern through the range, with San Diego County contributing only a small portion of the range to the south.

Fig. 2. Map of the Santa Ana Mountains showing the main roads (~), canyons (cyn), mountain peaks (▲), and the United States Forest Service (USFS and the California Division of Forestry (CDF) fire stations (●).

The longitudinal axis of the range, extending some 64 km southeasterly from the Santa Ana River Canyon consists of a crest which roughly follows the alignment of the major peaks from Sierra Peak in the north to Elsinore Peak in the south (Fig. 2). The average elevation of the crest is approximately 1,165 m and culminates around its midpoint in Santiago Peak at 1,733 m. At no point is the transverse axis of the range more than 21 km wide. The range thus is relatively narrow with many knife-edged ridges separating the coastal plain from the interior valleys. The Main Divide Truck Trail tends to follow this crest with many of the lateral truck trails winding down ridge tops and slopes. The total area of the range, thus defined, is approximately 1,150 sq. km.

The crest of the mountains drops off at Los Alamos Canyon where the Santa Rosa Plateau (average elevation, 610 m) and its canyons and slopes make up the remainder of the Santa Ana Mountains southward. This region (Fig. 1), originally an 18,000 hectare cattle range of Rancho California (presently subject to development), consists essentially of a high plateau broken by canyons, mesas, and low hills (Lathrop and Thorne, 1968).

Geology of the Region

Because the geology of the Santa Ana Mountains has been described by several authors when writing about the vegetation of the range (Packard, 1916; Pequegnat, 1951; Wilson and Vogl, 1965; and Vogl, 1973, 1976), only a brief summary of the general geology is presented here.

The Santa Ana Mountains are a large fault block of rather complex structure which has been elevated along the Elsinore Fault system and tilted southwestward toward the ocean (Vogl, 1973). This tilt has caused the longitudinal axis of the range to be marked by a crest that is located eccentrically, being near the eastern fault scarp, drained by short seasonal streams as in Tin Mine, Hagador, Bedford, Coldwater, Slaughterhouse, and Miller canyons. Santiago, Trabuco, and San Mateo creeks are the main streams draining the mountains to the west (Vogl, 1976).

The mountains generally consist of decomposed granites that are subject to continual erosion. Sedimentary sandstones and conglomerates are common in the western foothills, at the extreme northern end, and in the area inland from San Juan Capistrano Creek and south of the Ortega Hwy where the range merges with the Santa Margarita Mountains and the Santa Rosa Plateau (Vogl, 1976). The latter plateau was formed by undulating volcanic lava flows and is capped by olivine (Santa Rosa) basalt with many boulders and outcroppings of granitic rocks and marine shales on hills, on mesa slopes, and in some valleys (Snow, 1972).

The soils of the Santa Ana Mountains are many and varied, chiefly in the soil families of loams, clays, sands, thermic and nonacidic, which are dis-

tributed in six associations and 36 series. These soils are well outlined and discussed for the Cleveland National Forest, Trabuco District, in maps and text by the USFS (1966, 1969) and for the Santa Rosa Plateau by USDA (1971).

Climate of the Region

The same authors cited above who have written about the geology of the region have also given good accounts of the climate of the range. A recent environmental-analysis report for the Cleveland National Forest, Trabuco District, discusses the environmental setting in the Santa Ana Mountains (USFS, 1977); hence, again our remarks here will be brief.

Despite the fact that the Santa Ana Mountains are somewhat influenced by orographic weather due to their orientation at right angles to the path of the rain-bearing southwesterly winds, resultant differences in vegetation on the two slopes are not significant. The increased moisture on the windward side is offset by the direct effect of the sun's rays in the afternoon and to some extent by the phenomenon of nighttime drying (Fosberg and Schroeder, 1965).

The rugged topography of the mountains produces varied climatic patterns throughout the range, modifying to some extent the general Mediterranean climate of southern California.

The recorded average annual precipitation for 17 years (1950–1966) on Santiago Peak is 68.1 cm and the corresponding annual average precipitation for Santa Ana is 37.1 cm (Wilson and Vogl, 1965). Rain records on file at the Cleveland National Forest, Trabuco District headquarters, Santa Ana, show mean annual precipitation amounts for the following locations: head of Silverado Canyon at 610 m elevation, 70 cm for the years 1930–1945; Silverado Canyon at 395 m elevation, 56 cm for the years 1919–1946; Trabuco Canyon at 368 m elevation, 56 cm for the years 1925–1945. The mean annual precipitation recorded at the USFS Tenaja Guard Station for the period 1960–66 is 42.2 cm (Lathrop and Thorne, 1968). About 90% of the precipitation in the Santa Ana Mountains falls from December to April (Pequegnat, 1951).

Snow occasionally falls in moderate amounts on the higher peaks and crests and, according to Pequegnat (1951), this usually occurs above 1,067 m. Marine air and fog are prevalent in the Santa Ana Mountains (Vogl, 1976). Pequegnat (1951) observed fog attaining elevations up to 1,330 m and spilling over the mountain crests in the passes.

The July average temperature for Santa Ana is 22 C and the January average is 11.5 C (Vogl, 1973). Using these temperatures, Vogl (1973) calculated that the July average temperature for Pleasants Peak would be approximately 14 C and the January average about 3 C. Pequegnat (1951)

reports that frost and freezing temperatures are common during the winter months at higher elevations.

Pequegnat (1951) states that "Santa Ana" winds frequently sweep the Santa Ana Mountains having a desiccating effect on the vegetation.

Botanical Exploration

More than fifty botanists have collected vascular plants in the Santa Ana Mountains in the last 75 years. A third of these botanists have collected more than 90% of the specimens. Aside from the authors, the principal collectors in order of number of specimens represented in the RSA-POM herbarium are P. A. Munz, C. B. Wolf, P. C. Everett, J. T. Howell, R. D. Harwood, F. W. Peirson, L. Abrams, E. K. Balls, D. D. Keck, Robinson and Crocker, N. Cooper, B. D. Stark, and J. D. Olmsted.

Several earlier studies have contributed knowledge about the flora of the Santa Ana Mountains. Among the first of these is the *Flora of the Santa Ana Canyon Region* by J. T. Howell (1929). Higgins (1949) and Beauchamp (1972) have given helpful range distribution information about the plants of San Diego County, many of which occur in the Santa Ana Mountains. Pequegnat (1951) listed 350 plant species for the range in his *Biota of the Santa Ana Mountains*. Boughey (1968), in his *Checklist of Orange County Flowering Plants*, reports many of the species which occur in Blackstar, Silverado, Santiago, Trabuco, and San Juan canyons, and from the coastal slope of Santiago Peak. The flora of the Santa Rosa Plateau area of the range was reported by Lathrop and Thorne (1968, also in several subsequent articles cited elsewhere in this paper). An account of the rare, endangered, and geographically interesting plant species of the Santa Ana Mountains was prepared by Shevock (1976).

Vegetation

The plant communities of the Santa Ana Mountains, as compiled from Thorne (1976a), listed with Vogl (1976) equivalents, are shown in Table 1. They are discussed here in order from the lowest elevation in the range to the highest, culminating at Santiago Peak, with allowance for overlapping of topographic types.

1. Inland sage scrub (Fig. 3). This community of "soft" shrubs is best developed along the lower fringes of chamisal in drier canyon valleys and slopes and occasionally as a successional stage in chaparral regeneration. California sagebrush (*Artemisia californica*), black sage (*Salvia mellifera*), white sage (*Salvia apiana*) and wild-buckwheat (*Eriogonum fasciculatum*) are the dominant shrubs present (Thorne, 1976a; Vogl, 1976).

2. Chamisal (Fig. 4). While this lower elevation chaparral community shares species of *Arctostaphylos*, *Ceanothus*, and *Rhus*, among others, with

Table 1. Plant communities of the Santa Ana Mountains as compiled from Thorne (1976a), with Vogl (1976) equivalents.

	Vogl equivalents
1. Inland sage scrub	Coastal sage scrub
2. Chamisal	Chamise chaparral
3. Mixed chaparral	Manzanita chaparral
4. Inland closed-cone coniferous woodland	
a. Knobcone pine woodland	Knobcone pine
b. Tecate cypress woodland	Tecate cypress
5. Coulter pine woodland	Coulter pine forest
6. Southern oak woodland	Canyon woodland, in part
7. Southern California grassland	Foothill grassland
8. Vernal pool ephemeral	—
9. Southern mixed-evergreen woodland	Big-cone Douglas fir, canyon woodland, in part
10. Riparian woodland	Riparian woodland, canyon woodland, in part
11. Ruderal	—
12. Freshwater aquatic	—

mixed chaparral, chamisal is heavily dominated by the shrubby chamise (*Adenostoma fasciculatum*), which at times may form nearly pure stands on dry ridges and steep south-facing slopes (Thorne, 1976a). It grades into mixed chaparral at elevations between 1,065 and 1,165 m. There are several broad-leaved associates such as holly-leaved cherry (*Prunus ilicifolia*), toyon (*Heteromeles arbutifolia*), and sugarbush (*Rhus ovata*).

3. Mixed chaparral (Figs. 5, 19–20). This widespread sclerophyllous scrub, which carpets the mountain slopes above 1,065–1,165 m, blends with the Coulter pine woodland along the range crest (Wilson and Vogl, 1965) and with southern mixed-evergreen forest on upper canyon walls and ridges (Thorne, 1976a). It is dominated by *Arctostaphylos glandulosa*, *A. glauca*, and a variety of other hard-leaved shrubs, including many species of *Ceanothus* and the scrub oak (*Quercus dumosa*).

4. Inland closed-cone coniferous woodland. Since the two tree species dominating this woodland in the Santa Ana Mountains, knobcone pine (*Pinus attenuata*) and tecate cypress (*Cupressus forbesii*), are separated geographically, they are here discussed as two subcommunities.

a. Knobcone pine woodland (Figs. 6–8). This woodland is restricted in the range to hydrothermally modified serpentinite within a radius of 1.6 km of Pleasants Peak at 1,220 m elevation (Vogl, 1973). The knobcone pine and a wild-lilac (*Ceanothus papillosus* var. *roweanus*) are apparently con-

Figs. 3-4. 3. Inland sage scrub on a southeast-facing slope near the base of Hagador Canyon at 425 m. Dominant shrubs in the foreground are white sage (*Salvia apiana*) and California sagebrush (*Artemisia californica*). Two herbaceous perennial associates are wild grape (*Vitis girdiana*) and the introduced horehound (*Marrubium vulgare*). 4. View of a nearly pure stand of chamise (*Adenostoma fasciculatum*), chamisal, on a south-facing slope along the Bedford Truck Trail, near the base of Bedford Canyon at 760 m.

fined to the serpentinite of this area (Vogl, 1973). Other common shrub species of the impoverished chaparral associated with knobcone pine here are *Ribes malvaceum* var. *viridifolium*, *Arctostaphylos glandulosa*, chamise, toyon, and buckbrush (*Ceanothus crassifolius*).

b. Tecate cypress woodland (Figs. 9, 10). Tecate cypress is restricted in the range to an area of sedimentary light sandstone and clay-bearing formations of approximately 1.6 km² between 430 and 800 m elevation (Wolf, 1948; Armstrong, 1966). The main grove is chiefly in the vicinity of Gypsum Canyon on the northwest slope of Sierra Peak, T4S, R8W, overlapping Secs. 1 and 2. Individuals and isolated small groups of trees appear on the many northwest-facing ridges of Sierra Peak, some, as a group of about six trees on the east slope, approaching an elevation near that of Sierra Peak's 928 m. The sparse chaparral associated with this woodland consists of wild-lilac (*Ceanothus tomentosus* ssp. *olivaceus*), shrub mallow (*Malacothamnus fasciculatus* ssp. *laxiflorus*), chamise, and several other shrubby species.

5. Coulter pine woodland (Fig. 11). The largest stands of Coulter pine (*Pinus coulteri*) in the mountains are found along the Main Divide Truck Trail in the area between Bald and Trabuco peaks. This woodland has many species associated with it that are also common in mixed chaparral and southern mixed-evergreen woodland (Thorne, 1976a; Vogl, 1976).

6. Southern oak woodland (Figs. 12, 20). This community in the range is often closely associated with grasslands, but chiefly it occurs from Los Pinos and El Cariso southward, with its greatest development on the Santa Rosa Plateau (Lathrop and Thorne, 1968). Engelmann oak (*Quercus engelmannii*) and coast live oak (*Q. agrifolia*) are the conspicuous dominants, with associates such as various species of *Ceanothus*, *Rhus*, *Ribes*, and other shrubby genera intruding from the chaparral (Thorne, 1976a). Two unpublished theses (Zuill, 1967; Snow, 1972) gave details of structure and ecology of this community on the Santa Rosa Plateau. Thorne and Lathrop (1976a) presented a brief account of species associated in this community on Mesa de Burro in the southern part of the range.

7. Southern California grassland (Figs. 13, 20). The largest expanse of this community in the range occurs on the Santa Rosa Plateau, with grassy glades along the Main Divide Truck Trail, especially between Los Alamos Canyon and the El Cariso-Los Pinos recreational area. The summit of Skyline Drive and parts of Black Star Canyon also have grassy hillside slopes. Representative species, such as needlegrass (*Stipa pulchra*), soft chess (*Bromus mollis*), and filaree (*Erodium cicutarium*) are among the numerous grasses and forbs of this community in the Santa Ana Mountains (Lathrop and Thorne, 1968, 1976a; Thorne and Lathrop, 1969; Kopecko and Lathrop, 1975; Thorne, 1976a; Vogl, 1976).

8. Vernal pool ephemeral (Fig. 14). This community is restricted in the Santa Ana Mountains to ten pools on three mesas (Burro, Colorado and La Punta) on the Santa Rosa Plateau. These seasonally wet pools, ranging in

Figs. 5-6. 5. Mixed chaparral. View facing southeast along the Main Divide Truck Trail approximately 3 km southeast of Trabuco Peak at 1,210 m. Among the common shrubs present are *Arctostaphylos glandulosa* and *Ceanothus leucodermis*. Three tree species also appear in the photograph, *Quercus dumosa*, *Q. chrysolepis*, and *Pseudotsuga macrocarpa*. 6. Inland closed-cone coniferous woodland showing the knobcone

size (calculations include the vernal moist grassland surrounding the pool margins) from <0.25 to 10.16 hectares. Their flora and ecology have been studied in the past by Lathrop and Thorne, 1968, 1976a, b; Thorne and Lathrop, 1969, 1970; Kopecko and Lathrop, 1975; Lathrop, 1976; Collie and Lathrop, 1976; and Stagg, 1977.

9. Southern mixed-evergreen forest (Figs. 15, 16, 19). This community is best developed in the moister canyons and on slopes with Pacific exposure, especially along the range crest between Modjeska and Trabuco Peaks. Its common component tree species are big-cone spruce (*Pseudotsuga macrocarpa*), canyon, interior, and coast live oaks (*Quercus chrysolepis*, *Q. wislizenii*, and *Q. agrifolia*), big-leaved maple (*Acer macrophyllum*), California bay (*Umbellularia californica*), and flowering ash (*Fraxinus dipetala*) (Thorne, 1976a; Vogl, 1976).

10. Riparian woodland (Figs. 17, 18). The association of such semiaquatic trees as white alder (*Alnus rhombifolia*), sycamore (*Platanus racemosa*), cottonwood (*Populus fremontii*), willow (*Salix laevigata*) and ash (*Fraxinus velutina*) make up a woodland restricted to intermittent or permanent streams in most of the major canyons of the range. Some of the riparian communities, such as those along stream banks in chaparral, oak woodlands, and grasslands may have only sycamore and willow present (Lathrop and Thorne, 1968). This community is perhaps best developed in Santa Ana River, Trabuco, Tin Mine, Hagador, Silverado, Coldwater, San Juan, Los Alamos, San Mateo, Cottonwood Creek and De Luz canyons (Thorne, 1976a; Vogl, 1976).

11. Freshwater aquatic (Fig. 21). Although freshwater habitats, other than the vernal pools and semiaquatic riparian woodlands listed above, are relatively rare in the range, there are a few seasonal streams with marshy margins or deep pools and some relatively persistent ponds on the Santa Rosa Plateau. Likewise, at least between times of scouring by floods of the Santa Ana River, there are, or have been, numerous ponds and marshes in the river bottom as described by Howell (1929) for the middle and upper parts of the Santa Ana River Canyon. Among the aquatics listed for the range from the Plateau, the Santa Ana River, the San Juan Hot Springs, and other moist areas in the canyons are such free floaters as *Azolla filiculoides*, *Eichhornia crassipes*, *Wolffiella oblonga*, and species of *Lemna*; attached

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pine (*Pinus attenuata*) subcommunity on the southeast face of Pleasants Peak 3.5 km northwest of the junction of Eagle Truck Trail with the Main Divide Truck Trail at 1,100 m. The knobcone pine (background) and the shrub *Ceanothus papillosus* subsp. *roweanus* (center foreground) are confined to the hydrothermally altered serpentinite surrounding Pleasants Peak (Vogl, 1973). Other shrubs in the foreground are *Adenostoma fasciculatum* and *Arctostaphylos glauca*.

Figs. 7-8. 7. A large knobcone pine (*Pinus attenuata*) on the east slope of Pleasants Peak, facing toward Eagle Canyon at 1,100 m. 8. Female cones of the knobcone pine.

Figs. 9-10. A small grove of tecate cypress (*Cupressus guadalupensis forbesii*) of the inland closed-cone coniferous woodland on the northwest slope of Sierra Peak in Gyrum Canyon at 335 m elevation. The sedimentary light sandstone and clay support a sparse associated chaparral including *Ceanothus tomentosus olivaceus*, *Malacothamnus fasciculatus laxiflorus*, and *Adenostoma fasciculatum*. 10. Female cones of the Tecate cypress (*Cupressus guadalupensis forbesii*).

Figs. 11-12. 11. Coulter pine woodland on a gentle southeast slope at the head of Silverado Canyon (background) near the junction of the Silverado Road with the Main Divide Truck Trail at 1,035 m. A lone big-cone spruce (*Pseudotsuga macrocarpa*) can be seen among the Coulter pines (*Pinus coulteri*). Mixed chaparral forms the understory of the woodland. 12. Looking northeast on the Mesa de Colorado 1.5 km north-

floaters like *Marsilea vestita*, *Callitriche heterophylla bolanderi*, *Ludwigia peploides*, *Ranunculus aquatilis capillaceus*, and species of *Hydrocotyle*; submersed plants like *Ceratophyllum demersum*, *Elatine brachysperma*, *Lemna trisulca*, *Zannichellia palustris*, and species of *Potamogeton*; and numerous emerged palustrine species of such genera as *Carex*, *Cyperus*, *Eleocharis*, *Scirpus*, *Juncus*, *Mimulus*, *Pluchea*, *Polygonum*, *Typha*, and *Veronica*. A few introduced palustrine plants are quite abundant locally as *Nasturtium officinale*, *Apium graveolens*, species of *Mentha*, and *Veronica anagallis-aquatica*.

12. Ruderal. Disturbance always provides a haven for opportunistic species; hence, many common weedy annuals and perennials can become established and form a seral community along truck trail road banks, fire breaks, and other disturbed areas. Many of the introduced species, each indicated in the annotated list by an asterisk, are common components of the ruderal community, some of these species even being restricted to it (Thorne, 1976a; Lathrop and Thorne, 1976a).

Relationships of the Flora

The flora of the Santa Ana Mountains, though the range is somewhat isolated from other southern California ranges, is essentially similar to that of nearby ranges of similar moderate elevation, especially the peninsular ranges to the south in San Diego County (Beauchamp, 1972). It has, therefore, produced few botanical surprises, and possesses very few endemic taxa. Nonetheless, the range does contain a number of vascular plants with disjunct or otherwise noteworthy distributions.

Apparently endemic to the range are *Lepechinia cardiophylla*, a suffrutescent pitcher-sage, and two subspecies, *Argemone munita robusta*, a prickly poppy, and *Phacelia suaveolens keckii*. Another subspecies, *Eriastrum densifolium sanctorum*, collected only in the Santa Ana River Canyon, is reported only from elevations below 500 m in the Santa Ana River drainage. A few taxa are included in the "Inventory of Rare and Endangered Vascular Plants of California" by Powell (1974):

Eryngium aristulatum parishii
Dudleya multicaulis

Dudleya viscida
Satureja chandleri

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east on the Santa Rosa Ranch toward a grove of oak trees in southern oak woodland at 625 m elevation. In the foreground are two trees of Engelmann oak (*Quercus engelmannii*) with coast live oaks (*Q. agrifolia*) in the extreme left background. In the immediate foreground is southern California grassland. Photograph by George E. Johnston.

Figs. 13-14. 13. Southern California grassland, looking west along the Tenaja Road near the junction with the Santa Rosa Ranch Road at 600 m. Clumps of lupine (*Lupinus excubitus*) and scattered tidy-tips (*Layia platyglossa*) are among the associated forbs of the grassland. Light patches of gold fields (*Lasthenia chrysostoma*) appear on the slope in the background just in front of a sparse stand of Engelmann oaks. 14. View of the largest vernal pool on the Santa Rosa Plateau, looking northeast on Mesa de Colorado at 625 m. The oaks on the distant rim of the mesa are Engelmann oaks.

Dicentra ochroleuca
Chorizanthe parryi fernandina
Brodiaea filifolia

Brodiaea orcuttii
Orcuttia californica

Two dozen more taxa are listed in the same work as rare and not endangered or as not rare but with limited distribution.

Disjunct plants, those with very spotty distribution patterns because of restriction to very rare habitats or because of unexplained absence from common habitats, are especially fascinating to botanists. The vernal pools on several mesas on the Santa Rosa Plateau account for some of the rarest and most disjunct plants in the range, as might be expected from this rapidly vanishing and highly scattered habitat. Among these are:

Isoetes howellii
Isoetes orcuttii
Marsilea vestita
Pilularia americana
Eryngium artistulatum parishii
Psilocarpus brevissimus
Plagiobothrys undulatum
Callitriche marginata
Downingia bella (disjunct from
 Tulare Co.)
Downingia cuspidata
Crassula aquatica
Elatine californica

Elatine chilensis
Plantago bigelovii californica
Navarretia prostrata
Montia fontana amporitana
Anagallis minima
Myosurus minimus apus
Juncus kelloggii
Juncus sphaerocarpus
Lilaea scilloides
Alopecurus howellii
Deschampsia danthonioides
Orcuttia californica

Pinus attenuata, the knobcone pine, and *Ceanothus papillosus roweanus*, a California-lilac, with generally more northern ranges, are restricted to serpentinite around Mount Pleasant. Less easy to explain are such disjuncts from the north as *Arnica discoidea*, *Arbutus menziesii*, *Mahonia pinnata pinnata*, and *Styrax officinalis fulvescens*. *Cupressus guadalupensis forbesii*, *Ceanothus palmeri*, and *Nolina parryi*, all mostly of the chaparral communities, represent species with mostly more southern distributions.

Any north to south-trending mountain range near the coast might be expected to support many species from farther north, farther south, the interior, or the coast that terminate in the range. The Santa Anas are no exception to this expectation though the numbers of such species are greatly diminished by the large number of "northern" species that terminate in the related ranges of San Diego County farther south, as listed by Beauchamp (1972). Those taxa that appear to range no farther south than the Santa Anas (including the De Luz area) are:

Arnica discoidea
Evax acaulis
Stephanomeria cichoriacea

Mahonia dictyota
Stellaria longipes
Amorpha californica

<i>Astragalus brauntonii</i>	<i>Holodiscus discolor franciscanus</i>
<i>Astragalus trichopodus antiselli</i>	<i>Boykinia rotundifolia</i>
<i>Lathyrus laetiflorus barbarae</i>	<i>Ribes californicum hesperium</i>
<i>Trifolium fucatum gambelii</i>	<i>Ribes malvaceum viridiflorum</i>
<i>Juglans californica</i>	<i>Collinsia parryi</i>
<i>Lycopus americanus</i>	<i>Diplacus longiflorus rutilus</i>
<i>Monardella hypoleuca hypoleuca</i>	<i>Viola sheltonii</i>
<i>Salvia leucophylla</i>	<i>Allium monticola keckii</i>
<i>Clarkia dudleyana</i>	<i>Carex barbarae</i>
<i>Dicentra ochroleuca</i>	<i>Carex densa</i>
<i>Eriogonum nudum saxicola</i>	<i>Carex schottii</i>
<i>Rhamnus californica cuspidata</i>	<i>Wolffiella oblonga</i>
<i>Holodiscus boursieri</i>	<i>Muhlenbergia californica</i>

Less numerous are the vascular plants that terminate their northernmost distribution in the Santa Anas, several of them expectedly in the southernmost portion of the range:

<i>Cupressus guadalupensis forbesii</i>	<i>Cercocarpus minutiflorus</i>
<i>Dudleya viscida</i>	<i>Jepsonia parryi</i>
<i>Comarostaphylis diversifolia</i>	<i>Diplacus aurantiacus australis</i>
<i>diversifolia</i>	<i>Diplacus clevelandii</i>
<i>Tetracoccus dioicus</i>	<i>Mimulus diffusus</i>
<i>Salvia clevelandii</i>	<i>Physalis greenei</i>
<i>Satureja chandleri</i>	<i>Broadiaea orcuttii</i>
<i>Chorizanthe fimbriata</i>	<i>Calochortus weedii weedii</i>
<i>Chorizanthe polygonoides</i>	
<i>longispina</i>	

A few inland species, including some very characteristic of the California deserts, have filtered into the range, mostly coming down the Santa Ana River and into the Santa Ana River Canyon:

<i>Artemisia tridentata tridentata</i>	<i>Stillingia linearifolia</i>
<i>Bebbia juncea</i>	<i>Glycyrrhiza lepidota glutinosa</i>
<i>Chilopsis linearis</i>	<i>Eustoma exaltatum</i>
<i>Opuntia basilaris basilaris</i>	<i>Distichlis spicata stricta</i>

Likewise, a few coastal species range across the coastal plain to the foothills of the Santa Anas, entering some of the more deeply incised canyons:

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Figs. 15–16. 15. Southern mixed-evergreen forest in Trabuco Canyon at 790 m looking up canyon in a southeasterly direction in the vicinity of Yeager Mesa. A large canyon oak (*Quercus chrysolepis*) appears at the left with a dense stand of big-cone spruce (*Pseudotsuga macrocarpa*) on a north-facing slope to the right. 16. Habitat of big-cone

spruce (*Pseudotsuga macrocarpa*) in a west-facing ravine, looking south along the Main Divide Truck Trail approximately 1.5 km southwest of Trabuco Peak at 1,210 m. Interior live oaks (*Quercus wislizenii*) appear in mixed chaparral in the background. A few Coulter pines (*Pinus coulteri*) can be seen on the horizon.

Figs. 17–18. 17. Riparian woodland of white alder (*Alnus rhombifolia*) and coast live oaks (*Quercus agrifolia*) looking southeast up Trabuco Canyon, 1 km beyond the end of the road in the canyon at 730 m. The dry, rocky bed of the intermittent stream in the foreground supports a cover of Scale-broom (*Lepidospartum squamatum*). 18. Looking east at a stand of white alder (*Alnus rhombifolia*), with *Pseudotsuga macrocarpa* in the background, in a riparian woodland of Trabuco Canyon 1.5 km beyond the end of the road at 730 m.

Cryptantha clevelandii
Opuntia oricola
Spergularia marina
Atriplex lentiformis breweri

Atriplex serenana davidsonii
Calystegia macrostegia cyclostegia
Astragalus trichopodus leucopsis

Catalogue of the Vascular Plants

General Remarks

The following list includes all the species collected or observed by the authors in the Santa Ana Mountains during field work for this survey. It also includes some species represented only by earlier specimens on file from the area in the POM-RSA Herbarium of the Rancho Santa Ana Botanic Garden or, for a few species, from other designated herbaria. The most recent records of the species not collected by the authors are listed by the name and collection number of the collector and the date of collection. In a few instances, species are included only from published records from the region (as Howell, 1929; Pequegnat, 1951; and Boughey, 1958) and from an unpublished flora of Starr Ranch (Little, 1977). We have omitted without comment, however, reported species based on misidentifications or dubious records. The first set of specimens taken on the survey are filed in the Herbarium of the Rancho Santa Ana Botanic Garden. The second set is at Loma Linda University.

Families are arranged alphabetically within subdivisions, classes, or subclasses, as are also genera within families, and species within genera. Asterisks indicate naturalized species. Common names are given, usually only for the first species in a genus, and only if genuine or nonrepetitive of the generic name. Nomenclature of species largely follows that of *A Flora of Southern California* by Munz (1974), and families that of Thorne (1976b) in *A Phylogenetic Classification of the Angiosperms*. Synonyms are omitted unless the names used differ from those of Munz (1974).

Habit of growth is usually given for each species. The statements of habitat in the Santa Ana Mountains for each species were obtained from field observations and collection labels. Frequency terms, where used, are based arbitrarily upon the following scale: rare, 1–2 collection or observation stations; infrequent, 3–4 stations; frequent, 5–6 stations; common, 7 or more stations. The terms “abundant” and “locally abundant” indicate large numbers of a taxon throughout the area or in the habitat listed. Fig. 2 shows many of the collection or observation sites in the Santa Ana Mountains, as cited in the Annotated List. Subspecific names are used where appropriate. Twenty-one new subspecific combinations, needed for this flora and not likely to be made in the near future by monographers, have been made and basonyms cited in the paper immediately preceding this by Thorne (1978). Varieties, considered here as minor genetic variants with little if any geo-

Figs. 19-20. 19. View of Santiago Peak (1,733 m elev.) looking south across the chaparral-clad east slope of Modjeska Peak (1,675 m). Trees of *Pseudotsuga macrocarpa* of a mixed evergreen woodland are on the slope in the left foreground (1,280 m). The right foreground shows a steep, dry chaparral bank with an interior live oak (*Quercus wislizenii*) at the top. 20. View from Redonda Mesa (760 m) looking northeast over

graphic or ecologic significance, are placed in parentheses or brackets when mentioned at all.

Annotated List

Sphenopsida

Equisetaceae

Equisetum arvense L. Horsetail. Rare in wet places, as Starr Ranch and moist, sandy soil along San Juan Creek.

Equisetum hyemale L. subsp. *affine* (Engelm.) Calder & Taylor. Horsetail. Rare in riparian-woodland streams in Hagador and San Juan canyons.

Equisetum laevigatum A. Br. Scouring-rush. Infrequent along streams on the Santa Rosa Plateau, in Hagador Canyon, and on Starr Ranch.

Equisetum telmateia Ehrh. (incl. the var. *braunii* Milde). Giant Horsetail. Infrequent along streams on the Santa Rosa Plateau and in Holy Jim and San Juan canyons.

Lycopsida

Isoetaceae

Isoetes howelli Engelm. Quillwort. Ephemeral aquatic locally abundant in several vernal pools and in shallow water of a small intermittent stream on the Santa Rosa Plateau.

Isoetes orcuttii A. A. Eat. Locally abundant in the same locations with the preceding species.

Selaginellaceae

Selaginella bigelovii Underw. Spike-moss. Abundant throughout on dry rocky slopes of canyons and rock outcroppings in chaparral and grasslands.

Pteropsida

Filicae

Aspidiaceae

Dryopteris arguta (Kaulf.) Watt. Coastal Wood Fern. Common on shaded rocky slopes and under live oaks and other woodland trees.

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the Santa Rosa Plateau showing a mosaic of communities of chamisal, oak woodland, and grassland. A portion of the inflorescence of *Yucca whipplei* appears in the lower edge of the photo.

Fig. 21. Freshwater aquatic community in a seasonal stream on the Santa Rosa Plateau. The water surface has a dense cover of *Azolla filiculoides* and species of *Lemna*. Blossoms and foliage of water cress (*Nasturtium officinale*) and sterile foliage of *Paspalum distichum* appear above the surface. A dense cluster of *Juncus xiphioides*, mixed with *Rumex conglomeratus*, is growing along the opposite bank. *Anemopsis californica* is scattered in the marshy background.

Polystichum munitum (Kaulf.) Presl. subsp. *curtum* Ewan. Sword Fern. Locally abundant on shaded slopes and moist canyon banks at mid elevations to 1,370 m, mostly in the vicinity of Trabuco Canyon and Modjeska and Bear springs.

Aspleniaceae

Asplenium vespertinum Maxon. Spleenwort. Rare fern found in crevices of rocks on slopes of mesas on the Santa Rosa Plateau.

Blechnaceae

Woodwardia fimbriata Sm. in Rees. Western Chain Fern. Locally abundant near water in canyon woodlands and chaparral throughout the mountains.

Marsileaceae

Marsilea vestita Hook. and Grev. Clover Fern. Locally abundant in shallow water and desiccated mud of vernal pools and small streams of the Santa Rosa Plateau.

Pilularia americana A. Br. American Pillwort. An inconspicuous aquatic fern locally and seasonally abundant in wet mud and shallow water of the vernal pools of Mesa de Colorado and Mesa de Burro on the Santa Rosa Plateau.

Polypodiaceae

Polypodium californicum Kaulf. California Polypody. Common through the mountains on rocky outcrops in shaded ravines, oak woodlands, and chaparral.

Pteridaceae

Adiantum capillus-veneris L. Venus-hair Fern. Rare, only on shaded banks of riparian woodlands of Hagador Canyon and a N-facing bluff, wet with seepage, of San Juan Canyon.

Adiantum jordanii K. Muell. Maidenhair Fern. Common in the mountains on moist shaded banks of canyons, woodlands, and chaparral.

Aspidotis californica (Hook.) Nutt. ex Copel. Lace Fern. Common on rocky, grassland openings in chaparral on mesa and canyon slopes.

Cheilanthes clevelandii D. C. Eaton. Rare fern locally abundant on rocky bluffs in San Juan Canyon.

Cheilanthes covillei Maxon. Lip Fern. Rare, rocky slope in chaparral in Holy Jim Canyon on the trail to Santiago Peak, *Munz* 7753, Sept. 7, 1923.

Notholaena newberryi D. C. Eat. Cotton Fern. Infrequent on dry rocky slopes in chaparral of the Santa Rosa Plateau and on rocky bluffs in San Juan Canyon.

Pellaea andromedaefolia (Kaulf.) Fee. Cliff-brake, Coffee Fern. Frequent on rocky outcrops in chaparral, oak woodlands, and riparian woodlands.

Pellaea mucronata (D. C. Eat.) D. C. Eat. subsp. *mucronata*. Bird's-foot Fern. Common on dry rocky and grassy slopes and openings in chaparral throughout the mountains, even to dry ridges of Santiago Peak.

Pityrogramma triangularis (Kaulf.) Maxon subsp. *triangularis*. Goldenback Fern. Common on shaded rocky outcrops and in humus of chaparral and oak woodlands.

Pteridium aquilinum (L.) Kuhn. subsp. *aquilinum* (var. *pubescens* Underw.). Western Brake or Bracken Fern. Locally abundant in springy places on chaparral-clad slopes, in Coulter-pine forests, in Yeager's Meadow, and in Leach, Trabuco, Hagador, and San Juan canyons.

Salviniaceae

Azolla filiculoides Lam. Water Fern. Locally abundant, floating on shallow, quiet water of intermittent streams and tenajas on the Santa Rosa Plateau.

Coniferae

Cupressaceae

Cupressus guadalupensis Wats. subsp. *forbesii* (Jeps.) Beauchamp ex Thorne. Forbes's or Tecate Cypress. Handsome conifer up to 10 m tall in open chaparral on sandstone. Locally abundant only at the northernmost end of the Santa Ana Mountains, primarily on the Pacific Slope between Gypsum and Coal canyons and Sierra Peak in T4S, R8W, Sec. 1 and 2, Orange County (Wolf, 1948; Armstrong, 1966) (Figs. 9, 10).

Juniperus californica Carr. California-cedar. Rare. A badly stunted specimen, less than $\frac{1}{2}$ m tall and wide, in a crevice of a large granitic boulder along Tenaja Creek at Tenaja Guard Station, Cleveland National Forest.

Pinaceae

Pinus attenuata Lemmon. Knobcone Pine. Locally abundant on the slopes of Pleasants Peak along the Main Divide Truck Trail between 915 and 1,220 m. Restricted to a hydrothermally altered serpentine substrate which supports only limited shrub growth as opposed to the surrounding dense chaparral on nonspecialized substrates (Vogl, 1973). Trees to 11 m in isolated stands (Figs. 6, 7).

Pinus coulteri D. Don. Coulter Pine. Ranging between 1,000 and 1,525 m, this tree is locally abundant mostly on interior ridges and slopes along the Main Divide Truck Trail between El Cariso on Los Pinos Peak (Ortega Hwy) and Bedford Peak to the north. The trees occur in dense to sparse stands (coulter-pine woodlands) or as isolated individuals scattered in chaparral, mixed-evergreen forests, and occasionally in southern oak woodlands (Fig. 11).

Pseudotsuga macrocarpa (Vasey) Mayr. Big-cone spruce. Locally abundant in canyon bottoms and on northfacing slopes from 610 to 1,525 m. Scattered individuals and groves occur more extensively in the mountains than the Coulter pine, the largest groves being found in upper Trabuco Canyon adjacent to Yeager's Meadow. It is a major component of the southern mixed-evergreen forest and ranges from riparian woodlands up to Santiago Peak between Gypsum Canyon and El Cariso (Bolton and Vogl, 1969) (Figs. 5, 11, 15, 16, 18, 19).

Angiospermae

Dicotyledonae

Aceraceae

Acer macrophyllum Pursh. Big-leaf Maple. Locally abundant in riparian-woodland canyons but also ranging up to 1,220 m in association with *Quercus chrysolepis*, *Pinus coulteri*, and *Pseudotsuga macrocarpa*.

Amaranthaceae

*Amaranthus albus L. Tumbleweed. Common weed of disturbed areas. *Amaranthus californicus* (Moq.) Wats. Infrequent weed of open disturbed ground along intermittent streams in southern oak woodlands.

**Amaranthus hybridus* L. Rare weed, known only from the Santa Ana River Canyon, Howell 1210, Sept. 20, 1928, and Starr Ranch, Little 2283, May 7, 1977 (CSF).

Anacardiaceae

Malosma laurina (Nutt. in T. & G.) Nutt. ex Abrams. Laurel Sumac. Abundant shrub of mixed chaparral, borders of southern mixed evergreen woodlands, and upper slopes of riparian woodlands in canyons.

Rhus integrifolia (Nutt.) Brew. & Wats. Lemonadeberry. Frequent shrub in chaparral below 820 m. Found mainly at the north end of the range on the Pacific slope of Sierra Peak, in Blackstar, Santiago, and San Juan canyons, and on Starr Ranch.

Rhus ovata Wats. Sugarbush. Common shrub of mixed chaparral throughout the mountain range.

Rhus trilobata Nutt. ex T. & G. (var. *pilosissima* Engl. in DC.) Squaw Bush. Infrequent shrub in chaparral and along the lower slopes with riparian woodlands but also ranging up to the crest of the mountain range in southern mixed-evergreen forest.

*Schinus molle L. Pepper-tree. Occasionally naturalized in canyons, as in lower San Juan Canyon at San Juan Hot Springs.

Toxicodendron radicans L. subsp. *diversilobum* (T. & G.) Thorne. Poison-oak. Much too abundant variable shrub or vine in shaded canyons, on wooded slopes, about springs or moist places, and in the grassy understory of oak woodlands.

Apocynaceae (incl. Asclepiadaceae)

Apocynum cannabinum L. [incl. *A. sibiricum* Jacq. var. *salignum* (Greene) Fern.] Dogbane, Indian-hemp. Infrequent perennial among granitic boulders along intermittent streams on the Santa Rosa Plateau and in San Juan and Santa Ana River canyons.

Asclepias californica Greene. Milkweed. Rare perennial growing in disturbed places and rocky open areas in chaparral, Leach Canyon, *Munz* 5060, Apr. 28, 1922, and Burton Canyon, *Robinson & Crocker s.n.*, Mar. 28, 1916.

Asclepias eriocarpa Benth. Infrequent perennial in grasslands and grassy clearings in chaparral.

Asclepias fascicularis Dcne. in A. DC. Common perennial in small colonies along streambanks and in moist places.

Sarcostemma cynanchoides Dcne. subsp. *hartwegii* (Vail) R. Holm. Infrequent suffrutescent perennial vine collected in sparse chaparral in Gypsum Canyon near Sierra Peak, 655 m, *Howell* 469, July 4, 1927; in Santa Ana River Canyon, *Howell* 461, July 24, 1927; and *Little* 1210, July 16, 1977, at Starr Ranch, 305 m, in inland sage scrub (John Little specimens at CSF, California State University, Fullerton).

*Vinca major L. Periwinkle. European trailing evergreen often persisting near residences in shaded woodlands of Silverado, Holy Jim, and Trabuco canyons.

Araliaceae (incl. Apiaceae)

Apiastrum angustifolium Nutt. in T. & G. Annual frequent in depressions in grasslands, rocky openings in chaparral, and open places in canyons, as in Glen Ivy, Hagador Canyon, and the Santa Rosa Plateau.

*Apium graveolens L. Celery. Perennial infrequent in riparian woodland on moist banks of Hagador Canyon at 460 m elevation, in Santa Ana River Canyon, and at San Juan Hot Springs.

Aralia californica Wats. Spikenard. Rare in moist shaded canyons. Collected only at Big Cone Spring on the Maple Spring Truck Trail at 1,085 m elevation, where discovered by Gordon & Karlin Marsh.

*Bowlesia incana R. & P. Delicate spring annual frequent in shady places of canyons and hillside woodlands.

*Conium maculatum L. Poison-hemlock. Poisonous biennial weed, locally abundant in disturbed places at low elevations, as on Starr Ranch, *Little* 1192 (CSF); and in the Santa Ana River Canyon, *Howell* 447, July 19, 1927.

Daucus pusillus Michx. Rattlesnake Weed. Common annual in shaded places in oak woodlands, chaparral, and riparian woodlands in canyons.

Eryngium aristulatum Jeps. var. *parishii* (C. & R.) Math. & Const. Spreading prostrate perennial locally abundant in dry vernal pool beds on mesas of the Santa Rosa Plateau. This "variety" appears to be at least a subspecies, and is now under study at Berkeley.

**Foeniculum vulgare* Mill. Sweet Fennel. Stout perennial weed of disturbed places.

- Hydrocotyle ranunculoides* L. f. Pennywort. Locally abundant perennial with floating leaves in shallow water of streams.
- Hydrocotyle umbellata* L. Slender creeping perennial aquatic collected only from shallow water and wet bottomlands of Santa Ana River Canyon, *Howell* 624, Aug. 13, 1927.
- Hydrocotyle verticillata* Thunb. [var. *triradiata* (A. Rich.) Fern.] Slender creeping perennial aquatic collected only in the bottoms of the Santa Ana River Canyon, *Howell* 2658, July 5, 1927.
- Lomatium dasycarpum* (T. & G.) C. & R. subsp. *dasycarpum*. Lace-parsnip. Common perennial in grasslands and grassy openings in woodlands and chaparral.
- Lomatium lucidum* (Nutt.) Jeps. Wild-parsley. Common perennial in grasslands and grassy clearings in woodlands and chaparral.
- Lomatium utriculatum* (Nutt.) C. & R. Bladder-parsnip. Perennial herb frequent in grasslands and grassy openings in chaparral.
- Oenanthe sarmentosa* Presl in DC. Succulent perennial in shallow water of marshy bottomlands in Santa Ana River Canyon. *Howell* 398, July 14, 1927.
- Osmorhiza brachypoda* Torr. ex Durand. Sweet-Cicely. Common caulescent perennial in shaded areas of wooded canyons and on chaparral-clad slopes.
- Sanicula arguta* Greene ex C. & R. Sanicle, Snakeroot. Infrequent perennial of grasslands.
- Sanicula bipinnatifida* Dougl. ex Hook. Purple Sanicle. Perennial locally frequent in grassy openings in oak woodlands and chaparral.
- Sanicula crassicaulis* Poepp. ex DC. Pacific Sanicle. Occasional in grassy clearings of woodlands and chaparral.
- Sanicula graveolens* Poepp. ex DC. A rare perennial from the summit of Santiago Peak.
- Sanicula tuberosa* Torr. Rare perennial on shaded slopes of canyons, as Trabuco and Leach canyons.
- Tauschia arguta* (T. & G.) Macbr. Infrequent perennial of open places in chaparral and southern mixed evergreen forests of the northern half of the Santa Ana Mountains.
- Tauschia parishii* (C. & R.) Macbr. Rare perennial of open places in chaparral at high elevations, as on Santiago Peak.
- *Torilis nodosa (L.) Gaertn. Hedge-parsley. Annual common in disturbed shady places.

Asteraceae

- Achillea millefolium* L. [var. *californica* (Pollard) Jeps.] Yarrow. Perennial occasional in open places in chaparral.
- **Ageratina adenophora* (Spreng.) King & Robins. Occasional perennial gar-

- den escape, as on Starr Ranch, *Little 1004*, May 15, 1976 (CSF = California State University, Fullerton).
- Agoseris grandiflora* (Nutt.) Greene. Mountain-dandelion. Infrequent perennial of grasslands and grassy openings in oak and mixed-evergreen forests.
- Agoseris heterophylla* (Nutt.) Greene. Infrequent annual of grasslands and grassy openings in woodlands.
- Agoseris retrorsa* (Benth.) Greene. Frequent perennial of clearings in chaparral and woodlands.
- Ambrosia acanthicarpa* Hook. Rare weed, clayey roadside ditch in San Juan Canyon and on sand in Santa Ana River Canyon.
- Ambrosia psilostachya* DC. [var. *californica* Rydb.] Blake in Tidestrom]. Western Ragweed. Common perennial weed of roadsides and disturbed places.
- *Anthemis cotula L. Mayweed. Annual weed collected only in bottomlands in Santa Ana River Canyon, *Howell 425*, July 18, 1927.
- Arnica discoidea* Benth. Rare perennial disjunct collected by *Pequegnat s.n.*, Apr. 13, 1940, from below live oaks at Modjeska Springs (1,370 m), and on the Silverado Canyon Truck Trail in mixed evergreen forest, *P. H. Raven 17,751*, May 18, 1962.
- Artemisia californica* Less. Coastal Sagebrush. Abundant shrub of inland sage scrub and sparse open chaparral at lower elevations.
- Artemisia douglasiana* Bess. in Hook. Mugwort. Rhizomatous perennial abundant in moist soil along streams and in riparian woodlands.
- Artemisia dracunculus* L. Infrequent in dry, usually disturbed places, as chaparral, San Juan Canyon, and sage scrub, Starr Ranch.
- Artemisia tridentata* Nutt. subsp. *tridentata*. Basin Sagebrush. Rare shrub of sandy bottomlands in Santa Ana River Canyon, *Howell 763*, Oct. 22, 1927.
- Aster exilis* Ell. Slender annual on moist bottomland flats in Santa Ana River Canyon, *Howell 750*, Sept. 24, 1927.
- Baccharis emoryi* Gray. Broom. Common shrub along banks of run-off streams and in open places of canyons.
- Baccharis glutinosa* Pers. (incl. *B. viminea* DC.) Mule Fat. Shrub commonly found along dry stream beds and ditchbanks.
- Baccharis pilularis* DC. subsp. *consanguinea* (DC.) C. B. Wolf. Coyote Brush. Rare shrub, found only at the lowest elevations on eastern slopes, as in lower San Juan Canyon (there in a place wet with seepage).
- Bebbia juncea* (Benth.) Greene. Sweet Bush. Frequent half-shrub in inland sage scrub on foothills, as Santiago Creek, Santa Ana River, and Trabuco canyons.
- Bidens laevis* (L.) B.S.P. Bur-marigold. Glabrous perennial of bottomland marshes in Santa Ana River Canyon, *Howell 768*, Oct. 23, 1927.

- *Bidens pilosa L. Beggar-ticks. Rare weedy annual found only at San Juan Hot Springs and in the Santa Ana River Canyon.
- Blennosperma nanum* (Hook.) Blake. Locally abundant annual of moist soil, forming a ring of yellow around desiccating vernal pools.
- Brickellia californica* (T. & G.) Gray. Suffrutescent perennial common on rocky, dry streambanks and in clearings in chaparral.
- Calycadenia tenella* (Nutt.) T. & G. Rosinweed. Common annual in dry soil of vernal pools and in open grasslands.
- **Centaurea melitensis* L. Tocalote. Abundant annual weed of roadsides, pastured grasslands, and open places in grazed woodlands.
- *Centaurea repens L. Russian Knapweed. Weedy perennial collected only in disturbed ground in Santa Ana River Canyon, *E. R. Johnson* 9497, Apr. 25, 1939.
- Chaenactis artemisiaefolia* (Harv. & Gray) Gray. Common annual of disturbed places in grasslands and chaparral.
- Chaenactis glabriuscula* DC. Common annual of chaparral and grasslands.
- Chaetopappa aurea* (Nutt.) Keck. Low slender annual common in grasslands.
- Chrysopsis villosa* (Pursh) Nutt. [var. *echioides* (Benth.) Gray] Golden-aster. Rare perennial of brushy places at low elevations, S Preusker Road, Starr Ranch, *Little* 1028, Aug. 4, 1976 (CSF).
- Chrysothamnus nauseosus* (Pall.) Britt. subsp. *consimilis* (Greene) Hall & Clem. Rabbit-brush. Rare shrub of alkaline soils, Mid Bell Canyon, Starr Ranch, *Little* 1053, Aug. 4, 1976 (CSF).
- **Cichorium intybus* L. Chicory. Rare perennial weed, N Bell Canyon, Starr Ranch, *Little* 1052, July 2, 1976 (CSF).
- Cirsium californicum* Gray. Thistle. Common weedy biennial of disturbed ground in grasslands, chaparral, and woodlands.
- Cirsium occidentale* (Nutt.) Jeps. Tall perennial, infrequent in disturbed chaparral along the Main Divide Truck Trail north of the Ortega Hwy; an abundant thistle toward the coast at lower elevations.
- Cirsium tioganum* (Congd.) Petr. Acaulescent perennial of bare, disturbed ground in grassy clearings in chaparral and woodlands and along dry banks of run-off streams in grasslands.
- **Cirsium undulatum* (Nutt.) Spreng. Perennial adventive in Silverado Canyon according to Boughey (1968).
- **Conyza bonariensis* (L.) Cronq. Common annual weed of disturbed places.
- **Conyza canadensis* (L.) Cronq. Horseweed. Common annual weed of dry banks, roadsides, and disturbed places generally.
- Conyza coulteri* Gray. Rare annual of disturbed areas in chaparral.
- Corethrogyne filaginifolia* H. & A. (including several varieties). Variable

suffrutescent perennial, frequent in open grassy places in chaparral, sage scrub, and woodlands and in disturbed soil of roadcuts.

*Cotula australis (Sieber) Hook. Infrequent weedy annual of hard-packed soil of trails and roadsides.

**Cotula coronopifolia* L. Brass-buttons. Low perennial locally abundant in mud and moist margins of vernal pools, ponds, and river bottomlands.

**Cynara cardunculus* L. Cardoon. Locally abundant, weedy, thistlelike perennial, near San Juan Fire Station and on the Starr Ranch.

Encelia californica Nutt. Bush-sunflower. Frequent shrub in sage scrub, where sometimes abundant, and on dry lower slopes of chaparral.

Encelia farinosa Gray ex Torr. Brittlebush, Incienso. Infrequent shrub of lower elevations in sage scrub and rocky borders of chaparral.

Erigeron divergens T. & G. Annual or biennial collected only from Santa Ana River Canyon, Munz 11,554, Oct. 2, 1946.

Erigeron foliosus Nutt. [incl. var. *foliosus* and var. *stenophyllus* (Nutt.) Gray]. Fleabane Daisy. Common perennial of grassy openings in oak woodlands and chaparral and of dry banks.

Eriophyllum confertiflorum (DC.) Gray. Golden-yarrow. Suffrutescent perennial common on chaparral slopes over a wide range of elevations.

Eriophyllum multicaule (DC.) Gray. Bush-goldenrod. Rare annual in chaparral at lower elevations in Leach Canyon, Pierson 2927.

Evax acaulis (Kell.) Greene. Apparently rare acaulescent annual in open places in chaparral and oak woodlands, probably mostly overlooked.

Filago californica Nutt. Locally abundant small annual in dry, open places, especially burns, in sage scrub and chaparral.

*Filago gallica L. Infrequent annual of disturbed ground.

Gnaphalium beneolens Davids. Everlasting. Frequent perennial of dry slopes and open places in chaparral along trails between Glen Ivy and Santiago Peak.

Gnaphalium bicolor Bioletti. Common biennial or perennial in dry open places bordering chaparral.

Gnaphalium californicum DC. Common biennial of rocky slopes and openings in chaparral and along streams.

Gnaphalium chilense Spreng. Infrequent weedy annual from bottomlands, Santa Ana Canyon, Howell 453, July 21, 1927, and from Starr Ranch (Little, 1977).

**Gnaphalium luteo-album* L. Common weedy annual of roadsides, stream-sides, and disturbed ground in grasslands.

Gnaphalium microcephalum Nutt. Frequent herbaceous perennial of dry slopes and open places.

Gnaphalium palustre Nutt. Common annual in drying beds of vernal pools and on stream margins.

- Gnaphalium purpureum* L. Purple Cudweed. Infrequent annual of disturbed ground in grasslands.
- Grindelia robusta* Nutt. Gum Plant. Infrequent perennial known only from canyons at lower elevations on the Pacific Slope, 305 m in Trabuco Canyon, *Howell* 1093, July 10, 1928; and Starr Ranch, *Little* 2290, May 7, 1977 (CSF). The discoid var. *bracteosa* (J. T. Howell) Keck was described from Santa Ana River Canyon, *Howell* 418 (and 2786), July 16, 1927.
- Gutierrezia bracteata* Abrams. Matchweed. Frequent subshrub of rocky slopes in cleared chaparral, inland sage scrub, and woodlands, especially at lower elevations.
- Haplopappus arborescens* (Gray) Hall subsp. *parishii* (Greene) Blake. Golden Fleece. Infrequent shrub of dry slopes in chaparral, mostly at lower elevations.
- Haplopappus linearifolius* DC. Goldenbush. Infrequent shrub of dry slopes in sage scrub and chamisal.
- Haplopappus palmeri* Gray subsp. *pachylepis* Hall. Infrequent shrub of lower elevation chaparral and sage scrub.
- Haplopappus pinifolius* Gray. Pinebush. Rare robust shrub reported from chaparral in the Santa Ana Mountains by Pequegnat (1951) and Santa Ana River Canyon by Howell (1929).
- Haplopappus squarrosus* H. & A. subsp. *grindelioides* (DC.) Keck. Common shrub of rocky slopes and openings in chaparral and oak woodlands.
- Haplopappus venetus* (H.B.K.) Blake subsp. *vernonioides* (Nutt.) Hall. Frequent shrub of dry rocky open places in chaparral and sage scrub.
- **Hedypnois cretica* (L.) Willd. Rare introduced weed in disturbed soil along a roadside through chaparral in Coal Canyon.
- Helenium puberulum* DC. Sneezeweed. Plant of open, moist places, collected only in bottomlands of Santa Ana River Canyon, *Howell* 402, July 15, 1927.
- Helianthus annuus* L. subsp. *lenticularis* (Dougl.) Ckll. Sunflower. Frequent stout annual of roadsides and other disturbed places.
- Helianthus gracilentus* Gray. Tall perennial common in open places in chaparral and along trails and roads.
- Helianthus petiolaris* Nutt. Rare annual collected by Kolpacoff in San Mateo Canyon, Oct. 13, 1957.
- Hemizonia fasciculata* (DC.) T. & G. Tarweed. Common annual of grasslands and grassy openings in chaparral and woodlands.
- Hemizonia kelloggii* Greene. Infrequent annual of low elevations along margins of cultivated fields near Glen Ivy, *Howell* 1042, July 8, 1928; and San Juan Canyon, *Everett* 7178, June 18, 1935.
- Hemizonia paniculata* Gray subsp. *paniculata*. Common annual of grasslands and grassy openings in chaparral.

- Heterotheca grandiflora* Nutt. Telegraph Weed. Frequent stout annual of roadsides and other disturbed places at low elevations.
- Holocarpha virgata* (Gray) Keck subsp. *elongata* Keck. Tarweed. Locally abundant annual of grasslands and grassy places on rocky slopes.
- **Hypochoeris glabra* L. Cat's-ear. Locally abundant weedy annual of grassy places and disturbed areas.
- *Lactuca serriola L. Prickly Lettuce. Common weedy annual of roadsides and other disturbed places.
- Lagophylla ramosissima* Nutt. Hareleaf. Locally abundant annual of open, often hard, dry ground.
- Lasthenia chrysostoma* (F. & M.) Greene. Goldfield. Common early spring annual of grasslands and other grassy areas at low elevations.
- Lasthenia coronaria* (Nutt.) Ornduff. Rare erect annual of open places at low elevations, found only in Santa Ana River Canyon, *Howell* 850, Feb. 25, 1928, and in burned-over area in chaparral, 12 km N.E. of Murietta, 457 m, *Munz & Johnston* 5349, May 19, 1922.
- Layia platyglossa* (F. & M.) Gray subsp. *campestris* Keck. Tidy-tips. Locally abundant spring annual in open grasslands.
- Lepidospartum squamatum* (Gray) Gray. Scale-broom. Locally abundant shrub in the rocky wash of Trabuco and other canyons and in Coal Canyon at the northeast base of Sierra Peak.
- Madia elegans* D. Don subsp. *elegans*. Tarweed. Apparently rare coarse herb of chaparral, collected only on the trail to Santiago Peak, 1,005 m, *L. Abrams* 1817, June 1901.
- Madia gracilis* (Sm.) Keck. Common annual of dry, open, clayey or rocky places in chaparral and grassy open places.
- Malacothrix clevelandii* Gray. Infrequent annual of openings in chaparral.
- Malacothrix glabrata* Gray. Desert-dandelion. Rare annual, collected once, in chaparral in Tin Mine Canyon.
- Malacothrix saxatilis* (Nutt.) T. & G. [var. *tenuifolia* (Nutt.) Gray.] Frequent suffrutescent perennial from dry, rocky slopes, especially in chaparral. The type of the variety is from dry slopes along the Glen Ivy Trail to Santiago Peak, *Munz* 7101, 305 m, June 14, 1923. This taxon needs further study to determine whether it is better treated as a subspecies or as a species.
- **Matricaria matricarioides* (Less.) Porter. Pineapple Weed. Locally common annual of disturbed, hard-packed ground.
- Micropus californicus* F. & M. Cottonweed. Infrequent annual of dry open places.
- Microseris douglasii* (DC.) Sch.-Bip. subsp. *platycarpa* (Gray) K. Chamb. Infrequent acaulescent annual of grasslands and grassy open places.
- Microseris heterocarpa* (Nutt.) K. Chamb. Common annual of grasslands.

- Microseris linearifolia* (DC.) Sch.-Bip. Common annual of grasslands and grassy openings in chaparral and in shady areas.
- Perezia microcephala* (DC). Gray. Common perennial of chaparral and rocky clearings in woodlands.
- *Picris echioides L. Bristly Ox-tongue. Rare annual weed of roadsides in Tin Mine Canyon, *Harvey* 153, Aug. 4, 1959, and Starr Ranch, *Little* 1145, July 21, 1976 (CSF).
- Pluchea odorata* (L.) Cass. [*P. purpurascens* (SW.) DC.] Marsh-fleabane. Locally abundant perennial at San Juan Hot Springs and in moist bottomlands in Santa Ana River Canyon.
- Pluchea sericea* (Nutt.) Cov. Arrowweed. Willowlike, slender shrub locally abundant in bottomlands of Santa Ana River Canyon, *Howell* 456, July 21, 1927.
- Porophyllum gracile* Benth. Infrequent suffrutescent perennial of dry, rocky slopes in chaparral and sage scrub.
- Psilocarphus brevissimus* Nutt. Woolly-heads. Locally abundant inconspicuous annual of dried beds of vernal pools on the Santa Rosa Plateau.
- Psilocarphus tenellus* Nutt. Abundant annual of dried vernal pools on the Santa Rosa Plateau; also found in mud of a stream bank in Silverado Canyon.
- **Pulicaria hispanica* Boiss. Rare adventive herb along stream of Davenport Ranch on the north-facing slope of Santa Ana Canyon, *Hardinge & Crooks* 311, Sept. 6, 1961.
- Rafinesquia californica* Nutt. California-chicory. Common annual of clearings in chaparral and riparian woodlands.
- Senecio californicus* DC. Ragwort. Apparently rare slender annual of open dry places in sage scrub and chaparral on canyon slopes, as in Santiago Canyon, *H. D. Geis* 537, spring 1902, and Santa Ana River Canyon, *Everett* 6294, Mar. 15, 1935.
- Senecio douglasii* DC. subsp. *douglasii*. Groundsel, Ragwort. Common perennial of open grassy places in chaparral and sage scrub, and occasionally in bottomlands.
- *Senecio vulgaris L. Groundsel. Frequent weed of dry places.
- *Silybum marianum (L.) Gaertn. Milk-thistle. Infrequent stout biennial weed in pastures and disturbed places of Tin Mine, Coal, and Santa Ana River canyons.
- Solidago californica* Nutt. Goldenrod. Frequent perennial of grassy clearings of woodlands and chaparral slopes.
- Solidago occidentalis* (Nutt.) T. & G. Locally abundant perennial in lower San Juan Canyon, especially at San Juan Hot Springs, and in Santa Ana River Canyon.
- *Sonchus asper (L.) Hill. Sow-thistle. Common weedy annual of disturbed places and grassy openings.

- **Sonchus oleraceus* L. Common weedy annual of disturbed, grassy or shady places.
- Stephanomeria cichoriacea* Gray. Rare suffrutescent perennial of open places and exposed banks in chaparral on Santiago and Modjeska peaks.
- Stephanomeria exigua* Nutt. Branched annual locally abundant on road cuts through chaparral in Trabuco Canyon.
- Stephanomeria virgata* Benth. Common late summer annual of rocky slopes in chaparral and other dry, open places.
- Stylocline gnaphalioides* Nutt. Infrequent small woolly annual of open dry slopes and openings in chaparral.
- **Taraxacum officinale* Weber in Wiggers. Common Dandelion. Occasional in grassy waste places.
- Tetradymia comosa* Gray. Frequent shrub in chaparral.
- Venegasia carpesioides* DC. Locally abundant perennial in riparian live-oak woodlands of Cottonwood and San Juan canyons.
- Wyethia ovata* T. & G. Rare, coarse perennial collected once, near El Cariso in southern oak woodland, 1,006 m. *Raven 17,761*, May 18, 1962.
- **Xanthium spinosum* L. Cocklebur. Infrequent weedy annual of disturbed areas, Black Star Canyon, 305 m, *Olmsted 834*, Aug. 25, 1959.
- Xanthium strumarium* L. Abundant annual weed of waste places and stream valleys.

Berberidaceae

- Mahonia dictyota* (Jeps.) Fedde. Rare shrub found once in chaparral along the Bedford Truck Trail, 0.8 km below the junction with the Main Divide Truck Trail.
- Mahonia pinnata* (Lag.) Fedde subsp. *pinnata*. Rare shrub in dense chaparral 4.2 km east of the San Juan Fire Station adjacent to a gully on the south side of the Ortega Hwy, where originally collected by G. & K. Marsh, Apr., 1977.

Betulaceae

- Alnus rhombifolia* Nutt. White Alder. Common tree along streams in riparian woodlands (Fig. 18).

*Bignoniaceae

- **Chilopsis linearis* (Cav.) Sweet. Established on roadbank of Ortega Hwy east of El Cariso.

Boraginaceae

- Amsinckia intermedia* F. & M. Common Fiddleneck. Infrequent annual of grasslands.

Amsinckia menziesii (Lehm.) Nels. & Macbr. Frequent annual of dry grassy places.

Cryptantha clevelandii Greene. Infrequent annual of openings in chaparral and sage scrub at low elevations, especially in Santa Ana River Canyon, Howell 897, Apr. 7, 1928, and Starr Ranch, Little 1225. June 18, 1976 (CSF).

Cryptantha intermedia (Gray) Greene. Common annual of grassy places and clearings in chaparral.

Cryptantha microstachys (Greene ex Gray) Greene. Infrequent annual of grasslands and chaparral.

Cryptantha muricata (H. & A.) Nels. & Macbr. Common annual of gravelly or rocky open places in chaparral.

Heliotropium curassavicum L. subsp. *oculatum* (Heller) Thorne. Wild Heliotrope. Common perennial of moist ground, gullies, and roadsides.

Pectocarya linearis DC. subsp. *ferocula* (Jtn.) Thorne. Infrequent small annual of open, often hard-packed ground in chaparral and grasslands.

Pectocarya penicillata (H. & A.) A. DC. Infrequent small annual of open places, as bottomlands in Santa Ana River Canyon, Howell 861, Feb. 26, 1928; Santiago Canyon, H. D. Geis s.n., Mar. 27, 1902; and Starr Ranch, Little 2150, Apr. 14, 1977 (CSF).

Plagiobothrys acanthocarpus (Piper) Jtn. Infrequent annual of grasslands.

Plagiobothrys arizonicus (Gray) Greene ex Gray. Infrequent annual of grasslands.

Plagiobothrys californicus (Gray) Greene subsp. *californicus*. Rare sprawling annual of grassy places at low elevations, Starr Ranch, Little 1234, Apr. 6, 1976 (CSF); and Santa Ana River Canyon, Wolf 2710, Mar. 14, 1932.

Plagiobothrys nothofolvus (Gray) Gray. Popcorn Flower. Locally abundant spring annual in grasslands and grassy openings in woods and chaparral.

Plagiobothrys undulatus (Piper) Jtn. Locally abundant annual of moist soil and shallow standing water of vernal pools of the Santa Rosa Plateau.

Brassicaceae

*Arabis glabra (L.) Bernh. Tower-mustard. Rare perennial of shaded slopes in Silverado Canyon, Munz & Harwood 3721, Apr. 25, 1921.

Athysanus pusillus (Hook.) Greene. Annual commonly found in grassy openings in oak woodlands and other wooded areas.

Barbarea orthoceras Ledeb. Winter Cress. Frequent weedy biennial or perennial of springy places in canyons and other wet places.

**Brassica geniculata* (Desf.) J. Ball. Mustard. Abundant weedy biennial of disturbed ground.

*Brassica juncea (L.) Coss. Rare weedy annual at lower elevations, as Starr Ranch, Little 1291, Apr. 3, 1976 (CSF).

- *Brassica kaber (DC.) Wheeler [var. *pinnatifida* (Stokes) Wheeler] Charlock. Frequent weedy annual of roadsides, burns, and waste places.
- *Brassica nigra (L.) Koch. Black Mustard. Frequent annual weed of roadsides in chaparral and other disturbed soil.
- *Brassica rapa L. subsp. *sylvestris* (L.) Janchen. Field Mustard. Common annual weed of roadsides and other disturbed places.
- **Capsella bursa-pastoris* (L.) Medic. Shepherd's-purse. Common weedy annual of disturbed areas.
- Cardamine californica* (Nutt.) Greene. Milk Maids. Common perennial in shady places of riparian and other woodlands.
- *Cardaria draba (L.) Desv. Hoary Cress. Weedy perennial collected only in Santa Ana River Canyon, *E. R. Johnson* 9496, Apr. 25, 1939.
- Descurainia pinnata* (Walt.) Britt. subsp. *menziesii* (DC.) Detl. Tansymustard. Rare annual in foothills of the range, as in bottomlands of Santa Ana River Canyon, *Howell* 827, Feb. 7, 1928.
- **Diplotaxis muralis* (L.) DC. Sand-rocket. Rare weedy annual of disturbed adobe soil, Santa Ana River Canyon, *Wolf* 7,942, June 14, 1936.
- **Diplotaxis tenuifolia* (L.) DC. Wall-rocket. Reported for disturbed areas on the Pacific slope by *Pequegnat* (1951).
- Draba cuneifolia* Nutt. ex T. & G. (var. *integrifolia* Wats.) Rare annual of open hillsides, Santa Ana River Canyon, *Wolf* 2661, Feb. 17, 1932.
- Erysimum capitatum* (Dougl.) Greene. Wallflower. Infrequent biennial of dry, rocky places in chaparral, as on Santiago Peak and in Hagador Canyon.
- Lepidium lasiocarpum* Nutt. Pepperpod. Infrequent annual of sage scrub, *Robinson & Crocker, s.n.*, Apr. 3, 1961, on Ortega Hwy near Elsinore, and *Howell* 859, Feb. 26, 1929 in Santa Ana River Canyon.
- Lepidium nitidum* Nutt. Smooth Peppergrass. Infrequent annual of grasslands, margins of vernal pools, and other open places.
- Lepidium virginicum* L. [var. *pubescens* (Greene) Thell.] Peppergrass. Infrequent annual of dry places, as the chaparral ridge on the Santiago Peak trail from Glen Ivy and the rocky floor of Trabuco Canyon. The var. *robinsonii* (Thell.) C. L. Hitchc. is known only from the Santa Ana River Canyon, *M. E. Jones s.n.*, Mar. 10, 1926.
- **Nasturtium officinale* R. Br. Water Cress. Locally abundant perennial in shallow water of streams.
- **Raphanus raphanistrum* L. Jointed Charlock. Rare annual or biennial weed of disturbed ground, Starr Ranch, *Little* 1297, July 1, 1976 (CSF).
- *Raphanus sativus L. Wild Radish. Common weed of old fields and roadsides.
- **Sisymbrium altissimum* L. Tumble Mustard. Common annual weed of fields and roadsides.

*Sisymbrium irio L. London-rocket. Infrequent annual weed in disturbed soil of woodlands and chaparral.

**Sisymbrium officinale* (L.) Scop. Hedge-mustard. Infrequent weedy annual of disturbed areas and roadsides.

Streptanthus heterophyllus Nutt. Infrequent annual of grassy clearings in chaparral and mixed evergreen forest along the Main Divide Truck Trail; range west of Lake Elsinore; on Starr Ranch; and in Santa Ana River Canyon.

Thysanocarpus curvipes Hook. Lace-pod. The var. *curvipes* is an infrequent annual on borders of chaparral and southern mixed evergreen forest. The var. *elegans* (F. & M.) Rob. in Gray is frequent in disturbed areas of grasslands and along borders of chaparral.

Thysanocarpus laciniatus Nutt. ex T. & G. [var. *crenatus* (Nutt.) Brew.] Infrequent annual, collected by Craig 205, Apr. 23, 1927, in chaparral above Glen Ivy; in Santa Ana River Canyon, Jones s.n.; and on Starr Ranch, Little 1304, Apr. 3, 1976 (CSF).

Tropidocarpum gracile Hook. Common annual of dry grassy slopes and other open areas.

Cactaceae

Opuntia basilaris Engelm. & Bigel. (var. *basilaris*). Beavertail Cactus. Reported by Pequegnat (1951) for dry washes at low elevations on the interior slopes of the range. Also indicated from the range by Benson (1969).

Opuntia littoralis (Engelm.) Ckll. (var. *littoralis*). Prickly-pear. Frequent in sage scrub at low elevations on both the interior and coastal slopes.

Opuntia oricola Philbr. Coastal prickly-pear, rarely reaching the interior, as in Santa Ana River Canyon (Benson, 1969).

Opuntia parryi Engelm. subsp. *parryi*. Valley Cholla. Dry open places in chaparral on interior slopes of the range and in Santa Ana River Canyon.

Opuntia phaeacantha Engelm. [var. *discata* (Griffiths) Bens. and Walk.] Prickly-pear. Infrequent prostrate or sprawling cactus locally abundant on dry grassland slopes and openings in chaparral.

Callitrichaceae

Callitriche heterophylla Pursh subsp. *bolanderi* (Hegelm.) Calder & Taylor. Water-starwort. Slender aquatic plant of shallow clear water of small streams and one vernal pool on the Santa Rosa Plateau.

Callitriche longipedunculata Morong. Common annual in shallow standing water of vernal pools, Santa Rosa Plateau. Perhaps not specifically distinct from the next listed starwort.

Callitriche marginata Torr. Locally abundant annual in shallow water and muddy margins of vernal pools, Santa Rosa Plateau.

Campanulaceae

Downingia bella Hoover. A showy annual abundant in shallow standing water and moist margins of vernal pools on the Santa Rosa Plateau. Not previously reported from southern California.

Downingia cuspidata (Greene) Greene. A showy annual occurring mixed with the preceding species or in isolated stands within the same pools.

Githopsis diffusa Gray. Inconspicuous annual of grassy openings in southern oak woodlands and chaparral. Reported for the Santiago Peak trail above Glen Ivy by Nancy Morin (pers. comm.). Specimen on file at the University of California. Berkeley.

Heterocodon rariflorum Nutt. Rare annual reported for moist grassy situations by Pequegnat (1951).

Lobelia cardinalis L. subsp. *graminea* (Lam.) McVaugh. Cardinal Flower. Rare perennial of springy places, hillside 3.2 km south of Murietta, Munz & Johnston 11,303, Sept. 12, 1928.

Lobelia dunni Greene [var. *serrata* (Gray) McVaugh]. Infrequent perennial of moist shaded places as in Santiago Canyon, Sweet, s.n., Aug. 1928; Holy Jim Canyon (G. and K. Marsh); and near Glen Ivy, Howell 1030, July 7, 1928.

Caprifoliaceae

Lonicera subspicata H. & A. (var. *johnstonii* Keck) Honeysuckle. Climbing shrub in chaparral, along streams, and in shaded areas of woodlands; locally abundant.

Sambucus caerulea Raf. Blue Elderberry. Rare shrub in open places on Santiago Peak.

Sambucus mexicana Presl. Common large shrub or small tree along streams and in moist woodland borders.

Symphoricarpos mollis Nutt. in T. & G. Snowberry. Common understory shrub in riparian woodlands and in shaded areas of chaparral and mixed evergreen woodland.

Symphoricarpos parishii Rydb. Rare shrub in *Quercus chrysolepis* woodlands on Santiago Peak.

Caryophyllaceae

Arenaria douglasii Fenzl. ex T. & G. Sandwort. Rare delicate annual of dry soil in sage scrub and chaparral, Glen Ivy Trail to 1,463 m, Santiago Peak, Munz & Keck 7086, June 14, 1923; and Santa Ana River Canyon, Munz et al. 2615, May 3, 1919.

**Cerastium glomeratum* Thuill. [var. *apetalum* (Dumort) Rouy & Foved]. Chickweed. Common annual weed of grassy places.

**Herniaria cinerea* DC. Rare mat-forming annual of waste places, Starr Ranch, Little 1327, June 7, 1976 (CSF).

Loeflingia squarrosa Nutt. in T. & G. Rare annual of sandy open places in bottomlands of Santa Ana River Canyon, *Howell* 893, Mar. 18, 1928.

**Polycarpon tetraphyllum* (L.) L. Rare prostrate annual weed, Starr Ranch, *Little* 1326, June 7, 1976 (CSF).

Sagina occidentalis Wats. Pearlwort. Rare delicate annual found only on a grassy bank of a small stream in Tenaja Canyon.

Silene antirrhina L. Catchfly. Infrequent slender annual of open places, especially burns in sage scrub and chaparral, collected from Trabuco Canyon, *L. Abrams* 3272, Apr. 18, 1903; north of Murrieta at 505 m, *Munz & Johnston* 5357, May 19, 1922; and in Santa Ana River Canyon, *Howell* 851, Feb. 25, 1928.

*Silene gallica L. Campion. Common weedy annual of disturbed ground at lower elevations.

Silene laciniata Cav. subsp. *major* Hitchc. & Maguire. Common perennial of grassy shaded areas in chaparral and oak and mixed-evergreen woodlands.

Silene lemmonii Wats. Infrequent perennial of open woods and mixed chaparral on the Main Divide Truck Trail between El Cariso and Santiago Peak.

Silene verecunda Wats. subsp. *platyota* (Wats.) Hitchc. & Maguire. Infrequent perennial of mixed chaparral at higher elevations, *Munz & Keck* 7074, June 14, 1923, and summit of Santiago Peak, *P. C. Everett* 7219, June 18, 1935.

**Spergularia bocconii* (Scheele) Foucaud. Sand Spurrey. Rare annual weed found only along the edge of the Tenaja Road near Santa Rosa Ranch.

Spergularia marina (L.) Griseb. Rare weedy perennial of damp, alkaline soils, at lower elevations, as in Santa Ana River Canyon, *Howell* 161, June 17, 1927.

**Spergularia villosa* (Pers.) Comb. Rare perennial weed collected only on Starr Ranch, *Little* 1325, May 22, 1976 (CSF).

Stellaria longipes Goldie. Reported from Bear Springs by Pequegnat (1951).

*Stellaria media (L.) Cyrill. Chickweed. Common annual weed of shaded places.

Stellaria nitens Nutt. Rare annual on moist shaded slope of Leach Canyon, 609 m, *Munz* 5039, Apr. 28, 1922.

Ceratophyllaceae

Ceratophyllum demersum L. Rare submersed aquatic in shallow water of river bottom ponds in Santa Ana River Canyon, *Howell* 625, Aug. 13, 1927.

Chenopodiaceae

Atriplex canescens (Pursh) Nutt. subsp. *canescens*. Saltbush. Rare shrub in Santa Ana River Canyon, *Howell* 761, Oct. 22, 1927.

- Atriplex lentiformis* (Torr.) Wats. subsp. *breweri* (Wats.) H. & Cl. One shrub found at San Juan Hot Springs in San Juan Canyon.
- **Atriplex semibaccata* R. Br. Australian Saltbush. Abundantly established on dry ground about the San Juan Hot Springs; also in Santa Ana River Canyon.
- Atriplex serenana* A. Nels. [var. *davidsonii* (Standl.) Munz]. Rare decumbent annual in sage scrub on Starr Ranch (Little, 1977), and in Santa Ana River Canyon, *B. D. Stark* 4465, Dec. 30, 1932.
- **Chenopodium album* L. Rare annual weed of waste places, as in Santa Ana River Canyon, *L. M. Booth* 827, no date and Starr Ranch, *Little* 2271, May 7, 1977 (CSF).
- **Chenopodium ambrosioides* L. Mexican-tea. Common annual weed of roadsides and streamsides.
- Chenopodium berlandieri* Moq. [var. *sinuatum* (J. Murr.) H. A. Wahl]. Common erect annual in dry grassy places and disturbed ground.
- Chenopodium californicum* (Wats.) Wats. Soap Plant. Common perennial of shaded slopes and openings in woodlands.
- **Chenopodium murale* L. Frequent annual weed of disturbed ground, as in Silverado and Santa Ana River canyons and on the Starr Ranch.
- **Cycloloma atriplicifolia* (Spreng.) Coult. Winged-pigweed. Diffusely branched annual in disturbed areas in river bottoms, in Santa Ana River Canyon, *Howell* 968, May 13, 1928.
- *Salsola iberica Sennen & Pau. Russian-thistle. Common annual tumbleweed along roadsides and in waste places.

Cistaceae

- Helianthemum scoparium* Nutt. Rock-rose. Suffrutescent perennial common throughout in dry rocky places, chiefly in chaparral. The prevalent variety seems to be var. *aldersonii* (Greene) Munz. The var. *scoparium* is infrequent in chaparral at higher elevations.

Convolvulaceae

- Calystegia macrostegia* (Greene) Brummitt. Morning glory. The subsp. *arida* (Greene) Brummitt is the common twining perennial of dry slopes and open places in chaparral. The subsp. *cyclostegia* (House) Brummitt from Trabuco Canyon and Starr Ranch, and the subsp. *longiloba* (Abrams) Brummitt of Hagador Canyon; both seem to be much less frequent in the range.
- Cuscuta californica* H. & A. Dodder. Common twining parasite in chaparral on various herbs and shrubs but especially on *Eriogonum fasciculatum* Benth. and species of *Salvia*.

Cuscuta ceanothi Behr. Abundant twining parasite on *Malosma laurina*, *Prunus ilicifolia*, *Ceanothus* and *Quercus* species, and other shrubs in chaparral and on *Toxicodendron* and species of *Salix* and *Baccharis* in canyon bottoms.

Crassulaceae

Crassula aquatica (L.) Schoenl. Stonecrop. Locally abundant annual of shallow water or moist soil of vernal pools on the Santa Rosa Plateau.

Crassula erecta (H. & A.) Berger. Common annual, sometimes in dense mats, on open dry ground.

Dudleya blochmanae (Eastw.) Moran subsp. *blochmanae*. Rare cormous perennial of dry, rocky slopes, apparently found only in Silverado Canyon by C. M. Fox (painting, without number or date).

Dudleya lanceolata (Nutt.) B. & R. Live-forever. Rosette perennial common on dry banks and rocky slopes, mostly in chaparral.

Dudleya multicaulis (Rose) Moran. Rare succulent of dry, rocky or sandy places below 610 m, Starr Ranch (Little, 1977); and Santa Ana River Canyon, Howell 10, June 1, 1927, and F. W. Peirson 3071, May 18, 1922.

Dudleya pulverulenta (Nutt.) B. & R. Chalk-lettuce. Frequent on steep rocky canyon walls and among granitic outcroppings of mesa slopes.

Dudleya viscida (Wats.) Moran. Locally abundant perennial on rocky banks in chaparral, above and below San Juan Fire Station along Ortega Hwy.

Cucurbitaceae

Cucurbita foetidissima H. B. K. Calabazilla. Coarse rough perennial common in sandy or gravelly disturbed places.

Marah macrocarpa (Greene) Greene. Wild-cucumber, Big Root. Common climbing perennial, especially on low shrubs of chaparral and open woodlands.

Datisceae

Datisca glomerata (Presl) Baill. Durango Root. Common tall perennial along and in stream beds in riparian and oak woodlands especially in the southern half of the range.

Elatinaceae

Elatine brachysperma Gray. Waterwort. Rare aquatic annual in muddy margins of a pool in oak woodland on the Santa Rosa Plateau.

Elatine californica Gray. Locally abundant in shallow standing water and bottom mud of vernal pools, Santa Rosa Plateau.

Elatine chilensis Gay. Common submersed aquatic annual of vernal pools, Santa Rosa Plateau.

Ericaceae

Arbutus menziesii Pursh. Madroño. Rare evergreen tree, known only as scattered individuals and small stands at 915 m on the north face of Trabuco Canyon in dense southern mixed-evergreen forest.

Arctostaphylos glandulosa Eastw. ssp. *glandulosa*. Eastwood Manzanita. An abundant evergreen shrub of mixed chaparral and mixed-evergreen forest throughout the mountain range.

Arctostaphylos glauca Lindl. Bigberry Manzanita. Infrequent shrub of chamise chaparral at lower elevations ranging from 450 to 1,200 m.

Comarostaphylis diversifolia (Parry) Greene subsp. *diversifolia*. Summer-holly. Found only in San Juan Canyon east of San Juan Fire Station, where locally abundant and a conspicuous, large shrub in the chaparral.

Xylococcus bicolor Nutt. Locally abundant shrub of mixed and chamise chaparral at elevations of approximately 600 m, apparently restricted to the southern end of the range.

Euphorbiaceae

Croton californicus Muell.-Arg. Perennial of sandy soil at lower elevations, as in Silverado Canyon, C. M. Fox (painting); Starr Ranch, *Little 1381*, July 27, 1976 (CSF); and in sandy bottomlands in Santa Ana River Canyon, *Howell 47*, June 6, 1927.

Eremocarpus setigerus (Hook.) Benth. Turkey-mullein, Dove Weed. Locally abundant, low spreading annual of roadsides and other open, disturbed ground.

Euphorbia albomarginata T. & G. Rattlesnake Weed. Common prostrate perennial on open ground in grasslands and chaparral.

Euphorbia crenulata Engelm. Spurge. Infrequent annual of grassy mesa tops and shaded areas of canyon woods.

Euphorbia palmeri Engelm. Rare sub-shrub on chaparral slope in Trabuco Canyon.

*Euphorbia peplus L. Petty Spurge. Infrequent annual at borders of chaparral and in riparian woodlands.

Euphorbia polycarpa Benth. (var. *polycarpa*). Frequent prostrate perennial of grasslands and rocky canyon slopes.

Euphorbia serpyllifolia Pers. Ground Spurge. Common weedy annual of dry banks, roadsides, and other open, disturbed places.

Euphorbia spathulata Lam. Infrequent erect annual of open places in chaparral and oak woodlands.

Euphorbia supina Raf. Infrequent prostrate annual weed of waste places, as long San Juan Creek, in Santa Ana River Canyon, and on Starr Ranch.

*Ricinus communis L. Castor Bean. Locally abundant shrub, established

along Ortega Hwy, along the road entering Tin Mine Canyon, and in other disturbed places at low elevations.

Stillingia linearifolia Wats. Rare perennial of sandy bottomlands in Santa Ana River Canyon, *Howell* 271, July 5, 1927.

Tetracoccus dioicus Parry. Rare shrub collected in chaparral near San Juan Camp along the Ortega Hwy, *F. Wylie s.n.*, March, 1948.

Fabaceae

*Acacia decurrens Willd. Green Wattle. Well established in colonies along roadbanks and in gullies along Ortega Hwy east of El Cariso.

Amorpha californica Nutt. False-indigo. Common deciduous shrub of wooded or brushy slopes, especially along borders of chaparral.

Amorpha fruticosa L. [incl. var. *occidentalis* (Abrams) Kern. & Peeb.] Large shrub reported as infrequent along dry stream banks below 460 m by Pequegnat (1951) and collected in moist bottomlands in Santa Ana River Canyon, *Howell* 49, June 6, 1927, where locally abundant.

Astragalus brauntonii Parish. Locoweed. Rare perennial of chaparral burns. Collected only from the slopes of Sierra Peak, *Stark* 4997, June, 1933; *Wolf* 8000, June 22, 1936.

Astragalus didymocarpus H. & A. subsp. *didymocarpus*. Infrequent small annual of open, grassy places in sage scrub and chaparral, as in Black Star, Santiago Creek, and Santa Ana River canyons.

Astragalus gambelianus Sheld. Rare annual of grassy places, Starr Ranch, *Little* 1437, May 2, 1976 (CSF).

Astragalus pomonensis Jones. Perennial common in grasslands and grassy openings in woodlands, especially on the Santa Rosa Plateau.

Astragalus trichopodus (Nutt.) Gray subsp. *antiselli* (Gray) Thorne. Rare perennial of a grassy clearing in oak woodland at the base of Coal Canyon on the north slope of Sierra Peak. The subsp. *leucopsis* (T. & G.) Thorne, Bladderpod, is an infrequent bushy perennial at the base of rocky cliffs in Trabuco Canyon, from 305 to 505 m, and in sage scrub and chaparral in the Santa Ana River Canyon.

Glycyrrhiza lepidota Pursh [var. *glutinosa* (Nutt.) Wats. in Brewer & Wats.]. Wild Licorice. Rare perennial of moist bottomlands in Santa Ana River Canyon, *E. R. Johnson* 5169, July 6, 1933.

Lathyrus laetiflorus Greene subsp. *alefeldii* (White) Brads. Everlasting Pea. Common climbing perennial over shrubs in chaparral and along wooded stream margins. The typical subsp. *laetiflorus*, with pale-colored flowers, was collected in Trabuco Canyon, and the subsp. *barbarae* (White) C. L. Hitchc. in sage scrub on Starr Ranch, *Little* 1421, May 20, 1976 (CSF).

Lotus crassifolius (Benth.) Greene. Bird's Foot Trefoil. Locally abundant

perennial in open dry places beneath chaparral and along edges of oak woodland, as in Trabuco Canyon.

Lotus hamatus Greene. Common prostrate annual of grasslands and chaparral.

Lotus heermannii (Dur. & Hilg.) Greene. Frequent prostrate perennial of moist places in woodlands and on dry rocky canyon walls.

Lotus micranthus Benth. Apparently rare annual, collected only along the trail to Santiago Peak, Orange Co., *L. R. Abrams* 1825, June, 1901.

Lotus purshianus (Benth.) Clem. & Clem. Spanish-clover. Common annual in grassy clearings in chaparral and woodlands.

Lotus salsuginosus Greene subsp. *salsuginosus*. Rare prostrate annual collected only in grassy clearings in chaparral of Black Star and Santa Ana River canyons.

Lotus scoparius (Nutt. in T. & G.) Ottley subsp. *scoparius*. Deerweed. Common suffruticose perennial of dry slopes, chaparral, and woodland. The subsp. *brevialatus* (Ottley) Munz is a slender-stemmed perennial collected in chaparral on the Santa Rosa Plateau, *Wolf* 7962, June 7, 1938.

Lotus strigosus (Nutt. in T. & G.) Greene. Common annual of dry banks and other disturbed places.

Lotus subpinnatus Lag. Infrequent annual of open ground in chaparral.

Lupinus agardhianus Heller. Lupine. Frequent annual in grasslands.

Lupinus albifrons Benth. ex Lindl. subsp. *eminens* (Greene) D. Dunn ex Thorne. Silverbush Lupine. Rare subshrub in chaparral clearings and firebreaks of Trabuco Canyon.

Lupinus bicolor Lindl. subsp. *marginatus* D. Dunn. Common annual of grasslands following spring moisture. The subsp. *microphyllus* (Wats.) D. Dunn is known only from Sierra Canyon, *Munz & Harwood* 3768, Apr. 24, 1920 and Hagador Canyon, *Weatherby* 3026. Also rare is the subsp. *umbellatus* (Greene) D. Dunn in a clearing in southern mixed evergreen forests and grasslands.

Lupinus concinnus Agardh ssp. *concinnus*. Infrequent annual of grasslands and open rocky places in chaparral.

Lupinus densiflorus Benth. subsp. *austrocollum* (C. P. Sm.) D. Dunn ex Thorne. Common annual in grassy openings in woodlands and chaparral.

Lupinus excubitus Jones subsp. *hallii* (Abrams) D. Dunn ex Thorne. Common suffrutescent perennial of grasslands and grassy openings in woodlands and chaparral.

Lupinus hirsutissimus Benth. Infrequent robust annual of open, rocky areas of chaparral and edges of woodlands.

Lupinus latifolius Agardh subsp. *parishii* (C. P. Sm.) Kenney & Dunn. Frequent herbaceous perennial of moist shaded soil in mixed-evergreen forests along the Main Divide Truck Trail, especially at Bear Springs, and in riparian woodland in San Juan Canyon.

- Lupinus longifolius* (Wats.) Abrams. Frequent perennial of shaded canyons along the Main Divide Truck Trail and openings in chaparral and sage scrub, as on Starr Ranch (Little, 1977) and in Trabuco and Santa Ana River canyons.
- Lupinus sparsiflorus* Benth. ssp. *sparsiflorus*. Frequent annual of openings in chaparral, oak woodlands, and mixed-evergreen forests.
- Lupinus succulentus* Dougl. ex Koch. Frequent succulent annual of grassy places at low elevations, as Black Star, Silverado, and Santa Ana River canyons and on mesas 13 km northwest of Murrieta.
- Lupinus truncatus* Nutt. ex H. & A. Common annual of grasslands and open rocky places in oak woodlands and chaparral.
- **Medicago polymorpha* L. Bur-clover. Common weak-stemmed annual of grassy places.
- *Medicago sativa L. Alfalfa. Commonly cultivated and occasionally established along roadsides.
- *Melilotus albus Desr. White Sweet-clover. Infrequent erect annual weed along streams.
- **Melilotus indicus* (L.) All. Indian Sweet-clover. Common weed of grassy places, especially in disturbed ground.
- Pickeringia montana* Nutt. subsp. *tomentosa* (Abrams) Abrams. Chaparral-pea. Rare shrub in chaparral, collected only from the north end of the range on a ridge above Coal Canyon, *B. D. Stark* 4484, January 4, 1933.
- Psoralea macrostachya* DC. Leather Root. Frequent perennial, to 3 m, in moist areas of canyons and shallow ravines in riparian and oak woodlands, as in San Juan and Santa Ana River canyons.
- Psoralea orbicularis* Lindl. Infrequent prostrate perennial of wet places.
- Psoralea physodes* Dougl. ex Hook. California-tea. Erect perennial infrequent in open places in chaparral in Silverado Canyon and in southern mixed evergreen forest in Trabuco and San Juan canyons.
- **Robinia pseudo-acacia* L. Black Locust. Occasionally naturalized shrub or small tree along roadsides in lower canyons and along the Ortega Hwy.
- *Spartium junceum L. Spanish Broom. Frequent naturalized shrub along roadsides, especially along the Ortega Hwy.
- Trifolium albopurpureum* T. & G. Clover. Frequent annual of grasslands and grassy openings in chaparral and woodlands.
- Trifolium amplexens* T. & G. [var. *truncatum* (Greene) Jeps.] Sack Clover. Frequent annual in moist grassy places, as about vernal pool borders, on the Santa Rosa Plateau.
- Trifolium ciliolatum* Benth. Frequent annual of open grassy slopes.
- Trifolium fucatum* Lindl. [var. *gambellii* (Nutt.) Jeps.] Rare annual of open, moist places, Santa Ana River Canyon, *Howell* 873, Mar. 17, 1928.
- Trifolium gracilentum* T. & G. Frequent slender-stemmed annual of open grassy areas.

- Trifolium microcephalum* Pursh. Common annual of open, moist, grassy places.
- Trifolium obtusiflorum* Hook. Rare annual of riparian woodlands and protected areas in chaparral, road to Santiago Peak, 1.6 km from Ortega Hwy, Everett 7183, June 18, 1935; and Starr Ranch, Little 1401, June 25, 1976 (CSF).
- Trifolium tridentatum* Lindl. [var. *aciculare* (Nutt.) McDermott] Common annual of grassy open areas.
- Trifolium variegatum* Nutt. in T. & G. Frequent annual of moist grassy places.
- Trifolium wormskioldii* Lehm. Frequent creeping perennial of damp places in canyons and moist grassy places.
- Vicia americana* Muhl. ex Willd. Vetch. Infrequent trailing perennial of grassy places in woodlands and on dry, open banks.
- *Vicia dasycarpa Tenore. Rare Eurasian introduction collected in Trabuco Canyon, Pat McClellan HSO471, May 9, 1965 (UCI).
- Vicia exigua* Nutt. in T. & G. Infrequent annual on rocky slopes in chaparral, sage scrub, and woodlands.

Fagaceae

- Quercus agrifolia* Neé [incl. var. *oxyadenia* (Torr.) J. T. Howell] Coastal Live Oak. The dominant tree of southern oak woodlands in valleys and on less arid slopes (Figs. 12, 17).
- Quercus chrysolepis* Liebm. Canyon Live Oak. The common oak on canyon walls and slopes above 1,200 m and an important component of southern mixed evergreen forest (Fig. 15).
- Quercus dumosa* Nutt. Scrub Oak. A conspicuous and often dominant element in chaparral on dry rocky slopes, less conspicuous in woodlands (Fig. 5).
- Quercus dumosa* Nutt. $\times$ *Q. engelmannii* Greene. Infrequent hybrid with an irregular distribution between Sierra Peak and Tenaja Road on the Santa Rosa Plateau; most often in the transition zone between chaparral and southern oak woodland.
- Quercus engelmannii* Greene. Engelmann Oak. Dominant tree of drier upland sandy slopes in southern oak woodlands (Figs. 12, 14).
- Quercus wislizenii* A. DC. (var. *frutescens* Engelm.) Interior Live Oak. Rare in southern oak woodlands on the Santa Rosa Plateau but a common large shrub of mixed chaparral above 900 m and in southern mixed-evergreen forests (Figs. 16, 19).
- Quercus wislizenii* A. DC. $\times$ *Q. kelloggii* Newb. (*Q. \times morehus* Kell.) Or-acle Oak. Reported from above Horsethief Springs (vicinity of Trabuco Peak) at 1,220 m by Pequegnat (1951); however, no specimens of *Q. kelloggii* have been reported from the range.

Garryaceae

Garrya flavescens Wats. subsp. *pallida* (Eastw.) Dahling. (*G. fremontii* of S. Calif. authors). Silk-tassel Bush. Common shrub of chaparral with a relatively wide distribution throughout the mountain range.

Garrya veatchii Kell. A rare shrub which was found only on the Santa Rosa Plateau in San Mateo Canyon and near the Tenaja Road in the chaparral community.

Gentianaceae

Centaurium venustum (Gray) Rob. Canchalagua. Frequent annual of grassy places and openings in chaparral and woodlands or in sand along streams.

Eustoma exaltatum (L.) Griseb. Catchfly-gentian. Rare glaucous annual of bottomlands in Santa Ana River. *P. C. Everett* 8275, Sept. 29, 1936.

Frasera parryi Torr. Green-gentian. Infrequent perennial of open dry places in southern oak woodlands, especially on the Santa Rosa Plateau.

Geraniaceae

**Erodium cicutarium* (L.) L'Her. Filaree. Abundant weedy annual of grasslands, open cultivated ground, and other dry, grassy places.

**Erodium moschatum* (L.) L'Her. Common annual of grasslands and disturbed areas in chaparral and inland sage scrub.

**Erodium obtusifolium* (Maire, Weiller, & Wilcz) J. T. Howell. Frequent weedy annual of grasslands and other grassy places.

Geranium carolinianum L. Cranesbill. Infrequent annual of grassy ravines and shaded places in woodlands and chaparral.

**Geranium dissectum* L. Cut-leaved Geranium. Rare weedy annual collected only along a drainageway in grasslands on the Santa Rosa Plateau.

Hydrophyllaceae

Emmenanthe penduliflora Benth. Whispering Bells. Common annual of dry, rocky, or grassy places, particularly after burns or other disturbances.

Eriodictyon crassifolium Benth. Yerba Santa. Infrequent but locally abundant shrub in dry, rocky and disturbed places in chamise chaparral and sage scrub.

Eriodictyon trichocalyx Heller subsp. *lanatum* (Brand) Munz. Rare shrub of sandy bottomlands of the Santa Ana River Canyon, *B. D. Stark* 4474, Dec. 30, 1932.

Eucrypta chrysanthemifolia (Benth.) Greene subsp. *chrysanthemifolia*. Common annual of shaded places in woodlands and chaparral.

Nemophila menziesii H. & A. subsp. *menziesii*. Baby Blue-eyes. Common annual of grassy, rocky openings in woodlands. The subsp. *integrifolia* (Parish) Munz is infrequent in grassy openings in mixed-evergreen forests

along the Main Divide Truck Trail and in southern oak woodlands of the Santa Rosa Plateau.

Phacelia brachyloba (Benth.) Gray. Common annual of mixed chaparral and woodlands at higher elevations.

Phacelia cicutaria Greene subsp. *hispida* (Gray) Beauchamp ex Thorne. Common annual widely distributed in a variety of habitats, but chiefly in dry rocky areas in chaparral and woodlands.

Phacelia curvipes Torr. ex Wats. Rare annual of open areas in chaparral, road to Indian Hill Canyon 0.6 mi east of Santiago Peak, 1,600 m, *P. H. Raven* 17,756, May 18, 1962.

Phacelia davidsonii Gray. Locally abundant annual on the summit of Santiago Peak, *F. W. Peirson* 3499, May 6, 1923, and along the Glen Ivy Trail to Santiago Peak, *Munz & Keck* 7068, June 14, 1923.

Phacelia distans Benth. Wild-heliotrope. Common annual of grasslands and borders of or disturbed areas in chaparral.

Phacelia grandiflora (Benth.) Gray. Rare coarse annual on a dry slope along a stream on the Santa Rosa Plateau and in disturbed chaparral in Santa Ana River Canyon.

Phacelia imbricata Greene subsp. *patula* (Brand) Heckard. Rare perennial on a rocky grassland slope of the Santa Rosa Plateau. The subsp. *bernardina* (Greene) Heckard is infrequent at the base of the range in sage scrub and chaparral of lower canyons, as in Santa Ana River Canyon, *E. R. Johnson* 2233, June 1, 1931; on Starr Ranch, *Little* 1599, June 7, 1976 (CSF); and in Silverado Canyon, *C. M. Fox* (painting).

Phacelia minor (Harv.) Thell. Wild-Canterburybell. Infrequent annual in open rocky areas in chamise chaparral and sage scrub.

Phacelia parryi Torr. Frequent annual of dry slopes, burns, and other disturbed places at lower elevations in sage scrub and chaparral, as in Silverado, Santiago, Sierra, and Santa Ana River canyons.

Phacelia suaveolens Greene subsp. *keckii* (M. & J.) Thorne. Infrequent annual on slopes from 1,220 to 1,525 m in chaparral and Coulter pine woodland on or near Santiago Peak. Apparently this subspecies is endemic in the Santa Ana Mountains, and the holotype is *P. A. Munz* 7056, June 14, 1923, from Glen Ivy Trail to Santiago Peak on a dry ridge, 1,600 m.

Phacelia suffrutescens Parry. Frequent suffrutescent perennial of shaded, rocky canyons and chaparral, often locally abundant.

Phacelia tanacetifolia Benth. Rare annual of low elevations, as shady places in Silverado Canyon, *C. M. Fox s.n.*, 1899.

Pholistoma auritum (Lindl.) Lilja. Fiesta Flower. Weak-stemmed annual frequent in shaded places in chamise chaparral and riparian woodlands at lower elevations.

Turricula parryi (Gray) Macbr. Sticky-nama. Stout viscid perennial frequent in open places in mixed chaparral and in clearings of riparian woodlands; foliage causes dermatitis in susceptible individuals.

Hypericaceae

Hypericum formosum H.B.K. subsp. *scouleri* (Hook.) Thorne. St. John's Wort. Infrequent perennial of wet places, along streams and in riparian woodlands.

Juglandaceae

Juglans californica Wats. California Walnut. Infrequent tree of riparian woodlands, mainly in Hagador, Santa Ana River, and lower San Juan canyons.

*Juglans regia L. English Walnut. Escaped tree established in a dense riparian woodland in Trabuco Canyon below Yaeger's Mesa, possibly of hybrid origin between *J. regia* and *J. californica*.

Lamiaceae

Lepechinia cardiophylla Epl. Pitcher-sage. Infrequent endemic shrub of open areas in mixed chaparral and mixed-evergreen forests, mostly in the northern part of the range.

Lycopus americanus Muhl. Water-horehound. Stoloniferous perennial of bottomland marshes in Santa Ana River Canyon, *Howell* 753, Sept. 24, 1927.

**Marrubium vulgare* L. White Hoarhound. Common perennial weed of cleared and disturbed areas in chaparral over a wide elevational range.

*Mentha citrata Ehrh. Bergamot Mint. Escaped into marsh below San Juan Canyon.

*Mentha spicata L. Spearmint. Rare perennial escape in moist areas, as on Starr Ranch, *Little* 1495, Aug. 4, 1976 (CSF).

Monardella hypoleuca Gray subsp. *hypoleuca*. Infrequent suffrutescent perennial in mixed chaparral along the Main Divide Truck Trail, in Santiago and Black Star canyons, and on Starr Ranch.

Monardella lanceolata Gray. Common annual of burned areas, grasslands, and grassy openings in chaparral and woodlands.

Monardella macrantha Gray subsp. *hallii* (Abrams) Abrams. Infrequent perennial in cleared areas of mixed-evergreen forest and chaparral near Santiago and Mojeska peaks, *Munz & Keck* 7088, June 14, 1923, and *Wolf* 5406, Aug. 24, 1933. Some specimens seem intermediate in pubescence with the typical subsp. *macrantha*.

Pycnanthemum californicum Torr. Mountainmint. Infrequent, aromatic, perennial herb of moist places along streams and in moist pockets of chaparral in Trabuco Canyon, *Munz* 7757, September 7, 1923, and in Coldwater Canyon near Glen Ivy, *T. Howell* 1032, July 7, 1928.

Salvia apiana Jeps. White Sage. Common shrub of sage scrub.

Salvia clevelandii (Gray) Greene. Rare shrub collected only by *Wolf* 7965, June 17, 1936, along the road between Margarita Peak and the USFS Tenaja Guard Station.

- Salvia columbariae* Benth. subsp. *columbariae*. Chia. Common annual of dry, open, rocky or grassy places.
- Salvia leucophylla* Greene. Purple Sage. Frequent shrub of sage scrub and lower elevation chaparral, chiefly in the northwestern part of the mountains in Santa Ana River, Black Star, Santiago, and Trabuco canyons.
- Salvia mellifera* Greene. Black Sage. Common shrub of sage scrub and chamise chaparral.
- Satureja chandleri* (Bdg.) Druce. Infrequent shrub of canyon slopes and chaparral, chiefly on the Santa Rosa Plateau.
- Scutellaria tuberosa* Benth. subsp. *australis* Epl. Skullcap. Infrequent perennial found only in Tenaja Canyon and on a dry slope in chaparral 8 km NE of Murrieta.
- Stacys rigida* Nutt. ex Benth. subsp. *rigida*. Hedge-nettle. Common perennial of moist places along streams or in gullies throughout the mountain range. The subsp. *quercetorum* (Heller) Epling is a frequent coarse perennial of moist places in chaparral and sage scrub and in riparian woodlands at lower elevations.
- Trichostema lanatum* Benth. Woolly Blue Curls. Infrequent small shrub mostly in the northern part of the range between Santiago and Sierra peaks in chaparral and canyons.
- Trichostema lanceolatum* Benth. Vinegar Weed. Locally abundant annual in dry, open, or disturbed places.
- Trichostema parishii* Vasey. Blue Curls. Infrequent shrub in chaparral, chiefly at higher elevations along the Main Divide Truck Trail.

Lauraceae

- Umbellularia californica* (H. & A.) Nutt. California-laurel, California-bay. Common evergreen tree of riparian woodlands in canyons but occasionally at springs and seepages in chaparral to the crest of the mountain range.

Linaceae

- Hesperolinon micranthum* (Gray) Small. Wild Flax. Infrequent annual found on a chaparral burn scar on Skyline Drive and in open grassy places in chaparral of the Santa Rosa Plateau.

Loasaceae

- Mentzelia micrantha* (H. & A.) T. & G. Poorman's Patches. Infrequent annual of disturbed places, near Santiago Peak and Sierra Peak.
- Mentzelia montana* Davids. subsp. *montana*. Rare annual of grasslands and dry grassy openings in chaparral and mixed-evergreen forest.
- Mentzelia veatchiana* Kell. Apparently rare annual of open or disturbed places, collected only on Santiago Peak, *L. Abrams* 1850, June 15, 1901.

Lythraceae

Lythrum californicum T. & G. Loosestrife. Locally abundant perennial at San Juan Hot Springs.

Lythrum hyssopifolium L. Locally abundant slender annual of moist soil on stream margins and desiccated mud of vernal pools on the Santa Rosa Plateau and in San Juan Canyon.

Malvaceae

Malacothamnus densiflorus (Wats.) Greene subsp. *densiflorus*. Bush Mallow. Frequent shrub in chaparral in the vicinity of Santiago and Bedford peaks, near San Juan Hot Springs, and at Glen Ivy.

Malacothamnus fascicularis (Nutt.) Greene subsp. *laxiflorus* (Gray) Thorne. Frequent shrub of dry, rocky ravine slopes in chaparral.

*Malva nicaeensis All. Mallow. Rare annual weed in Santa Ana River Canyon, Wolf 7782, May 1, 1936.

*Malva parviflora L. Cheeseweed. Locally abundant weed, as on Starr Ranch, at San Juan Hot Springs, and in Santa Ana River Canyon.

Sida leprosa (Ort.) K. Schum. [var. *hederacea* (Dougl.) K. Schum.] Alkali Mallow. Locally abundant perennial of desiccated beds of vernal pools on the Santa Rosa Plateau.

Sidalcea malvaeflora (DC.) Gray ex Benth. subsp. *sparsifolia* C. L. Hitchc. Checker. Frequent perennial of grasslands.

*Moraceae

*Ficus carica L. Common Fig. Escaped tree along a stream near the junction with Holy Jim and Trabuco canyons.

Nyctaginaceae

Abronia villosa Wats. [var. *aurita* (Abrams) Jeps.] Sand-verbena. Rare procumbent annual on sandy soils in the lower end of Santa Ana River Canyon, Wolf 2254, July 1, 1931.

Mirabilis californica Gray (var. *californica*). Four-o'clock, Wishbone Bush. Frequent perennial of dry banks in coastal sage scrub and chaparral.

Oleaceae

Fraxinus dipetala H. & A. Flowering Ash. Frequent small tree widely distributed in chaparral and on upper slopes of riparian woodlands.

Fraxinus velutina Torr. [var. *coriacea* (Wats.) Rehder]. Arizona Ash. Infrequent tree along streams in riparian and southern oak woodlands. This variety is the prevalent taxon in cismontane riparian habitats but also occurs within the desert range of the typical variety.

Onagraceae

- Boisduvalia densiflora* (Lindl.) Wats. Common annual of moist places along streams in oak woodlands and in chaparral.
- Camissonia bistorta* (Nutt. ex T. & G.) Raven. Common annual of disturbed and open areas, especially at lower elevations.
- Camissonia californica* (Nutt. ex T. & G.) Raven. Frequent annual of disturbed places in sage scrub, chaparral, and oak woodlands.
- Camissonia hirtella* (Greene) Raven. Frequent annual of grasslands and oak woodlands and disturbed slopes in burned-over chaparral and oak woodland.
- Camissonia ignota* (Jeps.) Raven. Common annual in grasslands and open places.
- Camissonia micrantha* (Hornem. ex Spreng.) Raven. Infrequent annual of grasslands and open areas of chaparral along the Main Divide Truck Trail and on the Santa Rosa Plateau.
- Clarkia bottae* (Spach) Lewis & Lewis. Common annual scattered in chaparral, sage scrub, and on grassy slopes, and along streams in canyon woodlands.
- Clarkia delicata* (Abrams) Nels. & Macbr. Rare annual, collected only by Wolf 8001, June 22, 1936, in an open area of chaparral on the west slope of Modjeska Peak.
- Clarkia dudleyana* (Abrams) Macbr. Infrequent annual in the chaparral of Skyline Drive and the Santa Rosa Plateau.
- Clarkia epilobioides* (Nutt.) Nels. & Macbr. Common annual in chaparral and southern oak woodland.
- Clarkia purpurea* (Curt.) Nels. & Macbr. subsp. *quadrivulnera* (Dougl.) Lewis & Lewis. Common annual of open grassy areas. The subsp. *viminea* (Dougl.) Lewis & Lewis was taken along the trail to Santiago Peak, Abrams 1796, June 15, 1901.
- Clarkia rhomboidea* Dougl. Infrequent annual of open areas in chaparral, oak woodlands, and riparian woodlands in canyons, ranging up to Santiago Peak.
- Epilobium adenocaulon* Hausskn. [var. *parishii* (Trel.) Munz.] Willow-herb. Common perennial of moist places, especially along streams and in riparian woodlands in canyons.
- Epilobium canum* (Greene) Raven subsp. *angustifolium* (Keck) Raven. California-fuchsia. Locally abundant suffrutescent perennial in sage scrub on dry slopes of San Juan, Blackstar, and Coal canyons. The subsp. *mexicanum* (Presl) Raven is widespread through the range on rocky chaparral slopes and in canyons. The typical subsp. *canum* is known only from Starr Ranch, Little 1573, Nov. 17, 1975 (CSF).
- Ludwigia peploides* (H.B.K.) Raven. Locally abundant perennial in shal-

low water of streams on the Santa Rosa Plateau and bottomland ponds in Santa Ana River Canyon.

Oenothera californica (Wats.) Wats. Evening-primrose. Rare perennial collected only on the Santa Rosa Plateau.

Oenothera hookeri T. & G. subsp. *grisea* (Bartlett) Munz. Infrequent tall perennial along streams, as in San Juan and Santa Ana River canyons.

Orobanchaceae

Orobanche bulbosa (Gray) G. Beck. Broom Rape. Rare root-parasite collected on *Adenostoma fasciculatum* in chaparral 8 km northeast of Murrieta, 425 m, Munz & Johnston 5330, May 19, 1922, and in Gypsum Canyon at 450 m.

Orobanche fasciculata Nutt. Infrequent root-parasite in chaparral on Sierra, Trabuco, and Santiago peaks, especially on *Eriogonum fasciculatum*.

Oxalidaceae

Oxalis albicans Knuth subsp. *californica* (Abrams) Eiten. Wood-sorrel. Common perennial of rocky slopes in grassland and chaparral.

**Oxalis pes-caprae* L. Bermuda-butterfly. Bulbous perennial, a garden escape, Starr Ranch, Little 2284, May 7, 1977 (CSF); and Santa Ana River Canyon, E. R. Johnson s.n., July 1932.

Paeoniaceae

Paeonia californica Nutt. ex T. & G. Peony. Common perennial of chaparral and rocky, grassy open areas of oak and riparian woodlands.

Papaveraceae

Argemone munita Dur. & Hilg. subsp. *robusta* G. Ownbey. Prickly Poppy. Infrequent prickly herb in chaparral, in Hagador Canyon, on Santiago Peak, and between Modjeska and Santiago peaks. This subspecies is apparently restricted to the Santa Ana Mountains.

Dendromecon rigida Benth. subsp. *rigida*. Tree Poppy. Common stiff shrub of road cuts and open exposed banks in chaparral.

Dicentra chrysantha (H. & A.) Walp. Golden Ear-drops. Common erect, tall perennial on chaparral and woodland burns.

Dicentra ochroleuca Engelm. Frequent perennial of burn scars and disturbed places in chaparral at the northern end of the range.

Eschscholzia californica Cham. [incl. var. *peninsularis* (Greene) Munz]. Frequent herb in grassy open places throughout the range.

Meconella denticulata Greene. Slender-stemmed annual of grassy slopes along the edges of chaparral in canyons, infrequent in the range but rarer in the southern part, where it has been found only in Los Alamos Canyon, near the junction with San Mateo Canyon, and in Trabuco Canyon.

- Papaver californicum* Gray. Poppy. Infrequent annual along roadsides in chaparral and on chaparral burns.
- Platystemon californicus* Benth. Cream Cups. Frequent annual of open grassy places on the Santa Rosa Plateau but not reported in the northern part of the range.
- Romneya coulteri* Harv. (incl. *R. trichocalyx* Eastw.) Matilija Poppy. Tall conspicuous perennial abundant throughout the range in washes on exposed banks, and in disturbed areas in sage scrub and chaparral. We have seen only the typical variety in the range.
- Stylomecon heterophylla* (Benth.) G. Tayl. Rare annual of grassy slopes, known only from Silverado Canyon, C. M. Fox (painting).

Plantaginaceae

- Plantago bigelovii* Gray subsp. *californica* (Greene) Bassett. Plantain. Tiny ephemeral locally abundant on the desiccated, open, muddy margins of vernal pools on the Santa Rosa Plateau.
- Plantago erecta* Morris. California Plantain. Infrequent annual of dry, open, rocky or grassy places throughout the entire mountain range.
- Plantago hirtella* H.B.K. subsp. *galeottiana* (Dcne.) Thorne. Erect perennial known only from moist sandy bottomlands in Santa Ana River Canyon, E. R. Johnson 8006, June 26, 1936.
- Plantago fastigiata* Morris (*P. insularis* Eastw.). Rare spring annual known only from rocky, open places in Santa Ana River Canyon, Howell 818, Feb. 7, 1928.
- **Plantago lanceolata* L. English Plantain, Rib-grass. Rare weedy perennial found only on the Starr Ranch, Little 1610, Aug. 13, 1976 (CSF), in moist disturbed places.
- *Plantago major L. Common Plantain. Common perennial weed of moist grassy places.

Platanaceae

- Platanus racemosa* Nutt. Sycamore, Aliso. Common large tree of dry washes and open riparian woodlands at lower elevations.

Polemoniaceae

- Allophyllum glutinosum* (Benth.) A. & V. Grant. Common annual of dry, rocky banks, ravines, grasslands, and chaparral.
- Eriastrum densifolium* (Benth.) Mason subsp. *sanctorum* (Mlkn.) Mason. Rare perennial collected only from bottomlands of Santa Ana River Canyon, Howell 2985, Aug. 13, 1927. This subspecies seems to be restricted to the lowlands along the Santa Ana River.

- Eriastrum sapphirinum* (Eastw.) Mason subsp. *dasyanthum* (Brand) Mason. Common annual in grasslands throughout the range.
- Gilia angelensis* V. Grant. Common delicate annual of grassy places and roadsides in chaparral and woodlands.
- Gilia capitata* Sims. subsp. *abrotanifolia* (Nutt. ex Greene) V. Grant. Common annual of cleared chaparral and open slopes of riparian woodland and mixed evergreen forest.
- Leptodactylon californicum* H. & A. subsp. *glandulosum* (Eastw.) Mason. Prickly-phlox. Common shrub of exposed banks in chaparral and sage scrub. The typical subsp. *californicum* has been reported from the range but was not seen in this survey.
- Linanthus androsaceus* (Benth.) Greene subsp. *luteolus* (Greene) Mason. Frequent annual in grasslands and chaparral on the Santa Rosa Plateau. The subspecies *micranthus* (Steud.) Mason is frequent at lower elevations, as in lower San Juan, Leach, and Santa Ana River canyons.
- Linanthus dianthiflorus* (Benth.) Greene subsp. *dianthiflorus*. Ground-pink. Common early spring annual of grasslands.
- Linanthus floribundus* (Gray) Greene ex Mlk. subsp. *floribundus*. Common bushy suffrutescent perennial of dry, rocky, or grassy places and wooded canyons.
- Linanthus liniflorus* (Benth.) Greene subsp. *pharnaceoides* (Benth.) Mason. Common annual of dry, open, grassy places in chaparral, oak woodlands, and wooded canyons.
- Linanthus pygmaeus* (Brand) J. T. Howell subsp. *continentalis* Raven. Rare annual of dry, chaparral-clad slopes on the Santa Rosa Plateau and in Horsethief Canyon.
- Microsteris gracilis* (Dougl. ex Hook.) Greene. Infrequent annual of grassy, rocky places on the Santa Rosa Plateau.
- Navarretia atractylloides* (Benth.) H. & A. Frequent annual of dry places in grasslands and chaparral.
- Navarretia hamata* Greene. Infrequent annual of grassy openings in woodlands and along chaparral borders.
- Navarretia intertexta* (Benth.) Hook. Rare small annual collected only on the Mesa de Burro on dry banks of a vernal pool.
- Navarretia prostrata* (Gray) Greene. Locally abundant on desiccated margins and beds of vernal pools on the Santa Rosa Plateau.

Polygalaceae

- Polygala cornuta* Kell. subsp. *fishiae* (Parry) Munz. Milkwort. Infrequent slender shrub in shaded rocky places in chaparral and canyon woodlands, as in lower San Juan Canyon, near Sierra Peak, and in Santa Ana River Canyon.

Polygonaceae

Chorizanthe coriacea Goodm. Rare annual of lower elevations, collected only from a chaparral burn, 8 km NE of Murietta, 460 m, *Munz & Johnston* 5364, May 19, 1922; and S Bell Canyon, Starr Ranch, *Little* 2148, Apr. 14, 1977 (CSF).

Chorizanthe fimbriata Nutt. Common annual of rocky grasslands, inland sage scrub, and chaparral.

Chorizanthe parryi Wats. [var. *fernandina* (Wats.) Jeps.]. Rare annual collected only in a burned-over area in chaparral, 460 m, 8 km northeast of Murrieta, *Munz & Johnston* 5359, May 19, 1922.

Chorizanthe polygonoides T. & G. subsp. *longispina* (Goodm.) Munz. Rare annual found only along a streamway among lava boulders on the Mesa de Burro.

Chorizanthe procumbens Nutt. Frequent annual of grasslands and clearings in chaparral.

Chorizanthe staticoides Benth. subsp. *staticoides*. Turkish Rugging. Common annual of recently disturbed areas such as fire breaks and bare areas in grasslands, chaparral, and woodlands.

Eriogonum davidsonii Greene. Wild-buckwheat. Apparently rare annual in mixed chaparral along the Main Divide Truck Trail between El Cariso and Santiago Peak and in Tin Mine Canyon.

Eriogonum elongatum Benth. Locally abundant perennial of dry, rocky places and in chaparral, as on the Santa Rosa Plateau, in the vicinity of Santiago Peak, and in San Juan and Santa Ana River canyons.

Eriogonum fasciculatum Benth. subsp. *fasciculatum*. Californica-buckwheat. This shrubby subspecies was collected only at lower elevations in sage scrub in Hagador Canyon. The subsp. *foliosum* (Nutt.) S. Stokes is a common and important dominant shrub in sage scrub and in dry, rocky, open places in chamise chaparral throughout the range. The subsp. *polifolium* (Benth.) S. Stokes is known only from the summits of Santiago and Bedford peaks.

Eriogonum gracile Benth. Common annual of grasslands and dry, open slopes of the Santa Rosa Plateau, less frequent in the northern part of the range.

Eriogonum nudum Dougl. ex Benth. subsp. *saxicola* (Heller) Munz. Rare perennial collected along a stream in a ravine on the Santa Rosa Plateau and on Santiago Peak, *Wolf* 5400, Aug. 24, 1933.

Eriogonum saxatile Wats. Rare perennial reported from rocky soil along the Main Divide Truck Trail at 1,310 m by Pequegnat (1951).

Eriogonum thurberi Torr. Rare annual of sandy bottomlands in Santa Ana River Canyon, *Howell* 462, July 24, 1927, and 8 km N of Murietta in burned-over area in chaparral, 500 m, *Munz & Johnston* 5348, May 19, 1922.

Oxytheca trilobata Gray. Common annual throughout the range along trails and roads through mixed chaparral.

**Polygonum aviculare* L. Knotweed. Common prostrate annual weed of roadsides and other disturbed places.

Polygonum hydropiperoides Michx. (var. *asperifolium* Stanf.) Rare perennial of wet places, collected only from bottomlands of Santa Ana River Canyon, *Howell* 268, July 5, 1927.

**Polygonum lapathifolium* L. Erect weedy annual in moist sandy soil along San Juan Creek in San Juan Canyon.

Pterostegia drymarioides F. & M. Common delicate, decumbent annual of shaded areas along streams in canyons, in chaparral, and in woodlands.

**Rumex conglomeratus* Murr. Green Dock. Common tall perennial of wet margins of streams and ponds and in moist pastured swales.

*Rumex crispus L. Curly Dock. Common perennial of moist places.

Rumex salicifolius Weinm. (incl. *R. californicus* Rech.) Willow Dock. Common perennial of stream beds and margins, muddy pools, and other moist places in ravines.

Portulacaceae

Calandrinia ciliata (R. & P.) DC. [var. *menziesii* (Hook.) Macbr.] Red Maids. Common early spring annual of grassland swales and other semi-moist, grassy, open places.

Calyptridium monandrum Nutt. in T. & G. Locally abundant on chaparral burns, as north of Murrieta, *Munz & Johnston* 5365, May 19, 1922, and on a canyon wall near the San Juan Guard Station, A. S. *Boughey* 153, no date (UCI).

Claytonia perfoliata D. Donn. ex Willd. Miner's-lettuce. Common annual of shaded and vernal moist places in woodlands and ravines through chaparral.

Montia fontana L. subsp. *amporitana* Sennen. Small annual locally abundant in seasonally wet drainageways in the grasslands and on the wet margins of vernal pools on mesas of the Santa Rosa Plateau.

**Portulaca oleracea* L. Purslane. Rare succulent weed of waste places, as in Santa Ana River Canyon, *Howell* 1209, Sept. 17, 1928.

Primulaceae

**Anagallis arvensis* L. Scarlet Pimpernel. Common annual weed of disturbed places.

Anagallis minima (L.) E. H. L. Krause. Rare, tiny annual of desiccated vernal pool margins on the Santa Rosa Plateau.

Dodecatheon clevelandii Greene subsp. *clevelandii*. Shooting-star. Locally

abundant perennial of grasslands and open, grassy areas of chaparral and sage scrub.

Samolus parviflorus Raf. Water-pimpernel. Locally abundant perennial of shallow water and moist margins of streams and ponds on the Santa Rosa Plateau and in marshes in Santa Ana River Canyon.

Ranunculaceae

Clematis lasiantha Nutt. in T. & G. Virgin's Bower. Frequent woody climber over shrubs in chaparral and mixed evergreen woodland on dry slopes and ridges up to Santiago Peak.

Clematis ligusticifolia Nutt. in T. & G. Infrequent woody climber over shrubs, usually in riparian or oak woodlands, as in Santa Ana River Canyon.

Clematis pauciflora Nutt. in T. & G. Common woody climber on shrubs and small trees in canyons and near streams, mostly in chaparral.

Delphinium cardinale Hook. Scarlet Larkspur. Erect perennial locally abundant in cleared areas and on chaparral burns.

Delphinium parryi Gray. Larkspur. Common perennial of grasslands, grassy open areas of woodlands, and disturbed areas in chaparral.

Delphinium patens Benth. subsp. *hepaticoideum* Ewan. Infrequent perennial on moist shaded slopes of canyons, as Black Star and Trabuco canyons.

Myosurus minimus L. (var. *apus* Greene). Mouse-tail. Rare annual collected only on the desiccated margins and beds of a few vernal pools on the Santa Rosa Plateau.

Ranunculus aquatilis L. [var. *capillaceus* (Thuill.) DC.] Water Crowfoot. Locally abundant aquatic perennial of shallow water of ponds, vernal pools, and slow streams on the Santa Rosa Plateau.

Ranunculus californicus Benth. subsp. *californicus*. California Buttercup. Common perennial of vernal moist slopes, meadows, and grassland valleys.

Ranunculus cymbalaria Pursh subsp. *saximontanus* (Fern.) Thorne. Stoloniferous perennial locally abundant in subalkaline muddy places, as along the Santa Ana River, *Howell* 437, July 19, 1927.

Ranunculus hebecarpus H. & A. Infrequent annual of moist shady places, mostly in canyons, as in Silverado Canyon, *Munz & Harwood* 3739, Apr. 25, 1920, and Hagador Canyon, *R. Weatherby* 2972, May 18, 1950.

Thalictrum polycarpum (Torr.) Wats. Meadow-rue. Frequent tall perennial of shaded canyon woods and near streams and moist places in chaparral.

Rhamnaceae

Ceanothus crassifolius Torr. Buck Brush. Common, often dominant, shrub widespread in chaparral at lower elevations.

- Ceanothus integerrimus* H. & A. Deer Brush. Frequent shrub of mixed chaparral found chiefly north of the Ortega Hwy at Bear Springs, Santiago Peak, Modjeska Peak, and Hagador Canyon.
- Ceanothus leucodermis* Greene. Wild-lilac. Abundant shrub of mixed chaparral throughout the mountain range.
- Ceanothus megacarpus* Nutt. subsp. *megacarpus*. White-lilac. Infrequent shrub, apparently limited to the northern end of the range in the vicinity of Sierra and Pleasant peaks.
- Ceanothus oliganthus* Nutt. in T. & G. (incl. *C. soreliatus* of S. Calif. authors). Frequent shrub of mixed chaparral, with distribution chiefly in the middle part of the range between El Cariso and Silverado Canyon. A distinctive small-leaved form on Pleasants Peak may be a habitat response to the serpentinite substrate.
- Ceanothus palmeri* Trel. Infrequent large spreading shrub of mixed chaparral at higher elevations in the vicinity of Santiago Peak, Munz & Keck 7080, June 14, 1923.
- Ceanothus papillosus* T. & G. subsp. *roweanus* (McMinn.) Munz. Locally abundant shrub confined to serpentine, chiefly in the area between Santiago Peak and Skyline Drive. It associates with Knobcone Pine in the vicinity of Pleasants Peak.
- Ceanothus spinosus* Nutt. in T. & G. Locally abundant shrub in mixed chaparral north of and in San Juan Canyon at lower elevations.
- Ceanothus tomentosus* Parry subsp. *olivaceus* (Jeps.) Munz. Frequent shrub of chaparral throughout the range but most common in the central portion. This species is perhaps the most conspicuous and showy of the wild-lilacs when in bloom during March and April.
- Rhamnus californica* Esch. subsp. *californica*. Coffeeberry. Common evergreen shrub of riparian woodlands and chaparral on canyon slopes. The subsp. *cuspidata* (Greene) C. B. Wolf is found on rocky soil at the summit of Santiago Peak.
- Rhamnus crocea* Nutt. in T. & G. Redberry. Infrequent evergreen shrub of chaparral on canyon slopes along Coldwater Creek and on the Santa Rosa Plateau.
- Rhamnus ilicifolia* Kell. Buckthorn. Common shrub of chaparral but also found in association with riparian woodlands.

Rosaceae

- Adenostoma fasciculatum* H. & A. Chamise, Greasewood. Dominant, and often sole, shrub of chamise chaparral.
- Cercocarpus betuloides* Nutt. ex T. & G. subsp. *betuloides*. Mountain-mahogany. Common small tree or large shrub on dry slopes, in chaparral, and along borders of mixed-evergreen woodland, especially at the northern end of the range.

- Cercocarpus minutiflorus* Abrams. Locally abundant shrub in ravines in oak woodlands, chaparral, and on dry slopes on the Santa Rosa Plateau.
- Heteromeles arbutifolia* M. Roem. subsp. *arbutifolia*. Toyon, Christmas Berry. Common evergreen tree of semi-dry chaparral slopes, borders of riparian woodland, and mixed-evergreen woodlands.
- Holodiscus boursieri* (Carr.) Rehder in Bailey. Infrequent shrub of chaparral at the summit of Santiago and Modjeska peaks.
- Holodiscus discolor* (Pursh) Maxim. subsp. *franciscanus* (Rydb.) Tayl. & MacBr. Ocean-spray. Common shrub in the mountains primarily north of the Ortega Hwy in mixed-evergreen and riparian woodlands.
- Potentilla glandulosa* Lindl. subsp. *glandulosa*. Cinquefoil. Frequent along streams and in moist places in woodlands and chaparral. The subsp. *reflexa* (Greene) Keck is rare, known only from the summit of Santiago Peak.
- *Prunus avium L. Sweet Cherry. Tree, probably planted, established in Trabuco Canyon approximately 8 km east of Trabuco Oaks.
- **Prunus cerasifera* Ehrh. Plum. Tree, probably planted, established with sweet cherry in small orchard gone wild in Trabuco Canyon approximately 8 km east of Trabuco Oaks.
- Prunus emarginata* (Dougl.) Walp. Bitter Cherry. Infrequent deciduous shrub of rocky ridges and dry slopes.
- Prunus ilicifolia* (Nutt.) Walp. subsp. *ilicifolia*. Holly-leaved Cherry. Common evergreen shrub or small tree on drier slopes of canyon woodlands and in chaparral.
- *Pyrus communis L. Pear. Tree established in Trabuco Canyon along a stream near junction with Holy Jim Canyon.
- Rosa californica* C. & S. Wild Rose. Common deciduous shrub of riparian woodlands and shaded, moist places in other woodlands.
- Rubus leucodermis* Dougl. ex T. & G. subsp. *bernardinus* (Greene) Thorne. Western Raspberry. Reported by Pequegnat (1951) from Horsethief Springs at 1,220 m.
- Rubus ursinus* C. & S. California Blackberry. Frequent scrambling shrub in riparian woodlands.

Rubiaceae

- Galium angustifolium* Nutt. in T. & G. subsp. *angustifolium*. Bedstraw. Suffrutescent perennial common in chaparral and on rocky, open or grassy slopes.
- *Galium aparine L. Common sprawling vernal annual weed of shaded places.
- Galium nuttallii* Gray subsp. *nuttallii*. Common perennial of dry, rocky slopes, especially in chaparral, but also found in drier locations in riparian woodland.

**Galium parisiense* L. Rare weedy annual known only from the Starr Ranch, Little 1765, June 7, 1976 (CSF).

Salicaceae

Populus fremontii Wats. subsp. *fremontii*. Cottonwood. Locally abundant tree along streams, in riparian woodlands, and in drainage ravines of southern California oak woodlands.

Populus trichocarpa T. & G. subsp. *trichocarpa*. Black Cottonwood. Less common than the preceding species but found along streams in several locations throughout the range.

Salix gooddingii Ball. (incl. var. *variabilis* Ball). Black Willow. Abundant small tree in bottoms along Santa Ana River in Santa Ana Canyon, Wolf 2955, 120 m, Apr. 15, 1932.

Salix hindsianus Benth. [var. *leucodendroides* (Rowlee) Ball]. Sandbar Willow. Locally abundant shrub, as in the Santa Ana River Canyon. One specimen was collected by M. E. Jones 26,532, Mar. 3, 1930, from the range without specific location.

Salix laevigata Bebb. [incl. var. *araquipa* (Jeps.) Ball]. Red Willow. Common tree of river bottoms, and in other wet places, as at Bear Springs.

Salix lasiolepis Benth. Arroyo Willow. Abundant shrub or small tree of river bottoms and along streams in canyons ranging up to 1,400 m in elevation, as at Bear Springs.

Saururaceae

Anemopsis californica Hook. Yerba Mansa. Locally abundant stoloniferous perennial in wet grassy areas and in moist soil of grassy stream banks, mostly on the Santa Rosa Plateau, but also in bottomlands in Santa Ana River Canyon.

Saxifragaceae

Boykinia rotundifolia Parry. Brook-foam. Rare perennial of moist, shaded places in canyons, as in Holy Jim Canyon (G. & K. Marsh) and at Bear Springs.

Jepsonia parryi (Torr.) Small. Frequent seasonal perennial in riparian habitats on the Santa Rosa Plateau, and on rocky slopes of San Juan, Silverado, and Santa Ana River canyons; and on the Starr Ranch, Little 1778, Oct. 11, 1976 (CSF).

Lithophragma affine Gray subsp. *mixtum* R. L. Taylor. Woodland-star. Common slender perennial of moist, shaded or grassy slopes of oak and mixed-evergreen woodlands, especially in the canyons.

Ribes amarum McClat. Bitter Gooseberry. A deciduous shrub which is locally abundant in woodlands at higher elevations (1,300–1,600 m) but also found as low as 860 m in Trabuco Canyon.

Ribes californicum H. & A. subsp. *hesperium* (McClat.) Thorne. Common

Gooseberry of riparian woodlands and occasional in chaparral and mixed evergreen woodland.

Ribes indecorum Eastw. White-flowered Currant. Common erect shrub throughout the range in chaparral but occasional along creeks and washes.

Ribes malvaceum Sm. (var. *viridifolium* Abrams). Chaparral Currant. Common deciduous shrub of riparian woodlands and chaparral in canyons, but also ranges up into mixed-evergreen woodland along the Main Divide Truck Trail.

Ribes roezlii Regel. Sierra Gooseberry. Locally abundant shrub in mixed-evergreen woodlands and chaparral in the vicinity of Santiago Peak.

Ribes speciosum Pursh. Fuschia-flowered Gooseberry. Locally abundant shrub of riparian woodlands in less elevated western areas of the mountains but occasional in dense chaparral under live oaks and in mixed-evergreen forest along the Main Divide Truck Trail.

Saxifraga californica Greene. Saxifrage. Infrequent slender perennial of mossy, vernal moist, granitic rock outcrops and shaded grassy slopes bordering riparian woodland, collected from Murrieta, Leach, Silverado, and Los Alamos canyons.

Scrophulariaceae

Antirrhinum coulterianum Benth. in DC. Snapdragon. Common annual of dry, rocky, often disturbed slopes, mostly in chaparral but also in riparian and mixed-evergreen woodlands.

Antirrhinum kelloggii Greene. Frequent annual of dry, open, or grassy slopes, chaparral, and chaparral burns.

Antirrhinum nuttallianum Benth. in DC. Common annual of rocky banks and grassy clearings on chaparral-clad slopes, locally abundant on burns in chaparral.

Castilleja affinis H. & R. subsp. *affinis*. Indian Paint-brush. Common perennial of dry, wooded, or grassy slopes and chaparral.

Castilleja foliolosa H. & A. Common perennial of chaparral and sage scrub.

Castilleja martinii Abrams (var. *martinii*). Rare perennial, collected only from riparian woodlands of Traubco Canyon and Bear Springs.

Castilleja stanantha Gray. Common annual of wet stream banks in the vicinity of Bear Springs, and in Holy Jim, Silverado, Los Alamos, and San Juan canyons.

Collinsia heterophylla Buist ex Grah. subsp. *heterophylla*. Chinese-houses. Common annual of grasslands and grassy areas of woodlands, ranging from riparian woodlands in canyons to mixed-evergreen woodland near the crest of the mountain range.

Collinsia parryi Gray. Frequent annual of moist shaded or grassy places, ranging from oak to mixed-evergreen woodlands.

Cordylanthus filifolius Nutt. ex Benth. in DC. Bird's-beak. Common annual of oak woodlands and chaparral.

- Diplacus aurantiacus* (Curt.) Jeps. subsp. *australis* (McMinn) R. M. Beeks ex Thorne. Bush Monkey-flower. Frequent shrub of chaparral and dry, rocky slopes.
- Diplacus clevelandii* (Bdg.) Greene. Frequent suffrutescent perennial on dry, cleared slopes, road cuts, and open areas of mixed chaparral, mostly above 1,000 m in elevation, especially in the vicinity of Santiago Peak.
- Diplacus longiflorus* Nutt. subsp. *longiflorus*. Frequent shrub of chaparral and open, loose, rocky slopes, primarily north of the Ortega Hwy.
- Diplacus longiflorus* Nutt. subsp. *longiflorus* $\times$ *D. puniceus* Nutt. This putative hybrid is rare in chaparral on Elsinore Peak, N. Cooper 1321, June 4, 1944, and Indian Canyon, Everett 11,503, June 7, 1945.
- Diplacus puniceus* Nutt. Sticky Monkey-flower. Common shrub of sage scrub, chamise chaparral, and mixed chaparral at lower elevations.
- Diplacus puniceus* Nutt. $\times$ *D. aurantiacus* (Curt.) Jeps. subsp. *australis* (McMinn) R. M. Beeks ex Thorne. Infrequent putative hybrid shrub of the Santa Rosa Plateau and San Juan Canyon.
- Keckiella antirrhinoides* (Benth.) Straw. subsp. *antirrhinoides*. Bush Penstemon. Common shrub of sage scrub and chamise chaparral but ranging up to 1,500 m in mixed chaparral.
- Keckiella cordifolia* (Benth.) Straw. Honeysuckle Penstemon. Common shrub of chaparral and dry, rocky slopes of riparian woodlands in canyons.
- Keckiella ternata* (Torr. ex Gray) Straw. subsp. *ternata*. Rare shrub of mixed chaparral on Santiago Peak.
- Linaria canadensis* (L.) Dum-Cours. [var. *texana* (Scheele) Penn.] Blue Toadflax. Infrequent annual in grasslands and oak woodlands of the Santa Rosa Plateau, and in the range to the north, where collected on the Starr Ranch and Rancho Santa Ana.
- Mimulus brevipes* Benth. Monkey-flower. Common annual of open or grassy slopes and disturbed areas in chaparral.
- Mimulus cardinalis* Dougl. ex Benth. Red Monkey-flower. Common viscid-villous perennial of wet places along streams and on slopes wet with seepage.
- Mimulus diffusus* Grant. Infrequent annual of grassy openings in chaparral and oak woodlands, on the Santa Rosa Plateau and in Rice Canyon.
- Mimulus floribundus* Dougl. ex Lindl. Infrequent rather slimy annual of wet stream margins in several locations throughout the range, as in Tenaja, San Mateo, Santiago, and Santa Ana River canyons.
- Mimulus fremontii* (Benth.) Gray. Rare annual in mixed chaparral along the Main Divide Truck Trail near El Cariso.
- Mimulus guttatus* Fisch. ex DC. subsp. *guttatus*. Yellow Monkey-flower. Locally abundant herbaceous perennial of stream banks, vernal pool borders, and other wet grassy areas.
- Mimulus nasutus* Greene. Rare annual collected only in bottomlands of Santa Ana River Canyon, Howell 916, Apr. 14, 1928.

- Mimulus pilosus* (Benth.) Wats. Infrequent annual of oak woodlands on the Santa Rosa Plateau, and in San Juan, Santiago, and Santa Ana River canyons.
- Orthocarpus densiflorus* Benth. [incl. var. *gracilis* (Benth.) Keck]. Owl's-clover. Rare annual found in some abundance on the vernally moist grasslands surrounding a large vernal pool on the north end of the Santa Rosa Plateau.
- Orthocarpus purpurascens* Benth. (incl. var. *pallidus* Keck). Common annual of grasslands, oak woodlands, and grassy open areas in chaparral.
- Pedicularis densiflora* Benth. ex Hook. Indian-warrior. Frequent perennial of grasslands and grassy openings in woodlands and chaparral, collected at several locations between Tenaja Canyon and Skyline Drive, and in Santa Ana River and Trabuco canyons.
- Penstemon centranthifolius* Benth. Scarlet-bugler. Rare perennial found only in chaparral along the Main Divide Truck Trail near El Cariso and in San Juan Canyon.
- Penstemon heterophyllus* Lindl. subsp. *australis* (Munz & Jtn.) Keck. Beard-tongue. Common perennial of chaparral and dry, rocky or grassy slopes in canyon woodlands.
- Penstemon* × *parishii* Gray. Rare perennial hybrid between *P. spectabilis* Thurb. ex Gray and *P. centranthifolius* Benth., collected only in Trabuco Canyon.
- Penstemon spectabilis* Thurb. ex Gray. Common perennial of chaparral and dry, exposed places on roadsides.
- Scrophularia californica* C. & S. subsp. *floribunda* (Greene) Shaw. Figwort, California Bee Plant. Frequent tall perennial of rocky or grassy slopes in chaparral and open banks in woodlands.
- **Verbascum thapsus* L. Common Mullein. Biennial or perennial weed collected only in Silverado Canyon in disturbed chaparral, Wolf 5533, Nov. 3, 1933.
- Veronica americana* (Raf.) Schw. Brooklime. Rare perennial found only in a small stream between the Tenaja Road and Los Alamos Canyon on the Santa Rosa Plateau.
- **Veronica anagallis-aquatica* L. Infrequent perennial of wet places as on Starr Ranch and in San Juan Canyon.
- Veronica peregrina* L. subsp. *xalapensis* (H.B.K.) Penn. Speedwell. Rare annual collected only on the margins of two vernal pools on the Santa Rosa Plateau.

*Simaroubaceae

- **Ailanthus altissima* (Mill.) Swingle. Tree-of-heaven. A small grove of trees to 10 m tall on a steep bank in Santa Ana Canyon near junction with Coal Canyon and single trees along the Ortega Hwy east of El Cariso.

Solanaceae

**Datura stramonium* L. Jimson Weed, Thornapple. Rare annual weed adventive in Santa Ana River Canyon, *Howell* 494, July 27, 1927.

Datura wrightii Regel. (*D. meteloides* A. DC.). Toloache. Infrequent bushy perennial of gravelly soils in disturbed places and open places in grassland, as on the Santa Rosa Plateau and in Santa Ana River Canyon.

Nicotiana attenuata Torr. Wild Tobacco. Rare annual reported from open places in chaparral in Silverado Canyon, painting by C. M. Fox (*s.n.*).

Nicotiana bigelovii (Torr.) Wats. (var. *wallacei* Gray). Frequent annual in chaparral.

*Nicotiana glauca Grah. Tree Tobacco. Abundantly naturalized weedy shrub of ravine banks, roadsides, and other open, disturbed places.

Petunia parviflora Juss. Prostrate annual collected only in Santa Ana River Canyon in moist places along the river, *Howell* 426, July 18, 1927, and *R. Valverde* 9434, Aug. 4, 1938.

**Physalis acutifolia* (Miers) Sandwith. Ground-cherry. Weedy annual collected only in Santa Ana River Canyon, *E. R. Johnson* 9537, Sept. 8, 1939.

Physalis greenii Vasey & Rose. Rare erect weedy annual from disturbed places, Starr Ranch, *Little* 1842, May 31, 1976 and 1843, Feb. 27, 1977 (CSF).

Solanum douglasii Dunal in DC. Nightshade. Common perennial of rocky banks and near streams, especially in canyons with chaparral and live oaks.

**Solanum elaeagnifolium* Cav. Silverleaf-nettle. Silvery perennial weed collected in Santa Ana River Canyon, along the Santa Fe RR tracks, *E. R. Johnson* 9499, Apr. 25, 1939; and on Starr Ranch, *Little* 1847, May 15, 1976 (CSF).

Solanum nodiflorum Jacq. Nightshade. Weedy plant in fallow field in Santa Ana River Canyon, *I. L. Wiggins* 20,352, Nov. 6, 1965.

Solanum umbelliferum Eschs. (var. *glabrescens* Torr.) Suffrutescent perennial infrequent in open, cleared places in chaparral and oak woodlands.

Solanum xanti Gray (var. *xanti*). Chaparral Nightshade. Common shrub of open, rocky banks, and grassy openings in chaparral and woodlands.

*Sterculiaceae

**Brachychiton populneum* (Schott.) R. Br. One shrubby sapling found in chaparral along Ortega Hwy west of El Cariso.

Styracaceae

Styrax officinale L. subsp. *fulvescens* (Eastw.) Beauchamp ex Thorne. Snowdrop Bush. Locally abundant shrub of exposed slopes and borders of chaparral and in canyons under live oaks, as in Trabuco and San Juan canyons.

Urticaceae

Parietaria hespera Hinton (var. *californica* Hinton). (*P. floridana* of Calif. authors). Pellitory. Frequent slender annual of rocky slopes, usually in shade of trees or rocks.

Urtica dioica L. subsp. *holosericea* (Nutt.) Thorne. Creek Nettle. Common perennial of moist places along shaded streams.

*Urtica urens L. Dwarf Nettle. Rare annual stinging weed from the Starr Ranch, Little 1855, May 15, 1976 (CSF); and Santa Ana River Canyon, Howell 804, Jan. 15, 1928.

Valerianaceae

Plectritis ciliosa (Greene) Jeps. subsp. *insignis* (Suksd.) Morey. Infrequent slender annual collected only in grasslands and grassy margins of, and openings in, chaparral on the Santa Rosa Plateau.

Verbenaceae

Phyla lanceolata (Michx.) Greene (*Lippia l.* Michx.). Rare procumbent perennial of moist bottomlands in Santa Ana River Canyon, Howell 401, July 15, 1927.

Verbena bracteata Lag. & Rodr. Vervain. Rare spreading weedy herb of wet places, Santa Ana River Canyon, E. R. Johnson 11,285, July 16, 1942.

Verbena lasiostachys Link. [incl. var. *abramsii* (Mold.) Jeps.] Frequent perennial of moist places, mostly along grassy stream banks, as on the Santa Rosa Plateau and in Silverado and Santa Ana River canyons.

**Verbena tenuisecta* Briq. Rare garden escape in Hagador Canyon.

Violaceae

Viola pedunculata T. & G. Johnny-jump-up. Locally abundant perennial of grasslands and of grassy undergrowth of oak, Coulter pine, and mixed-evergreen woodlands.

Viola purpurea Kell. subsp. *purpurea*. Violet. Infrequent perennial of rocky places in mixed chaparral of higher elevations and in the shade of mixed-evergreen woodland along the Main Divide Truck Trail, including the summit of Santiago Peak.

Viola quercetorum Baker & Clausen. Rare perennial collected only on or near Santiago Peak in shady places, Munz & Keck 7072, June 14, 1923, and P. H. Raven 17,757, May 18, 1962.

Viola sheltonii Torr. Rare perennial collected only on Santiago Peak.

Viscaceae

Phoradendron tomentosum (DC.) Engelm. ex Gray subsp. *macrophyllum* (Engelm.) Wiens. Mistletoe. Common woody parasite on branches of

Platanus racemosa, less common on species of *Salix* and *Populus* and *Juglans californica*.

Phoradendron villosum (Nutt. in T. & G.) Nutt. subsp. *villosum*. Woody parasite on branches of various species of *Quercus*.

Vitaceae

Vitis girdiana Munson. Wild Grape. Locally abundant liana forming hanging shrouds from trees in riparian woodland.

*Zygophyllaceae

**Tribulus terrestris* L. Puncture Vine. Infrequent naturalized annual weed on bare, disturbed ground.

Monocotyledonae

*Araceae

**Zantedeschia aethiopica* (L.) Spreng. African Calla-lily. Naturalized perennial at San Juan Hot Springs.

Cyperaceae

Carex alma Bailey. Sedge. Frequent perennial along streams and in springy places.

Carex barbarae Dewey. Infrequent perennial collected along streams in San Mateo and San Juan canyons.

Carex densa (Bailey) Bailey. Rare perennial found along a stream in Tenaja Canyon, Santa Rosa Plateau.

Carex praegracilis W. Boott. Common perennial along stream margins.

Carex schottii Dewey. Infrequent perennial of wet marshy places on the Santa Rosa Plateau and in San Juan and Hagador canyons.

Carex senta Boott. Infrequent perennial, several collections from seasonally wet stream banks in Tenaja Canyon and in oak woodlands on the Santa Rosa Plateau.

Carex spissa Bailey. Locally abundant, coarse perennial in marsh below San Juan Hot Springs.

Carex triquetra Boott. Common perennial of clay soil of flats and rocky slopes, and in chaparral.

**Cyperus alternifolius* L. Umbrella-plant. Large perennial abundantly naturalized in marsh below San Juan Hot Springs.

Cyperus erythrorhizos Muhl. Galingale. Annual locally abundant along the Santa Ana River, also on Rancho Santa Ana, Wolf 9366, Sept. 23, 1937.

Cyperus eragrostis Lam. Umbrella Sedge. Locally abundant perennial as at San Juan Hot Springs and in sandy places in Santa Ana River and San Juan canyons.

- **Cyperus esculentus* L. Nut-grass, Chufa. Locally abundant perennial weed along the Santa Ana River, *J. T. Howell* 408, July 15, 1927.
- Cyperus laevigatus* L. Perennial locally abundant along Santa Ana River, *J. T. Howell* 407, July 15, 1927.
- Cyperus niger* R. & P. [var. *capitatus* (Britt.) O'Neill.] Perennial locally abundant at San Juan Hot Springs; also in Santa Ana River Canyon.
- Cyperus odoratus* L. (incl. *C. ferax* Rich.) Perennial locally abundant at San Juan Hot Springs, also along the Santa Ana River.
- Eleocharis acicularis* (L.) R. & S. [incl. *E. radicans* (Poir.) Kunth]. Spike-rush. Common small stoloniferous perennial of muddy stream margins and vernal pools.
- Eleocharis geniculata* (L.) R. & S. Rare annual known only from bottomlands in Santa Ana River Canyon, *Howell* 422, July 18, 1927.
- Eleocharis macrostachya* Britt. in Small. Common husky perennial of marshy places and the dominant emergent aquatic in the two largest vernal marshes on the Santa Rosa Plateau.
- Eleocharis montevidensis* Kunth [var. *parishii* (Britt.) V. Grant]. Abundant perennial of moist places, often associated with *E. macrostachya*. Some immature specimens appear to be the var. *montevidensis*.
- Eleocharis rostellata* (Torr.) Torr. Rare perennial collected only in Santa Ana Canyon along the river, *Howell* 449, July 21, 1927.
- Scirpus acutus* Muhl. Bulrush, Tule. Infrequent perennial of marshy places along streams.
- Scirpus cernuus* Vahl subsp. *californicus* (Torr.) Thorne. Low Clubrush. Small annual collected only in Santa Ana Canyon along the river, *Howell* 277 and 278, July 6, 1927, and *Howell* 434, July 18, 1927.
- Scirpus chilensis* Less. (*S. olneyi* Gray). Three-square. Locally abundant perennial at San Juan Hot Springs, also in Santa Ana Canyon.
- Scirpus microcarpus* Presl. Bulrush. Locally abundant perennial along streams and about springs.

Iridaceae

- Sisyrinchium bellum* Wats. Blue-eyed-grass. Locally abundant perennial of moist, grassy drainageways in grassland and moist open areas in chaparral.

Juncaceae

- Juncus balticus* Willd. Wire Rush. Frequent perennial of moist places, usually along streams.
- Juncus bufonius* L. Toad Rush. Common annual of moist open places, especially vernal pools and stream margins.
- Juncus effusus* L. var. *pacificus* Fern. & Wieg. Locally abundant perennial

in shallow water of intermittent streams in oak woodlands on the Santa Rosa Plateau. This "variety" will be recombined as a subspecies elsewhere by H. Lint (pers. comm.).

Juncus kelloggii Engelm. A rare tiny annual locally abundant in vernal wet depressions in grasslands on the mesas of the Santa Rosa Plateau.

Juncus macrophyllus Cov. Frequent perennial along intermittent streams in oak woodlands.

Juncus mexicanus Willd. Rush. Common perennial of stream margins and seasonally moist places; surely only a subspecies of *J. balticus*, to be treated elsewhere by H. Lint (pers. comm.).

Juncus oxymyris Engelm. Apparently rare perennial, having been collected only in Claymine Canyon near Sierra Peak, *J. T. Howell* 254, June 3, 1927.

Juncus rugulosus Engelm. Frequent tall perennial of shallow, rocky drainageways in grasslands and riparian and oak woodlands.

Juncus sphaerocarpus Nees in Funk. Rare annual found only on the desiccated margin of a large vernal pool on Mesa de Colorado of the Santa Rosa Plateau.

Juncus textilis Buch. Locally abundant tall perennial along stream margins in oak woodlands of the Santa Rosa Plateau and in San Juan and Santa Ana River canyons.

Juncus torreyi Cov. Rare perennial in wet, sandy bottomlands of Santa Ana River Canyon, *Howell* 399, July 14, 1927.

Juncus xiphioides E. Mey. Common perennial of moist places, especially along streams.

Juncaginaceae

Lilaea scilloides (Poir.) Haum. Flowering-quillwort. Locally abundant in mud and shallow water of vernal pools and small streams on the Santa Rosa Plateau.

Lemnaceae

Lemna gibba L. Duckweed. Tiny floating annual locally abundant on shallow pools of streams in wooded ravines of the Santa Rosa Plateau.

Lemna minima Phil. Floating on shallow water of vernal pools and streams: common on the Santa Rosa Plateau.

Lemna trisulca L. Rare duckweed floating in shallow water, Santa Ana River Canyon, *Howell* 400, July 15, 1927.

Wolffiella oblonga (Phil.) Hegelm. Rare tiny floating aquatic in shallow water of pools in Santa Ana River Canyon, *Howell* 1204, Sept. 6, 1928.

Liliaceae

Allium haematochiton Wats. Wild Onion. Common bulbiferous perennial of dry, rocky or clayey slopes in grasslands and chaparral.

- Allium monticola* A. Davids. subsp. *keckii* (Munz) Traub & Ownbey. Rare bulbiferous perennial collected in open places in chaparral at the summit of Santiago Peak.
- Allium peninsulare* Lemmon. Frequent bulbiferous perennial of open, rocky places or openings in, or margins of, chaparral on canyon slopes, especially on the Santa Rosa Plateau.
- Allium praecox* Brandegee. Frequent bulbiferous perennial in chaparral, as on the Bedford Truck Trail, the Cold Water Canyon Trail above Glen Ivy, at the head of Claymine and Coal canyons, and Rice and Santa Ana River canyons, mostly in the northern part of the range.
- Bloomeria crocea* (Torr.) Cov. subsp. *crocea*. Golden-stars. Frequent corm-bearing perennial of open, grassy or rocky places, especially in openings in chaparral.
- Brodiaea filifolia* Wats. Wild-hyacinth. Frequent corm-bearing perennial of grassy slopes and openings in chaparral.
- Brodiaea jolonensis* Eastw. Rare corm-bearing perennial collected only on Skyline Drive above Corona. *R. Cooper* 1, May 21, 1936.
- Brodiaea orcuttii* (Greene) Baker. Infrequent corm-bearing perennial in adobe soil about several vernal pools of Mesas de Burro and Colorado on the Santa Rosa Plateau.
- Brodiaea terrestris* Kell. subsp. *kernensis* (Hoov.) Niehaus. Common corm-bearing perennial in grasslands.
- Calochortus albus* Dougl. ex Benth. Mariposa-lily. Infrequent bulbiferous perennial of grassy openings in chaparral and oak woodlands.
- Calochortus catalinae* Wats. Infrequent bulbiferous perennial collected only in the north end of the range in chaparral in Sierra, Black Star and Santa Ana River canyons.
- Calochortus invenustus* Greene. Rare, slender bulbiferous perennial taken only from Santiago Peak, *Abrams* 1848, June 15, 1901, *Munz & Keck* 7093, June 14, 1923.
- Calochortus splendens* Dougl. ex Benth. The commonest of the Mariposa-lilies in grasslands, on slopes in oak woodlands, in grassy places in chaparral, and in sage scrub.
- Calochortus weedii* Wood. A frequent, showy perennial of dry, often heavy or rocky soil of grasslands and chaparral, especially along the Ortega Hwy.
- Chlorogalum parviflorum* Wats. Soap Plant. Infrequent bulbiferous perennial of burn scars and of open places in chaparral.
- Chlorogalum pomeridianum* (DC.) Kunth. Common bulbiferous perennial of dry, open, rocky or grassy places.
- Dichelostemma puchellum* (Salisb.) Heller. Blue Dicks. Common corm-bearing perennial in open grassy, or rocky places, found most abundantly in grasslands but also as high as Santiago Peak in clearings in chaparral.

- Fritillaria biflora* Lindl. Chocolate-lily. Infrequent bulbiferous perennial of grassy places in oak woodlands and chaparral, near Tenaja Canyon, Wildomar USFS Fire Station, Bedford Truck Trail, and Hagador Canyon.
- Lilium humboldtii* Roezl & Leichtl. subsp. *ocellatum* (Kell.) Thorne. Humboldt Lily. Tall bulbiferous perennial frequent in riparian woodland in canyons or in moist, semishady soil of chaparral.
- Muilla maritima* (Torr.) Wats. Locally abundant bulbiferous perennial along rocky, grassy drainageways in grasslands and chaparral.
- Nolina parryi* Wats. Frequent woody perennial of clearings and open banks in chaparral, primarily in the area from Sierra Peak and Coal and Blackstar canyons to Trabuco Canyon.
- Yucca whipplei* Torr. subsp. *whipplei*. Our Lord's-candle. Common woody lily of chaparral and upper canyon walls of riparian woodlands, seldom abundant locally, however.
- Zigadenus fremontii* (Torr.) Torr. ex Wats. (var. *fremontii*). Star-lily. Infrequent bulbiferous perennial on chaparral burns and under shrubs in chaparral.

Orchidaceae

- Epipactis gigantea* Dougl. ex Hook. Stream Orchid, Helleborine. Infrequent perennial from short creeping rootstock, collected only along a streambank in Hagador Canyon, in shaded soil of a Coulter pine woodland in the vicinity of Santiago Peak, and on a seepage slope in San Juan Canyon.
- Habenaria unalascensis* (Spreng.) Wats. Rein Orchid. Frequent perennial with tuberlike roots, collected under live oaks in Hagador Canyon, in chaparral in San Juan, Silverado, Trabuco, and Santa Ana River canyons, and in grassy oak woodlands near the head of Slaughterhouse Canyon on the Santa Ana Plateau.

Poaceae

- **Agropyron elongatum* (Host.) Beauv. Wheat Grass. Frequently established perennial along roadsides in chaparral.
- Agrostis diegoensis* Vasey. Bent Grass. Common perennial of grasslands and grassy clearings in oak, mixed-evergreen, and Coulter pine woodlands.
- Agrostis exarata* Trin. Rare perennial, collected only on moist sandy margins of San Juan Creek.
- **Agrostis semiverticillatus* (Forsk.) C. Chr. Abundant perennial of stream margins and other moist places.
- *Agrostis tenuis Sibth. Colonial Bent. Rare escape, known only on the Starr Ranch, Little 1623, July 1, 1976 (CSF).
- Alopecurus howellii* Vasey. Foxtail. Locally abundant annual in desiccated beds of vernal pools and other muddy flats on the Santa Rosa Plateau.

Andropogon glomeratus (Walt.) B.S.P. Beardgrass. Rare caespitose perennial in chaparral along Skyline Drive and at San Juan Hot Springs, where abundant.

Aristida adscensionis L. (var. *modesta* Hack.) Three-awn Grass. Rare annual of dry, open places, collected only in Santa Ana River Canyon, Howell 856, Feb. 26, 1928.

*Arundo donax L. Giant Reed. Abundantly naturalized tall perennial (to ca. 7 m) at San Juan Hot Springs and in Santa Ana River Canyon.

*Avena barbata Brot. Slender Wild Oat. Annual weed abundant in grasslands everywhere.

*Avena fatua L. Wild Oat. Annual weed heavily naturalized in grasslands, but not so abundant as *A. barbata*.

Bothriochloa barbinodis (Lag.) Herter. Frequent perennial on rocky slopes in clearings in chaparral of Redonda Mesa, Tin Mine, San Juan, and Santa Ana River canyons, and along Skyline Drive.

*Bromus arenarius Labill. Australian Chess. Infrequent weedy annual of rocky places in grasslands, woodlands, and chaparral.

Bromus carinatus H. & A. California Brome. Frequent perennial of dry, open, rocky places in grasslands, woodlands, and chaparral.

*Bromus diandrus Roth. Ripgut Grass. Abundant annual weedy grass of disturbed places, especially abundant in cleared chaparral and heavily grazed grasslands.

Bromus grandis (Shear) Hitchc. in Jeps. Rare perennial in rocky grasslands of the Santa Rosa Plateau and along the Main Divide Truck Trail south of Santiago Peak.

**Bromus madritensis* L. According to Pequegnat (1951) this species is occasional along trails and firebreaks at or below 915 m.

**Bromus molliformis* Lloyd. An apparently rare brome, collected only on the Santa Rosa Plateau. This grass is doubtfully distinct from the next listed.

*Bromus mollis L. Soft Chess. Abundant weedy annual of grasslands and disturbed grassy places in chaparral. Occasionally dense in dry semibare soil above the borders of vernal pools.

Bromus pseudolaevipes Wagnon. Infrequent perennial in chaparral.

*Bromus rubens L. Foxtail Chess, Red Brome. Common weedy annual, locally abundant on burns and other disturbed ground.

*Bromus tectorum L. Cheat Grass. Common weedy annual of disturbed places in chaparral and woodlands.

*Bromus trinii Desv. Reported by Pequegnat (1951) as a rare annual on dry hillsides.

Cenchrus longispinus (Hack. in Kneucker) Fern. Sandbur. Rare clumped annual collected only on moist, sandy bottomlands in Santa Ana River Canyon, Howell 435, July 18, 1927.

- *Cynodon dactylon (L.) Pers. Bermuda Grass. Creeping perennial weed common in disturbed grassy places.
- **Dactylis glomerata* L. Orchid Grass. Coarse perennial reported only for a moist open area in Silverado Canyon by Boughey (1968).
- Deschampsia danthonioides* (Trin.) Munro ex Benth. [var. *gracilis* (Vasey) Munz]. Hairgrass. Locally abundant in oak woodlands and in vernally moist grasslands near margins of vernal pools on the Santa Rosa Plateau.
- **Digitaria sanguinalis* (L.) Scop. Crabgrass. Rare weedy annual of disturbed places in San Juan Canyon.
- Distichlis spicata* (L.) Greene subsp. *stricta* (Torr.) Thorne. Salt Grass. Infrequent perennial of drainage swales in grasslands, moist places in ravines, bottomlands, and especially abundant at San Juan Hot Springs.
- **Echinochloa crusgalli* (L.) Beauv. Barnyard Grass. Common weedy annual of roadsides, drainage ditches, and other severely disturbed ground.
- Elymus condensatus* Presl. Giant Ryegrass. Common coarse perennial of rocky slopes in chaparral and woodlands, especially along ravine banks.
- Elymus glaucus* Buckl. subsp. *glaucus*. Ryegrass. Common perennial of moist, grassy stream margins and shaded places.
- Elymus* × *macounii* Vasey. Rare densely tufted perennial collected only on grassy borders of chaparral on the Santa Rosa Plateau near Murrieta.
- Elymus triticoides* Buckl. Common perennial of moist, grassy margins of streams and ravine banks in woodlands and around seepages in chaparral; found as high as Santiago Peak.
- **Gastridium ventricosum* (Gouan) Schinz & Thell. Nitgrass. Common annual of open, rocky or grassy places and in grassy openings in chaparral.
- Hordeum californicum* Covas & Steb. Wild Barley. Frequent perennial of moist, grassy stream banks in grasslands and oak and riparian woodlands.
- **Hordeum geniculatum* Allioni. Common weedy annual of open grasslands, occasionally forming sparse stands in seasonally wet depressions in grasslands or in dry beds of shallow vernal pools on the Santa Rosa Plateau.
- *Hordeum glaucum Steud. Locally abundant weedy annual of grassy places, as on the Santa Rosa Plateau.
- **Hordeum leporinum* Link. Foxtail Barley. Common weedy annual of open grassy places and disturbed ground.
- Koeleria macrantha* (Ledeb.) Spreng. Junegrass. Tufted perennial infrequent in grasslands and grassy openings in chaparral and woodlands.
- *Lamarckia aurea (L.) Moench. Goldentop. Locally abundant annual on dry, rocky soils of open grasslands and in openings in chaparral.
- Leptochloa fascicularis* (Lam.) Gray. Sprangletop. Weedy annual in drainage ditch below San Juan Hot Springs.
- Leptochloa uninervia* (Presl) Hitchc. & Chase. Rare annual grass of moist places, Starr Ranch, Little 1620, June 24, 1976 (CSF); and sandy margins of Santa Ana River, I. M. Johnston s.n., Dec. 1, 1917.

- *Lolium perenne L. subsp. *multiflorum* (Lam.) Husnot. Italian Ryegrass. Frequent annual of grassy slopes in canyons above riparian woodland and along borders of chaparral.
- **Lolium temulentum* L. Darnel. Infrequent annual of rocky, grassy hillsides.
- Melica frutescens* Scribn. Melic. Infrequent perennial of dry, rocky slopes in chaparral and sage scrub.
- Melica imperfecta* Trin. Common perennial widespread throughout the range, mainly in chaparral, but occasionally in rocky, grassy areas of woodlands.
- Muhlenbergia asperifolia* (Nees & Mey.) Parodi. Scratchgrass. Rare perennial on a stream margin in oak woodlands on the Santa Rosa Plateau and along the river in Santa Ana River Canyon.
- Muhlenbergia californica* Vasey. Rare perennial "around springs and seeps at intermediate altitudes," according to Pequegnat (1951).
- Muhlenbergia microsperma* (DC.) Kunth. Dropseed Grass. Infrequent annual of rock crevices in canyons and exposed areas in chaparral.
- Muhlenbergia rigens* (Benth.) Hitchc. Locally abundant along ravine banks of run-off streams in grasslands and oak woodlands, occasional on grassy hillsides.
- Orcuttia californica* Vasey. Rare grass appearing in dry beds of several of the vernal pools on the Santa Rosa Plateau. See Stagg (1977).
- **Oryzopsis miliacea* (L.) Benth. Ricegrass. Locally abundant weedy perennial in moist sandy soil along San Juan Creek.
- Panicum capillare* L. (var. *occidentale* Rydb.) Infrequent weedy annual in wet soil of ditch below San Juan Hot Springs.
- **Paspalum dilatatum* Poir. Dallas Grass. Rare perennial established on an eroded bank in a drainage ravine on the Santa Rosa Plateau.
- Paspalum distichum* L. Knotgrass. Common perennial of shallow water and moist ground along streams and about ponds.
- **Phalaris aquatica* L. Harding Grass. Rare rhizomatous perennial known only from Starr Ranch, *Little* 1626, May 31, 1976 (CSF).
- **Phalaris caroliniana* Walt. Canary Grass. Rare annual found only on the desiccated margins of a few vernal pools on the Santa Rosa Plateau.
- *Phalaris minor Retz. Infrequent annual in a shaded ravine and in a vernal pool on the Santa Rosa Plateau and in Santa Ana River Canyon.
- *Poa annua L. Water Grass. Frequent in moist or rocky grassy areas.
- Poa bolanderi* Vasey subsp. *howellii* (Vasey & Scribn.) Keck. Bluegrass. Slender annual rare in the range, collected only along the Holy Jim Canyon Trail to Santiago Peak, *Peirson* 3491, May 6, 1923.
- *Poa bulbosa L. Rare perennial of grasslands on the Santa Rosa Plateau.
- Poa scabrella* (Thurb.) Benth. ex Vasey. Malpais Bluegrass. Common tufted perennial of open, often rocky slopes in grasslands, woodlands, and chaparral.

- **Polypogon monspeliensis* (L.) Desf. Beard Grass. Common annual of stream margins and other wet places.
- **Schismus barbatus* (L.) Thell. Infrequent tufted annual along roadside clearings in chaparral and on burn scars.
- *Secale cereale L. Rye. Cultivated annual, occasionally spontaneous in waste places and fields.
- Setaria geniculata* (Lam.) Beauv. Bristle Grass. Rare perennial collected on dry roadbanks of the Ortega Hwy in San Juan Canyon east of the San Juan Fire Station.
- Sitanion ×hansenii* (Scribn.) J. G. Sm. Squirreltail. Rare perennial collected only on the Mt. Santiago Trail at 900 m elevation, *Abrams 1814*, June 15, 1901.
- Sitanion hystrix* (Nutt.) J. G. Sm. Common perennial of dry open grassy places.
- Sitanion jubatum* J. G. Sm. Infrequent perennial of rocky or chaparral-clad slopes.
- **Sorghum halepense* (L.) Pers. Johnson Grass. Infrequent tall perennial of grassy banks of ravines in grasslands, woodlands, and chaparral.
- Sporobolus airoides* (Torr.) Torr. Rare perennial collected in Santa Ana River Canyon, *Howell 181*, June 21, 1927.
- Stipa cernua* Stebbins & Love. Needlegrass. Tufted perennial frequent on dry, grassy slopes.
- Stipa coronata* Thurb. in Wats. Common large perennial grass of rocky grasslands and rocky slopes in chaparral and woodlands.
- Stipa lepida* Hitchc. Feather Grass. Slender perennial of open slopes in grasslands and occasional burn scars in chaparral.
- Stipa pulchra* Hitchc. Very common perennial of dry slopes in grasslands, chaparral, and grassy open areas of woodlands.
- Vulpia bromoides* (L.) S. F. Grant [*Festuca dertonensis* (All.) Asch. & Graebn.]. Foxtail Fescue. Frequent annual of open grasslands and woodland clearings.
- Vulpia microstachys* (Nutt.) Benth. [var. *pauciflora* (Beal) L. & G.] (*Festuca pacifica* Piper). Pacific Fescue. Rare annual of cleared firebreaks through chaparral along the Main Divide Truck Trail.
- *Vulpia myuros (L.) K. C. Gmel. (var. *hirsuta* Hack.) (*Festuca megalura* Nutt.). Rattail Fescue. Common annual of dry open places in grasslands and woodlands, even in mixed-evergreen woodlands at higher elevations. The typical var. *myuros* is infrequent in grasslands and grassy openings in chaparral, and locally abundant in the vernal moist zone of vernal pools on the Santa Rosa Plateau.
- Vulpia octoflora* (Watt.) Rybd. Six-weeks Fescue. Locally abundant annual of openings in chaparral and burn scars.

Statistical summary of the vascular plants of the Santa Ana Mountains.

	Indigenous			Naturalized				Grand totals:	
	Families	Genera	Species (incl. infrasp. taxa)	Additional infrasp. taxa (& hybrids)	Additional families	Genera	Species (incl. infrasp. taxa)		
Pteridophytes	10	18	25 (6)		0	0	0	Families	97
Conifers	2	4	5		0	0	0	Genera	403
Dicotyledons	67	258	522 (167)	20 (4)	5	52	110 (2)	Species (incl. infrasp. taxa)	818 (192)
Mono-cotyledons	11	53	116 (16)	1 (2)	2	17	40 (1)	Add. infra-specific taxa	24
Totals	90	333	668 (189)	21 (6)	7	69	150 (3)	Interspecific hybrids	6

*Pontederiaceae

**Eichhornia crassipes* (Mart.) Solms. Water-hyacinth. Rare aquatic floating in river water in Santa Ana River Canyon, E. R. Johnson 3808, June 29, 1932.

Potamogetonaceae

**Potamogeton crispus* L. Pondweed. Weedy plant naturalized in ponds in Santa Ana River Canyon, Howell 1203, Sept. 6, 1928.

Potamogeton foliosus Raf. Locally abundant submersed herb in shallow water of streams on the Santa Rosa Plateau.

Potamogeton pectinatus L. Sago Pondweed. Infrequent submersed aquatic in shallow water of streams on the Santa Rosa Plateau.

Potamogeton pusillus L. Rare submersed aquatic in shallow water of a large vernal pool on the Mesa de Colorado of the Santa Rosa Plateau.

Typhaceae

Typha angustifolia L. Cattail. Frequent perennial in some shallow ponds and streams on the Santa Rosa Plateau and in San Juan Canyon.

Typha domingensis Pers. Locally abundant in streams on the Santa Rosa Plateau and bottomlands in Santa Ana River Canyon.

Typha latifolia L. Locally abundant in wet places, as along San Juan Creek and in Santa Ana River Canyon.

Zannichelliaceae

Zannichellia palustris L. Horned-pondweed. Locally abundant submersed herb of shallow water in slow-running streams on the Santa Rosa Plateau and in bottomland ponds of the Santa Ana River.

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