U.S.D.A. Forest Service
Research Paper RM-41

1968

# Flora and Vegetation

# of the

# Sierra Ancha Experimental Forest,[1] Arizona

By

Charles P. Pase, Plant Ecologist[2]

and

R. Roy Johnson, Associate Professor[3]

[1]A portion of the Tonto National Forest, set aside for experimental purposes in 1932, under authority of the Secretary of the U. S. Department of Agriculture, and administered by the Rocky Mountain Forest and Range Experiment Station.

[2]Rocky Mountain Forest and Range Experiment Station, with central headquarters maintained in cooperation with Colorado State University at Fort Collins; Pase is located at Tempe in cooperation with Arizona State University.

[3]Department of Biology, University of Texas, El Paso. Dr. Johnson was a graduate student at the University of Arizona, Tucson, at the time this Research Paper was prepared.

CONTENTS

# Flora and Vegetation of the Sierra Ancha Experimental Forest, Arizona

Charles P. Pase and R. Roy Johnson

The Sierra Ancha Experimental Forest, a field unit of the Rocky Mountain Forest and Range Experiment Station devoted primarily to watershed research, lies in Sierra Ancha, a mountainous area about midway between Globe and Young in Gila County, central Arizona. Although only 12,820 acres in size, its broad elevational range—from 3,550 to 7,724 feet—covers a variety of vegetation types.

This Paper summarizes the physical environment of the Forest, with a brief description of each of the major plant associations, and a catalog of species listing all known vascular plants collected since the Forest was established in 1932.

## Physical Characteristics

### Climate

Upper elevations in Sierra Ancha are characterized by cold moist winters, dry warm springs, and hot moist summers (fig. 1). The fall dry season so characteristic of much of the State is less pronounced here. Precipitation averages 33.4 inches per year, 11.0 inches (33 percent) of which fall from June through September. Annual precipitation has varied from 18.6 to 49.9 inches. Much of the winter precipitation falls as snow above 6,000 feet. Winter snowpack in the upper Workman Creek area, at 7,000 feet, often exceeds 4 feet.

In the intermediate elevation zone, between 4,800 and 6,000 feet, temperatures are much higher and relatively little winter precipitation occurs as snow, except in occasional years. Annual rainfall at the Sierra Ancha headquarters, at 5,100 feet elevation, averages 24.7 inches of which 7.5 inches (30 percent) falls from June through September. Annual rainfall has varied from 13.1 to 42.0 inches. A moderate secondary dry season usually begins as temperatures begin to drop, but is commonly of short duration (fig. 1).

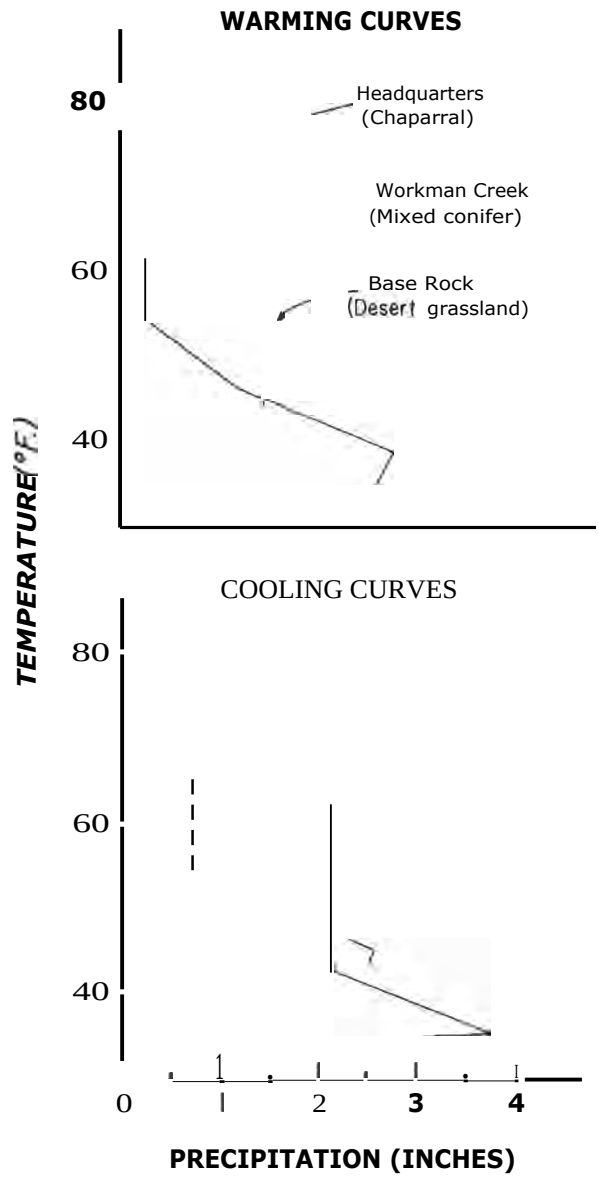


*Figure 1.--Mean monthly temperatures plotted against median monthly precipitation at three climatic stations, Sierra Ancha Experimental Forest. End points of curves for Workman Creek are July and February; for other stations, August and January.*

In the lower elevation zone at the south end of the Forest, low rainfall and high temperatures combine to make a hot, desertlike climate. Mean rainfall is 16.2 inches, but rainfall has varied from 10.2 to 22.6 inches. Rainfall distribution is not greatly different from that in the upper two zones, as 5.7 inches (35 percent) falls from June through September. A spring drought, more severe than in the higher elevation zones, usually extends from mid-April to mid-July. A less severe but still critical drought period occurs after the end of the summer rainy season, when temperatures are descending, yet still adequate for plant growth.

The striking differences in environments are apparent in the warming and cooling curves for the three elevation zones at Sierra Ancha based on median precipitation[4] and mean temperatures (fig. 1). The Workman Creek station is in a small mountain park completely surrounded with ponderosa pine (Pinus ponderosa) and mixed conifer forest; Headquarters Station is well within the chaparral type, and on the edge of a strip of oak-woodland; the Base Rock Station is in the semidesert grassland, but only a quarter mile from elements of the southern desert shrub formation.

## Geology

The Forest lies along the crest of the Sierra Ancha, a mountain range carved from sedimentary, metamorphic, and igneous rocks uplifted in a domelike structure. Several poorly to well defined faults cut the mountain mass.

Exposed formations within the Experimental Forest generally belong to the Apache Group of later Precambrian age. In descending order, these consist of Troy Sandstone and Quartzite, Mescal Limestone, Dripping Springs Quartzite, Barnes Conglomerate, Pioneer Shale, and Scanlon Conglomerate. Vesicular basalt flows of Tertiary and/or Quaternary age (Darton 1925, Granger and Raup 1964) are present in some of the higher basins. Intruded within these formations at various horizons are sills of diabase, often deeply weathered where exposed. The Apache Group as a whole has been subjected to low-grade metamorphism, with the addition of silica which has increased the resistance of the rocks to mechanical and chemical weathering.

The Dripping Springs Quartzite, one of the most conspicuous geologic features, is dissected by numerous gorges at the extreme south end of the Forest. According to Shride, (1962) the thickness of the quartzite beds (including the basal member, Barnes Conglomerate) varies from 550 to 700 feet. Shallow weathering of this formation restricts moisture penetration to the shallow, fine-textured soil. As a consequence, normally deep-rooted shrubs and trees do poorly on this formation except where local topographic features permit deeper soil formation, as in pockets and at the toe of slopes. A large part of Parker and Pocket Creek watersheds lies in this formation, which helps explain the low retention storage capacity and unusually high water yields from these areas.

## Soils

In the high-elevation zone at the north end of the Forest, surface soils are mostly of loam or clay-loam texture, with granular or crumb structure. Soil depth may vary from a few inches to more than 18 feet. Subsoils are mostly layered, and vary in texture from clay loams to clays. The area is primarily in conifer forest, and tree roots have been found to extend to a depth of at least 18 feet.

Soils in the intermediate elevation zone are mostly derived from deeply weathered medium- to coarse-grained diabase, locally mixed with talus from the steep Mescal Limestone and Dripping Springs Quartzites above. Horizons are ill defined, organic matter content is low, and the soils are almost structureless. Subsoils tend to be much lower in clay than soils derived from granites. Deep weathering permits shrub roots to penetrate to considerable depths. In a recent root distribution study, 13 grams of chaparral roots per cubic foot of soil were found at the 12-foot level, the maximum depth sampled. This was a substantially higher root

*[4] Plant distribution is apt to be more responsive to median rather than mean precipitation, especially in arid or semiarid climates (Daubenmire 1956). Where rainfall is low, a single large storm can greatly affect the mean rainfall value for many years, yet have little ecological effect on plant populations. Median values tend to be less distorted by these rare rainfall events, and presumably are more closely correlated with vegetation.*

*[5] Authors of scientific names are given in the checklist.*

concentration than was found under conifer trees at the same depth, and suggests that chaparral shrubs probably send roots considerably deeper (U. S. D. A. Forest Service 1957). Root studies conducted in the chaparral of California also showed that dominant shrubs were rooted to a depth of 28 feet (Hellmers et al. 1955).

Soils developed on the lower elevation Dripping Springs Quartzite, Barnes Conglomerate, and Pioneer formations are shallow and fine textured, and probably fall within the reddish chestnut great soil group. The soil horizons are poorly defined. The entire profile contains a large amount of disintegrated quartzite rock, is noncalcareous and slightly acid, and contains a high percentage of silt and clay (Martin and Rich 1948).

**Vegetation** Types

Eight vegetation types are found on the Experimental Forest (fig. 2). From high elevation to low these are: mixed conifer, mountain park, ponderosa pine, chaparral, oak-woodland, desert grassland, and desert shrub. The riparian type is adjacent to the major streams, and cuts across all the other types. General descriptions of four of these have been published recently in connection with a wildlife habitat study (Reynolds and Johnson 1964). Vegetation types used here agree generally with Nichol (1952). Botanical nomenclature follows Hitchcock (1950) for grasses, Little (1953) for trees, and Kearney and Peebles (1960) for all others. Common names generally follow Kelsey and Dayton (1942). Because of intimate

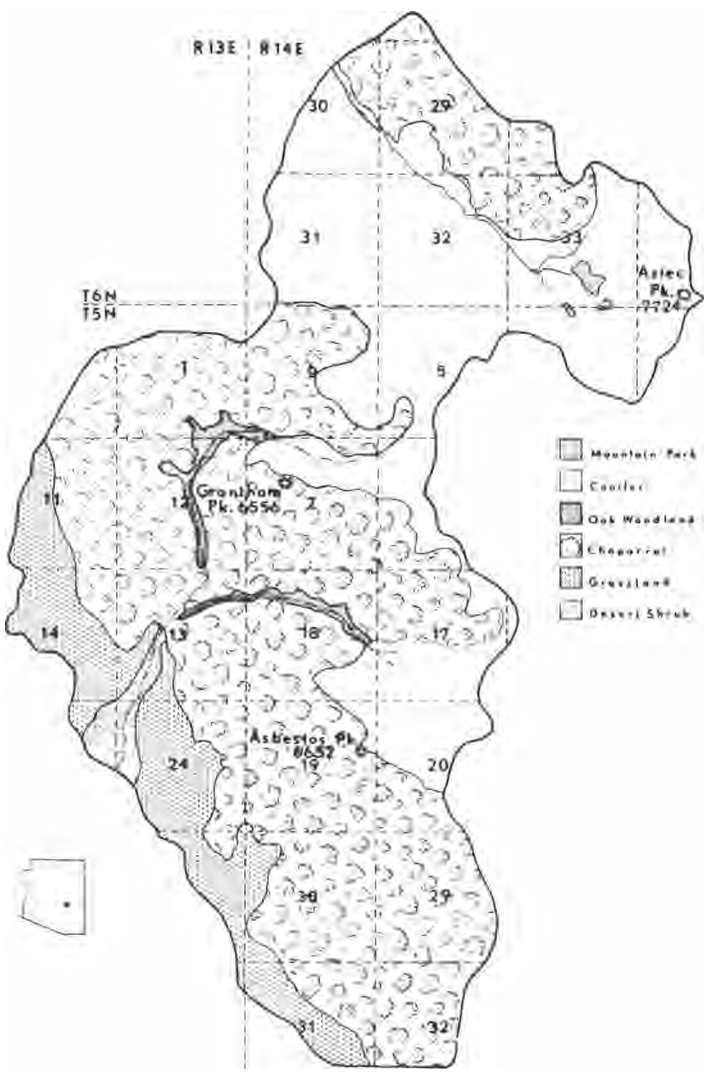


*Figure 2.--Vegetation types on the Sierra Ancha Experimental Forest.*

intermingling of types, the "conifer" type on the vegetation map (fig. 2) includes both mixed conifer and ponderosa pine. Acreage of the types is given below:

| Type: | Experimental Forest (acres) | (percent) |
|---|---|---|
| Conifer[1] | 3,776 | 29.5 |
| Mountain park | 30 | .2 |
| Oak-woodland | 131 | 1.0 |
| Chaparral | 7,302 | 57.0 |
| Desert grassland | 1,351 | 10.5 |
| Desert shrub | 162 | 1.3 |
| Riparian[2] | 68 | .5 |
| Total | 12,820 | 100.0 |

[1]Includes both pine-fir and ponderosa pine types.

[2]Based on estimated average width of 66 feet.

**Mixed Conifer**

Mixed conifer ranges from below 6,000 feet on cool, moist slopes to more than 7,500 feet in Workman Creek and Parker Creek drainages. The dominant trees are Douglas-fir (Pseudotsuga menziesii), white fir (Abies concolor), and ponderosa pine (fig. 3). Individual ponderosa pines usually attain greater size in the mixed conifer than in the pure ponderosa pine type. Understory trees are Gambel oak (Quercus gambelii) and New-Mexican locust (Robinia neomexicana). Quaking aspen (Populus tremuloides) commonly occurs at edges of clearings and in old burns. The main shrub scattered along the forest floor is mountain snowberry (Symphoricarpos oreophilus).

The few herbaceous species which grow under the large trees are shade-tolerant species such as Canadian violet (Viola canadensis), several species of orchids including western rattlesnake-plantain (Goodyera oblongifolia), and nonphotosynthetic species such as coralroots (Corallorhiza maculata, C. wisteriana and C. striata). During the summer rainy season fungi are common in decaying organic matter, such as old logs and duff, and mosses grow on rocks, soil, and logs. Species more common in small clearings and along roadsides include figwort (Scrophularia parviflora), red raspberry (Rubus strigosus), and strawberry (Fragaria ovalis).

**Mountain Park**

The major park is found on the Middle Fork of Workman Creek, in the mixed conifer vegetation type (fig. 4). Deep, fine soils and high rainfall contribute to a diverse flora. Clearings are bordered by dense stands of ponderosa pine, white fir, and Douglas-fir, interspersed with quaking aspen and Gambel oak. Clumps of Arizona walnut (Juglans major) are scattered within the park. Arroyo willow (Salix lasiolepis) forms dense colonies along washes. Thickets of Gambel oak, mountain snowberry, and roses (Rosa spp.) and the apple orchard (at the deserted Peterson Ranch) provide good wildlife cover.

Figure 3.--Mixed conifer stand at the head of Workman Creek. Dense shade restricts herbaceous understory.

*Figure 4.--Small mountain park in the Middle Fork of Workman Creek.*

Herbaceous plants are abundant. Grasses include Kentucky bluegrass (Poa pratensis), redtop (Agrostis palustris), and orchardgrass (Dactylis glomerata). Common bindweed (Convolvulus arvensis), skyrocket (Gilia aggregata), and several composites, including the common sunflower (Helianthus annuus) and ragleaf bahia (Bahia dissecta) grow throughout the clearings. Seeps and springs are surrounded by Juncus spp., Cyperus spp., Carex spp., and prairiemallow (Sidalcea neomexicana).

**Ponderosa Pine**

The ponderosa pine type ranges from approximately 5,500 feet on cool, moist slopes and in shaded canyons to 7,000 feet on drier sites such as west-facing slopes or in shallow, rocky soils (fig. 5). Ponderosa pine is the dominant tree. On drier sites, New-Mexican locust, Emory oak (Quercus emoryi), and alligator juniper (Juniperus deppeana) are the main understory species. In cooler, moist areas, New-Mexican locust and Gambel oak occur as an understory. Herbaceous plants are few. Bracken (Pteridium aquilinum) is common locally following summer rains. Plants common along roadsides and in clearings include the colorful scarlet bugler (Penstemon barbatus), Fendler ceanothus (Ceanothus fendleri), and red and yellow pea (Lotus wrightii). Sparse grasses, usually most common in clearings, include mountain muhly (Muhlenbergia montana), bulb panicum (Panicum bulbosum), and Pringle needlegrass (Stipa pringlei).

*Figure 5.--Ponderosa pine stand at Workman Creek.*

*Figure 6.--Dense oak-woodland community near Headquarters. Dominant tree is Quercus arizonica.*

**Oak-woodland**

A small area of oak-woodland occurs in Parker and Pocket Creeks between 4,800 and 5,300 feet elevation. Treelike oaks dominate the overstory, while understory shrubs, where present, are mainly those common in the adjacent chaparral type. Arizona white oak (Quercus arizonica) and Emory oak are particularly abundant, while southwestern black cherry (Prunus serotina var. rufula) is common usually on the more mesic sites (fig. 6). California buckthorn (Rhamnus californica), rarely found in the adjacent chaparral, is fairly common on the cooler slopes. The attractive but dangerous poison-ivy (Rhus radicans) is both widespread and abundant.

The herbaceous understory is rather sparse, except on the lower slopes adjacent to stream channels. Common plants include California brome (Bromus carinatus), fringed brome (B. ciliatus), blue wildrye (Elymus glaucus), deergrass (Muhlenbergia rigens), and purple geranium (Geranium eremophilum).

**Chaparral**

Chaparral reaches its best development on diabase-derived soils between 4,500 and 6,000 feet elevation (fig. 7). Where soils are thin,

*Figure 7.--Dense mature stand of chaparral near western edge of Experimental Forest. Quercus turbinella is the dominant species.*

overlying massive unfractured quartzite, chaparral stands become more open, with interspersed islands of grassland and forbs.

With few exceptions, characteristic chaparral shrubs are evergreen, broad sclerophylls. Most have deep, extensive root systems and the ability to resprout vigorously after fire. The few nonsprouting shrubs produce abundant seeds which germinate readily after fire (Pase 1965).

Shrub live oak (Quercus turbinella) is the most abundant shrub throughout the chaparral type on the Experimental Forest, often comprising 60 percent or more of the woody cover. Toward the upper elevations, common associated shrubs are true mountainmahogany (Cercocarpus montanus), Emory oak, Wright silktassel (Garrya wrightii), and Pringle manzanita (Arctostaphylos pringlei). Crown cover is usually high, and few understory forbs and grasses are present. At lower elevations where the type borders the desert grassland and desert shrub associations, common associated shrubs are skunkbush (Rhus trilobata), catclaw acacia (Acacia greggii), wait-a-bit (Mimosa biuncifera), Wright buckwheat (Eriogonum wrightii), and pointleaf manzanita (Arctostaphylos pungens). Shrubs are more scattered, and understory grasses and forbs, especially annuals, are fairly common. Scattered plants of pinyon (Pinus edulis), and one-seed and alligator junipers (Juniperus monosperma and J. deppeana) are sprinkled throughout the type, but are nowhere dominant.

Although the chaparral type is well adapted to fire, no large fires have occurred here for many years. Ring counts from occasional pine trees in the swales suggest an age of 78 years or more.

Desert Grassland

The grassland type lies mostly on the large area of Dripping Springs Quartzite near the south end of the Forest (fig. 8). Elevations range between 4,000 and 4,800 feet. Occasional plants of velvet mesquite (Prosopis iuliflora var. velutina) are scattered throughout. The most abundant half-shrub is broom snakeweed (Gutierrezia sarothrae). Both pricklypears and chollas (Opuntia spp.) are common. Mammillaria arizonica is common but inconspicuous. Most perennial grasses are summer growing, and usually do not begin growth until the onset of the summer rains. Several species of annual grasses, and annual and perennial forbs, however, are abundant especially after late winter rains. Common perennial grasses include side-oats, hairy, and black gramas (Bouteloua curtipendula, B. hirsuta, and B. eriopoda), three-awns (Aristida spp.) and curly-mesquite (Hilaria belangeri) on upland sites. Where additional moisture is available, as in swales and rocky areas, coarser grasses such as cane bluestem (Andropogon barbinodis), green sprangletop (Leptochloa dubia), and Arizona cottontop (Trichachne californica) may be locally abundant.

**Desert Shrub**

The desert shrub area is largely confined to the breaks of the canyons and the steep sides of Parker Creek Canyon, mostly between 3,550 and 4,500 feet elevation (fig. 9).

Unlike the desert floor outside the Forest, perennial grasses are fairly common on the steep, rocky slopes in the protection of the

*Figure 8.--Desert grassland on shallow, quartzite-derived soils near Base Rock.*

*Figure 9.--Desert shrub on rocky soils near the south end of the Experimental Forest.*

canyon. Common species are generally those encountered in the desert grassland above. Yellow paloverde (Cercidium microphyllum) is a characteristic tree. Common shrubs include Fremont wolfberry (Lycium fremontii) and jojoba (Simmondsia chinensis). Saguaros (Cereus giganteus) occur in protected niches in the canyon walls, but are nowhere abundant. Pricklypears and chollas are common.

**Riparian**

One perennial stream (Workman Creek) and two intermittent streams (Parker and Pocket Creeks) originate in the Forest. The combined length of these channels is approximately 8.5 miles; they traverse all vegetative types on the Forest. Flow in Parker and Pocket Creeks is intermittent during most summers, but even when flow is interrupted scattered pools of water remain in the channels, and some subsurface water is available to plants along the streams (fig. 10).

In Workman Creek and in the upper half of Parker and Pocket Creeks, arborescent vegetation is dominated by Arizona alder (Alnus oblongifolia), bigtooth maple (Acer grandidentatum), and Arizona walnut. Shade-tolerant herbaceous plants form a lush understory. Common plants include fowl mannagrass (Glyceria striata), false-Solomonseal (Smilacina racemosa), and wanderer violet (Viola nephrophylla). Common lianas are canyon grape (Vitis arizonica) and thicket creeper (Parthenocissus inserta).

In the lower reaches of Parker and Pocket Creeks, growing conditions are more severe during most summers and few truly riparian herbaceous species from upper reaches thrive here. Arizona sycamore (Platanus wrightii) and Arizona walnut are dominant. Shrubs and

*Figure 10.--Riparian vegetation along Parker Creek, within the chaparral type.*

trees characteristic of the adjacent oak-woodland and chaparral zones encroach almost to the water's edge. Common herbaceous plants include spike bent (Agrostis exarata), water bent (A. semiverticillata), Rocky Mountain rust (Juncus saximontanus), and inland rush (J. interior var. neomexicana).

**Plant Collections**

Extensive plant collections have been made in the Sierra Ancha since the Experimental Forest was established. Most of these collections are deposited in the Forest Service Herbarium, Washington, D. C., and in herbaria at the Forest Hydrology Laboratory, Tempe, Arizona; Arizona State University at Tempe; and The University of Arizona at Tucson. Collectors who have added significantly to botanical exploration of the area in addition to the authors include Frank W. Gould, Elbert L. Little, Jr., Jerry M. Johnson, Barnard A. Hendricks, and Charles K. Cooperrider. Of these collections, only the ferns and fern allies have been reported (Little 1938). Liverworts of hepatics of the Sierra Anchas have also been reported by Little (1939), but are not included in the present paper. A preliminary checklist covering Sierra Ancha has been prepared by Johnson.[6]

**Additions to the Known Arizona Flora**

Two introduced species of grasses in the present checklist are not previously reported from the State. Collector's name and number follow in parentheses.

Agropyron intermedium introduced at Workman Creek. (C. P. Pase 1766).

Poa bulbosa introduced at Parker Creek. (C. P. Pase 1183).

Poa bulbosa was established in a trial planting about 1938, and has persisted, without spreading, to the present. Agropyron intermedium appears well established in clearcut or otherwise disturbed sites in the mixed conifer and ponderosa pine types on Workman Creek.

[6] *Johnson, R. Roy. The biota of Sierra Ancha, Gila County, Arizona. Master's Thesis, Univ. Ariz., Tucson. 114 pp. 1960.*

**Distribution of Species**

Distribution of species of the Sierra Ancha Experimental Forest was taken from floras by Kearney and Peebles (1960) and Tidestrom and Kittell (1941). The 726 species and 9 varieties reported fall into the following seven more-or-less natural geographic groups. Varieties are considered as separate taxa in this classification.

1. **Arizonan.—Species** of local range known only from Arizona. The following 13 endemic species and varieties comprise 1.8 percent of the flora:
   - Agave chrysantha
   - Agave toumeyana
   - Cimicifuga arizonica
   - Cupressus glabra
   - Echeveria collomae
   - Echeveria rusbyi
   - Echinocereus boyce-thompsoni var. boyce-thompsoni
   - Echinocereus boyce-thompsoni var. bonkerae
   - Erigeron pringlei
   - Perityle ciliata
   - Phlox tenuifolia
   - Rumex orthonerurus
   - Sporobolus interruptus

   Of these, Cimicifuga arizonica is particularly interesting, as it is known from only two other locations, both in central Arizona. Rumex orthoneurus, known otherwise only from two collections in the Chiricahua Mountains of southeastern Arizona, has been found on rich, moist soil in Workman Creek.

2. **Californian.—Species** confined primarily to California. The following 8 species or 1.1 percent, fall in this group:
   - Calyptridium monandrum
   - Harpagonella palmeri
   - Lupinus bicolor
   - Muhlenbergia rigens
   - Pholistoma auritum
   - Plectritis ciliosa
   - Quercus chrysolepis
   - Thelypodium longifolium

3. **Southwestern.—Species** extending from west Texas to Arizona, and south into northern Mexico, or occasionally slightly beyond into the drier parts of southern Colorado, Utah, Nevada, and southeastern California. These are generally plants

of the arid Southwest. Examples are Bouteloua eriopoda, B. aristidoides, and Hilaria belangeri. The largest number of species, 292 or 39.7 percent, falls in this group.

4. **Western United States.—Species** ranging widely throughout the western half of the United States, including the Great Plains, Rocky Mountains, and the Great Basin of Utah and Nevada. Typical examples are snakeweed, Gambel oak, ponderosa pine, and white fir. This second largest group contains 220 species ox 29.9 percent.

5. **North American.—Species** widely distributed throughout temperate North America. These plants are usually, but not always, of mesic habitats. Examples are Corydalis aurea, red raspberry, and roadside agrimony (Agrimonia striata). This is the third largest group, with 152 species or 20.7 percent.

6. **Tropical.—Species** that extend from South or Central America and Mexico northward into the warmer parts of Texas, New Mexico, and Arizona. Only 3, or 0.4 percent, fall into this group: Cyperus flavus, Boerhaavia erecta, and tanglehead (Heteropogon contortus).

7. **Introduced.—Species** introduced by man from other regions of the new or old world, that have become successfully established in the area. These are usually plants of disturbed areas, (road shoulders, and so forth) but may include others that have spread far from such areas. Examples include red brome (Bromus rubens), Kentucky bluegrass, and shepherds-purse (Capsella bursa-pastoris). Forty-seven species, or 6.4 percent, are in this group.

The flora of the Sierra Ancha Experimental Forest is distinctly southwestern and western; approximately 70 percent of all known species fall in these two groups. This is perhaps not surprising, as the chaparral, desert grassland, **and** southern desert shrub formations represent types that extend well into northern Mexico. Few species in these associations are found north of Arizona. In addition, a large number of Rocky Mountain species extend south into Sierra Ancha, especially in the mixed conifer **and chaparral** types.

**Checklist**

In the following plant list, the authors attempted to place each species in its appropriate vegetation type, characteristic site where found, and abundance class. Such data were often missing from collection sheets, and the authors were forced to rely on their familiarity with the species concerned. Often a plant was collected in one vegetation type, when it might in fact be more representative of an adjacent type; in such cases, the more representative location was used in the list. While much of this information must of necessity be subjective, it is thought to be sufficiently reliable to be of some assistance to future students of the local flora.

**Acknowledgments**

The authors gratefully acknowledge the previously mentioned early collectors, without whom this flora would not be possible. Drs. Charles T. Mason of the University of Arizona, and Frederick J. Hermann of the Forest Service Herbarium assisted in examination of difficult specimens. Mr. Hubert Earle of the Desert Botanical Garden, Phoenix, Arizona, assisted in identification of Cactaceae. Drs. Donald J. Pinkava and Duncan T. Patten of Arizona State University reviewed the manuscript and gave many helpful suggestions.

**Literature Cited**

Darton, N. H.
1925. A resume of Arizona geology.* Ariz. Bur. Mines Bull. 119, 298 pp.

Daubenmire, R.
1956. Climate as a determinant of vegetation distribution in eastern Washington and northern Idaho. Ecol. Monogr. 26: 131-154.

Granger, H. C., and Raup, R. B.
1964. Stratigraphy of the Dripping Spring Quartzite, southeastern Arizona.* U. S. Geol. Surv. **Bull. 1168, 119 pp., illus.**

Hellmers, **H., Horton, J. S., Johren, G., and O'Keefe, J.**
**1955. Root systems of some chaparral plants in southern California. Ecology 36: 667-678.**

Hitchcock, A. S.
1950. Manual of the grasses of the United States. Ed. 2, U. S. Dep. Agr. Misc. Publ. 200, 1,051 pp., illus.

Kearney, Thomas H., and Peebles, Robert H.
1960. Arizona flora. Ed. 2, 1,085 pp. Berkeley and Los Angeles: Univ. Calif. Press.

Kelsey, Harlan P., and Dayton, William A.
1942. Standardized plant names. 675 pp. Harrisburg, Pa.: J. Horace McFarland Co.

Little, Elbert L., Jr.
1938. Pteridophytes of Sierra Ancha, Arizona. Amer. Fern J. 28: 144-151.

_____
1939. Hepaticae of Sierra Ancha, Arizona. Bryologist 42: 24-27.

_____
1953. Check list of native and naturalized trees of the States (including Alaska). U. S. Dep. Agr., Agr. Handb. 41, 472 pp.

Martin, W. P., and Rich, L. R.
1948. Preliminary hydrologic results, 1935-48, "Base Rock" undisturbed soil lysimeters in the grassland type, Arizona. Soil Sci. Soc. Amer. Proc. 13: 561-567.

Nichol, A. A.
1952. The natural vegetation of Arizona.* Ariz. Agr. Exp. Sta. Tech. Bull. 127, pp. 187-230.

Pase, Charles P.
1965. Shrub seedling regeneration after controlled burning and herbicidal treatment of dense Pringle manzanita chaparral.* U. S. Forest Serv. Res. Note RM-56, 2 pp., illus. Rocky Mountain Forest and Range Exp. Sta., Fort Collins, Colo.

Reynolds, Hudson G., and Johnson, R. Roy.
1964. Habitat relations of vertebrates of the Sierra Ancha Experimental Forest.* U. S. Forest Serv. Res. Pap. RM-4, 16 pp., illus. Rocky Mountain Forest and Range Exp. Sta., Fort Collins, Colo.

Shride, A. F.
1962. Some aspects of younger Precambrian geology in southern Arizona. Diss. Abstr. 22: 2362. (Ph.D. thesis, Univ. of Ariz., Tucson, 1961.)

Tidestrom, Ivar, and Kittell, Teresita.
1941. A flora of Arizona and New Mexico. 897 pp. Washington, D. C.: Catholic Univ. Press.

U.S.D.A. Forest Service.
1958. Progress thru research, Annual Report 1957.* 111 pp., illus. Rocky Mountain Forest and Range Exp. Sta., Fort Collins, Colo.

*Address requests for copies to the originating office.

# PLANT FAMILIES

# SIERRA ANCHA PLANT CHECKLIST

**Types:**

- **SDS - southern desert shrub**
- **G - desert grassland**
- **C - chaparral**
- **OW – oak woodland**
- **PP – ponderosa pine**
- **PF - pine-fir**
- **MP – mountain parks & meadows**

**Sites:**

- **u - dry uplands**
- **c - cool moist slopes**
- **s - swales & lower slopes**
- **f – flood plains**
- **r – riparian**

**Abundance:**

- **r - rare**
- **o - occasional**
- **f – frequent**
- **a – abundant**
- **va - very abundant**

| | Type | Site | Abundance |
|---|---|---|---|
| *SELAGINELLACEAE* | | | |
| *Selaginella arizonica* M[illegible] | G | | |
| EQVISETACEAE | | | |
| *Equisetum arvense* L. | PP | | |
| E[illegible] L. [illegible]. *affine* (Engelm.) A.A. E[illegible] | PP | | |
| *Equisetum laevigatum* A. B[illegible] | PP | | |
| *Equisetum*[illegible] L. | PP | | |
| *POLYPODIACEAE* | | | |
| A[illegible] *aquilina-venaria* L. | OW | c | |
| *Asplenium resiliens* K[illegible] | OW | c | |
| *Bommeria*[illegible] (M[illegible].) U[illegible]. | | | |
| C[illegible] B[illegible] | | | |
| C[illegible] M[illegible] | | | |
| C[illegible] H[illegible]. | OW | | |
| C[illegible] *lindheimeri* H[illegible]. | OW | | |
| C[illegible] (D.C. E[illegible]) D[illegible] | | | |
| C[illegible] M[illegible] | | | |
| C[illegible] H[illegible]. | | | |
| C[illegible] *auriculatum* (U[illegible].) M[illegible] | | | |
| C[illegible] *fragilis* (L.) B[illegible]. | PF | s | |
| *Dryopteris*[illegible] (K[illegible].) W[illegible]. | OW | c | |
| N[illegible] (P[illegible].) D[illegible]. | | | |
| N[illegible] Maxon | | | |
| N[illegible] (L[illegible].) K[illegible]. [illegible]. [illegible] | | | |
| N[illegible] (L[illegible].) K[illegible]. [illegible]. H[illegible]. | | | |
| *Pellaea*[illegible] (L.) L[illegible] | OW | | |
| *Pellaea intermedia* M[illegible]. | | | |
| *Pellaea*[illegible] (M[illegible]) M[illegible] | | | |
| P[illegible] *longimucronata* Hook. | | | |
| *Pellaea*[illegible] (Cav.) L[illegible] [illegible]. [illegible] (H[illegible].) A. F. T[illegible] | | | |
| *Pityrogramma*[illegible] (K[illegible].) M[illegible] | | | |
| *Polystichum*[illegible] (D.C. E[illegible]) Maxon | | | |
| P[illegible] *aquilinum*[illegible]. *pubescens* U[illegible]. | PP | | |
| W[illegible] *mexicana* F[illegible] | PP | | |
| W[illegible] J. E. S[illegible] | OW | | |
| PINACEAE | | | |
| A[illegible] *concolor* (C[illegible]. & G[illegible].) Lindl. | PF | | va |
| *Cupressus glabra* Sudw. | OW | c | |
| *Juniperus monosperma* (Engelm.) S[illegible]. | OW | | |
| J[illegible] S[illegible]. | | | |
| P[illegible] *edulis* Engelm. | | | |
| P[illegible] L[illegible]. | PP | u | |
| P[illegible] (Mirb.) Franco | PF | | |
| TYPNACEAE | | | |
| T[illegible] *domingensis* Pers. | | | |

| | Type | Site | Abundance |
|---|---|---|---|
| *GRAMINEAE* | | | |
| A[illegible] *desertorum* (Fisch.) S[illegible]. | PP | | |
| A[illegible] (H[illegible]) B[illegible]. | PP | | |
| A[illegible] *smithii* R[illegible]. | MP | | |
| A[illegible] *trachycaulum* (L[illegible]) Malte | PP | | o |
| *Agrostis*[illegible] T[illegible]. | OW | | |
| A[illegible] *palustris* B[illegible]. | MP | | |
| A[illegible] *semiverticillata* (Forsk.) C. C[illegible]. | OW | | |
| A[illegible] L[illegible]. | | | |
| A[illegible] *cirratus* H[illegible]. | | | |
| A[illegible] *adscensionis* L. | | | |
| *Aristida*[illegible] V[illegible] | | | |
| A[illegible] S[illegible]. | | | |
| A[illegible] *glabrata* (V[illegible]) H[illegible]. | | | |
| A[illegible] *glauca* (Nees) W[illegible]. | | | |
| *Aristida hamulosa* Henr. | | | |
| *Aristida*[illegible] M[illegible]. | | | |
| *Aristida*[illegible] V[illegible] | | | |
| A[illegible] W[illegible]. & S[illegible]. | | | |
| A[illegible] H[illegible]. | | | |
| *Aristida*[illegible] N[illegible]. | | | |
| A[illegible] L. | | | |
| B[illegible] (H.B.K.) G[illegible]. | | | |
| B[illegible] L[illegible]. | | | |
| *Bouteloua curtipendula* (Michx.) T[illegible]. | | | |
| *Bouteloua*[illegible] T[illegible]. | | | |
| *Bouteloua*[illegible] (H.B.K.) L[illegible]. | | | |
| *Bouteloua hirsuta* L[illegible]. | | | |
| *Bouteloua*[illegible] V[illegible] | | | |
| B[illegible] *trichopoda* (T[illegible].) N[illegible] | PP | | |
| *Bromus anomalus* R[illegible]. | PF | | |
| *Bromus breviaristatus* Buckl. | OW | | |
| B[illegible] H[illegible]. & Arn. | OW | | |
| *Bromus ciliatus* L. | OW | | |
| *Bromus*[illegible] (S[illegible]) W[illegible]. & S[illegible]. | OW | | |
| *Bromus japonicus* T[illegible]. | MP | | |
| *Bromus marginatus* N[illegible] | PF | | o |
| B[illegible] L. | | | va |
| B[illegible] *tectorum* L. | MP | | o |
| *Chloris verticillata* N[illegible]. | OW | | |
| *Chloris virgata* S[illegible] | OW | | |
| *Dactylis glomerata* L. | MP | | |
| *Digitaria sanguinalis* (L.) S[illegible]. | OW | | |
| E[illegible] L. | PP | | |
| *Elymus glaucus* B[illegible]. | OW | | |
| E[illegible] *desvauxii* B[illegible]. | | | |
| E[illegible] *ciliatensis* (A[illegible].) L[illegible] | | | |
| *Eragrostis diffusa* Buckl. | SDS | | |
| E[illegible] *intermedia* H[illegible]. | | | |
| *Eragrostis lutescens* S[illegible]. | PF | | |
| E[illegible] (H[illegible].) L[illegible] | | | |
| *Eriochloa*[illegible] (F[illegible].) H[illegible]. | SDS | | |
| F[illegible] *octoflora* W[illegible]. | | | |
| *Festuca*[illegible] P[illegible] | | | |
| *Glyceria*[illegible] Wats. | PF | | |
| G[illegible] (L[illegible].) H[illegible]. | PF | | |
| *Heteropogon contortus* (L.) B[illegible]. | | | |
| *Hilaria belangeri* (S[illegible].) N[illegible] | | | |
| *Hordeum*[illegible] C[illegible] | | | |
| *Koeleria*[illegible] (L.) Pers. | PP | | |
| *Leptoloma*[illegible] (S[illegible].) C[illegible] | | | |
| *Leptochloa*[illegible] (H.B.K.) N[illegible] | | | |

| | | |
|---|---|---|
| *filiformis* (L.) B. | | |
| *phleoides* H.B.K. | | |
| Scribn. | PF | s |
| *Muhlenbergia* | | |
| *fragilis* S. | | |
| *Muhlenbergia* H. | | |
| *Muhlenbergia* (N.) H. | PP | |
| *Muhlenbergia* Buckl. | | |
| *Muhlenbergia pauciflora* Buckl. | | |
| *Muhlenbergia* S. | | |
| *Muhlenbergia rigens* (B.) H. | OW | s |
| *Muhlenbergia sinuosa* S. | | |
| *P.* *arizonicum* Scribn. & M. | | |
| *Panicum bulbosum* H.B.K. | | |
| Vasey | PP | s |
| *P.* L. | | |
| R. | PP | s |
| *Panicum* Presl | | |
| *P.* A. | OW | s |
| *P.* *obtusum* H.B.K. | | |
| *P.* L. | MP | s |
| *P.* V. 6 S. | | |
| *P.* L. | | |
| *P.* L. | PP | s |
| *P.* *longiligula* S. & W. | | |
| *P.* *pratensis* L. | MP | s |
| *Polypogon* (L.) D. | | |
| S. H.B.K. | | |
| S. (N.) J. C. S. | PP | u |
| S. H. | | |
| S. (T.) G. | | |
| *Sporobolus* V. | PP | u |
| S. (T.) S. | | |
| S. Scribn. | PP | u |
| S. T. & R. | | |
| T. (Benth.) C. | | |
| T. *muticus* (T.) N. | | |
| T. (Buckl.) H. | | |
| T. *pulchellus* (H.B.K.) H. | | |

CYPERACEAE

| | | |
|---|---|---|
| B. (L.) | | |
| C. B. C. | OW | s |
| *Bulbostylis funckii* (S.) | | |
| C. B. C. | | |
| *Carex* M. | PP | s |
| C. M. | | |
| *Carex occidentalis* B. | PF | u |
| C. *praegracilis* W. B. | OW | |
| *Carex rossii* W. B. | PF | u |
| *Carex subfusca* W. B. | | |
| *Carex* Dewey | OW | s |
| C. *amiatatus* R. | | |
| C. L. | | |
| *Cyperus* B. | PF | s |
| *Cyperus flavus* (V.) N. | | |
| *Cyperus* B. | OW | s |
| C. B. | NW | s |
| C. Link | | |
| C. *uniflorus* T. & H. | | |
| S. Fresl. | PF | |

*COMMELINACEAE*

| | | |
|---|---|---|
| *Commelina* Delile | PF | s |
| T. (B.) | | |
| S. *acapulcorum* (R.) Anderson & W. | OW | c |
| T. G. | PF | c |

*JUNCACEAE*

| | | |
|---|---|---|
| *Juncus balticus* Willd. E. | PP | c |
| *Juncus* W. . *mexicanus* (W.) H. | OW | s |
| J. *saximontanus* A. N. . *saximontanus* | PP | s |
| J. *saximontanus* A. N. . *forma brunnescens* (R.) H. | PP | c |
| *Juncus* Willd. (W.) H. | OW | |

LILIACEAE

| | | |
|---|---|---|
| A. *palmeri* Wats. | OW | c |
| A. B. | PP | u |
| C. *ambiguus* (J.) O. | | |
| *Calochortus flexuosus* Wats. | | |
| *Calochortus* Wats. | | |
| *Dasylirion wheeleri* Wats. | | |
| *Nolina* Wats. | | |
| S. (L.) D. | PF | c |
| Y. T. | | |
| Y. Engelm. | | |

AMARYLLIDACEAE

| | | |
|---|---|---|
| A. Peebles | | |
| A. T. (A. *La* Breitung) | | |
| *Agave* Engelm. | | |
| *Agave* Engelm. | | |

*IRIDACEAE*

| | | |
|---|---|---|
| I. *missouriensis* N. | MP | s |

*ORCHIDACEAE*

| | | |
|---|---|---|
| C. R. | PF | c |
| *Corallorhiza striata* Lindl. | PP | c |
| *Corallorhiza* = C. | PP | c |
| G. R. | PF | c |
| *Habenaria* Wats. | PF | |

SALICACEAE

| | | |
|---|---|---|
| P. *angustifolia* J. | OW | |
| *Populus* Wats. | | |
| P. *tremuloides* Michx. | PF | c |
| *Salix* B. | | |
| *Salix laevigata* B. | PVC | |
| *Salix lasiolepis* B. | OW | |
| *Salix neoolurlana* B. | OW | s |

*JUGLANDACEAE*

| | | |
|---|---|---|
| J. (T.) H. | OW | s |

*BETULACEAE*

| | | |
|---|---|---|
| A. T. | OW | |

*FAGACEAE*

| | | |
|---|---|---|
| Q. S. | OW | u |
| *Quercus* L. | OW | |
| Q. T. | OW | u |
| *Quercus* K. | | |
| Q. N. | PP | u |
| Q. Greene | | |

*ULMACEAE*

| | | |
|---|---|---|
| C. T. | | |

*MORACEAE*

*Morus microphylla* Buckl.

URTICACEAE

| | | |
|---|---|---|
| P. N. | SDS | c |
| U. G. | PP | c |
| U. *gracilis* Ait. | PP | u |

*LORANTHACEAE*

| | | |
|---|---|---|
| *Arceuthobium* Engelm. | PF | |
| A. (H.B.K.) E. | PP | |
| *Phoradendron californicum* N. | | |
| P. T. | | |
| *Phoradendron* E. | | |

*SANTALACEAE*

| | | |
|---|---|---|
| C. DC. | | |

*ARISTOLOCHIACEAE*

*Aristolochia watsoni* Woot. & S□□□□□.

*POLYGONACEAE*

*Eriogonum abertianum* Torr.
*Eriogonum alatum* Torr. PF □
*Eriogonum cernuum* Nutt.
*Eriogonum fasciculatum* B□□□□. SDS □
*Eriogonum jamesii* B□□□□. OW c
*Eriogonum pharmaceoides* T□□□. PP u
*Eriogonum thurberi* T□□□.
*Eriogonum vimineum* Dougl.
*Eriogonum wrightii* T□□□.
*Polygonum convolvulus* L. PP □
*Polygonum sawatchense* S□□□□ OW u
*Pterostegia drymarioides* F□□□□. & M□□□□ SDS c
*Rumex acetosella* L. PP s
*Amex crispus* L. PP □
*Rumex hymenosepalus* Torr. SDS s
*Rumex orthoneurus* R□□□.□. PP s

*CRENOPODIACEAE*

*Chenopodium fremontii* Wats.
*Chenopodium graveolens* Willd.□□□□.
*neomexicanum* (A□□□□□) A□□□□□
*Salsola kali* L. PP u

*AMARANTHACEAE*

*Amaranthus graecizans* L.
*Amaranthus hybridus* L. PP □
*Amaranthus powellii* W□□□. PP u
*Froelichia arizonica* T□□□□□□□
*Froelichia gracilis* (H□□□.) Moq. PP u

*NYCTAGINACEAE*

*Boerhaavia erecta* L.
*Boerhaavia intermedia* J□□□□
*Boerhaavia spicata* C□□□□□
*Boerhaavia torreyana* (W□□□.) Standl. OW □
*Mirabilis bigelovii* G□□□ SDS □
*Mirabilis longiflora* L. PP u
*Mirabilis multiflora* (Torr.) G□□□
*Mirabilis oxybaphoides* G□□□ PF u
*Oxybaphus coccineus* Torr.
*Oxybaphus comatus* (S□□□□) W□□□□□□□□ PP c
*Oxybaphus linearis* (P□□□□) R□□□□□
*Oxybaphus pumilus* (Standl.) Standl.

*AIZOACEAE*

*Mollugo cerviana* (L.) S□□□□□□
*Mollugo verticillata* L.

*PORTULACACEAE*

*Calandrinia ciliata* (R□□ & P□□□□) DC.
*Calyptridium monandrum* N□□□.
*Claytonia rosea* R□□□. OW □
L□□ □□□ □□□□□□□□□□ E□□□□□. PP u
*Montia perfaiata* (D□□□) H□□□□□ OW □ □
*Portulaca coronata* S□□□□
*Portulaca oleracea* L.
*Portulaca suffrutescens* E□□□□□.
*Talinum parviflorum* Nutt.

*CARYOPHYLLACEAE*

*Arenaria confusa* R□□□. PP
*Arenaria saxosa* G□□□□□□. *cinerascens*
R□□□□. PP o
*Cerastium texanum* B□□□□. OW s
*Silene laciniata* Cav. PE □
*Ste laria longifolia* M□□□.
*Stellaria media* (L.) C□□□□□□

*RANUNCULACEAE*

*Anemone tuberoaa* R□□□.
*Aquilegia caerulea* J□□□□ PF □
*Aquilegia chrysantha* G□□□ PF c
*Cimicifuga arizonica* W□□□. PF c
*Clematis ligusticifolia* Nutt. OW s
*Delphinium amabile* T□□□□□□□ SOS □
*Delphinium scaposum* G□□□□□ OW □
*Delphinium scopulorum* G□□□ MP
*Myosurus cupulatus* W□□□.
*Ranunculus hydrocharoides* G□□□ PP □
*Ranunculus inamoenus* G□□□□□
*Ranunculus macounii* B□□□□. PF □
*Thalictrum fendleri* E□□□□□. OW c

*BERBERIDACEAE*

*Berberis haematocarpa* W□□□□□
*Berberis repens* Lindl. PE □

*PAPAVERACEAE*

*Argemone platyceras* L□□□ & O□□□ G □
*Corydalis aurea* W□□□□. OW c 7
*Eschscholtzia mexicana* G□□□□□ G □ o
*Platystemon californicus* B□□□□. SDS s o

*CRUCIFERAE*

*Arabia glabra* (L.) B□□□□. PP u
*Arabis perennans* W□□□. C □ □ □
*Athysanus pusillus* (H□□□.) G□□□□□ C □ □ o
*Brassica nigra* (L.) K□□□ C □ □
*Capsella bursa-pastoris* (L.) M□□□□. C □ □ f
*Descurainia obtusa* (G□□□□□)
O. E. S□□□□□ C □ □ o
*Descurainia pinnata* (W□□□.) B□□□□. C □ □ o
*Descurainia sophia* (L.) W□□□. C □ □ o
*Draba cuneiplia* N□□□. C □ s □ □
*Draba reptana* (L□□.) F□□□. C □ s □ o
*Erysimum capitatum* (Dougl.) G□□□□□ PP □ □
*Lepidium medium* G□□□□□ □□□□. *pubescens*
(G□□□□□) R□□□□□□□ PP u
*Lepidium lasiocarpum* Nutt. SDS □
*Lesquerella gordoni* (G□□□) W□□□. SDS □
*Rorippa nasturtium-aquaticum* (L.)
S□□□□ & T□□□□. (*Nasturtium*
*officinale* R. B□.) PF □ □
*Stanymbrium linearifolium* (G□□□)
P□□□□□ PP u o
*Sisymbrium irio* L. C □ □ □
*Thaypodium longifolium* (B□□□□.) W□□□. PP □ □
*The lypodium wrightii* G□□□ C □ □ □
*Thlaspi fendleri* G□□□ PP c
*Thysanocarpus amplectens* G□□□□□ C □ □ :

*CAPPARTDACEAE*

*Cleome lutea* H□□□. C □ □ □
*Cleome serrulata* P□□□□ C □ □ o
*Polanisia trachysperma* T□□□. & G□□□ G □ o

*CRASSULACEAE*

*Echeveria collomae* (R□□□) K□□□□□□ &
P□□□□□□
*Echeveria rubyi* (G□□□□□□) N□□□. &
M□□□□. OW u
*Sedum griffithsii* R□□□ OW □

*SAXIFRAGACEAE*

*Fendlera rupicola* G□□□□□□. *wrightii*
Gray
*Heuchera rubescens* T□□□. PF □
*Heuchera versicolor* G□□□□□ PF c
*Philadelphua microphyllus* G□□□

*PLATANACEAE*

*Platanus wrightii* Wats. OW □ □

| | T | S | Abundance | T | S | A |
|---|---|---|---|---|---|---|
| ROSACEAE | | | | | | |
| *Agrimonia* Wallr. | MP | | | | | |
| A *striata* M. | PF | | | | | |
| *Amelanchier utahensis* Koehne (*A.* C. K. Schneid.) | PP | | | | | |
| *Cercocarpus* Nutt. | | | | | | |
| C Raf. | | | • | | | va |
| C *mexicana* D. D | | | • | | | 0 |
| *Fallugia* D. D | | | | | | |
| F H | PP | | | | | |
| F *ovalis* (L. .) R. | PF | | | | | |
| *Holodiscus dumosus* (N. .) T. | PP | | | | | |
| P *divers*ifolia L. | PP | | | | | |
| P L. | PP | | | | | |
| P *subviscosa* G | PP | | | | | |
| P G | PF | | | | | |
| *Potentilla* R. | PP | | | | | |
| P (Dougl.) D. D. | PP | | | | | |
| *Prunus* Ehrh. (W. & Standl.) McVaugh | PP | s | | | | |
| P L. | PP | □ | | | | |
| R R. | PP | s | | | | |
| R C | OW | s | | | | |
| *Rubus leucodermis* D. | PF | □ | | | | |
| *Rubus neomexicanus* Gray | PF | □ | | | | |
| *Rubus* P. J. Muell. | PP | s | | | | |
| R M. | PP | s | | | | |
| S Nutt. | | | | | | |
| LEGUMINOSAE | | | | | | |
| A *angustissima* (M. .) K. (Nutt.) R. | | | | | | |
| A Benth. | SDS | □ | | | | |
| *Acacia* G | SDS | □ | | | | |
| A *fruticosa* L. (Abrams) Kearney & Peebles | OW | s | | | | |
| A *allochrous* G | | | | | | |
| A *famelicus* Sheldon | | | | | | |
| A G | | | | | | |
| A DC. | | | | | | |
| *Astragalus tephrodes* G | | | | | | |
| A Sheldon | | | | | | |
| *Calliandra* Gray | PP | u | | | | |
| C Benth. | | | | | | |
| C G | | | | | | |
| C G. | | | | | | |
| *Cercidium* (T. .) R. & J. | SDS | u | | | | va |
| C *occidentalis* T. | OW | □ | | | | |
| C L. | | | | | | |
| C *longifolia* G | | | | | | |
| *Dalea albiflora* G | | | | | | |
| *Dalea* Gray | PP | □ | | | | |
| D G | PP | — | | | | |
| *Desmanthus cooleyi* (E.) T. | | | | | | |
| *Desmodium arizonicum* W. | PP | — | | | | |
| D *grahami* G | OW | u | | | | |
| *Desmodium procumbens* A. S. H. | C | u | | | | f |
| *Galactia* G | C | s | | | | p |
| *Krameria* Benth. *glandulosa* (R. & P.) M. | | | | | | |
| L *arizonicus* B. | PP | u | | | | |
| L *graminifolius* (W.) W. | PP | u | | | | |
| *Lathyrus* G | MP | s | | | | |
| L *pauciflorus* F. | OW | u | | | | |
| L *humistratus* G | | | | | | |
| L *saluginosus* Greene | SDS | □ | | | | |
| L *rigidus* (Benth.) Greene | | | | | | |
| L (G.) G. | | | | | | |
| L *argenteus* Pursh | | | | | | |
| L *arizonicus* W. | SDS | □ | | | | |
| *Lupinus* L. | | | | | | |
| L *concinnus* A. | | | | | | |
| L *palmeri* W. | | | | | | |
| M G. | SDS | u | | | | |
| M *lupulina* L. | PP | u | | | | |
| *Melilotus albus* D. | MP | u | | | | |
| *Melilotus* (L.) L. | MP | u | | | | |
| M Benth. | | | | | | |
| P *angustissimus* G. | PP | u | | | | |
| *Phaseolus ritensis* J. | OW | □ | | | | |
| P (S.) DC. (W. .) S. | | | | | | |
| P P. | | | | | | |
| R Torr. & G. | | | | | | |
| R G. | PP | □ | | | | |
| *Thermopsis* G. | PP | u | | | | |
| *Trifolium* Torr. & G. | | | | | | |
| T T. & G. | | | | | | |
| *Vicia* Muhl. | PP | | | | | |
| V Muhl. (Nutt.) W. | PP | u | | | | |
| V *americana* Muhl. (Nutt.) B. | PP | u | | | | |
| V N. | OW | □ | | | | |
| GERANIACEAE | | | | | | |
| *Erodium* (L.) L'H. | | | | | | va |
| *Erodium texanum* G. | SDS | | | | | |
| G *carolinianum* L. | OW | | | | | |
| *Geranium eremophilum* W. & S. | OW | | | | | |
| *Geranium* Fisch. & T. | PP | | | | | |
| OXALIDACEAE | | | | | | |
| O *albicans* H.B.K. | OW | | | | | |
| O (R.) K. | | | | | | |
| *Oxalis* (S.) Knuth | PP | | | | | 0 |
| O *pilosa* Nutt. | PP | | | | | 0 |
| *Oxalis stricta* L. | PP | | | | | |
| LINACEAE | | | | | | |
| *Linum lewisii* P. | | | | | | |
| *Linum* G. | PP | | | | | |
| ZYGOPHYLLACEAE | | | | | | |
| *Kallstroemia grandiflora* Torr. | | | | | | |
| *Kallstroemia* N. | | | | | | |
| *Tribulus terrestris* L. | | | | | | |
| RUTACEAE | | | | | | |
| P *angustifolia* Benth. | PP | | | | | |
| POLYGALACEAE | | | | | | |
| *Polygala* Benth. | | | | | | |
| EUPHORBIACEAE | | | | | | |
| *Acalypha* M.-A. | C | | | | | |
| C *lindheimerianus* S. | G | | | | | |
| E M. | C | | | | | |
| E *hyssopifolia* L. | G | | | | | |
| E *mollis* Engelm. (N. ) L. C. W. | C | | | | | |
| E Engelm. | PP | | | | | |
| E *melanadenia* T. | C | | | | | |
| E *palmeri* Engelm. (Engelm.) L. C. W. | PP | | | | | |
| *Euphorbia revoluta* E. | C | | | | | |
| E Pers. | – | | | | | |
| T Cav. | OW | | | | | |
| T *lurida* Muell. A. | | | | | | |
| BUXACEAE | | | | | | |
| *Simmondsia chinensis* (L.) Schneid. | SDS | □ | | | | |
| ANACARDIACEAE | | | | | | |
| R L. | OW | | | | | |
| R W. | | | | | | |
| R L. | OW | | | | | |
| *Rhus trilobata* N. . *anisophylla* (G.) J. | | | | | | |
| R *trilobata* N. . *pilosis-ima* E. | | | | | | |

| | T | S | A |
|---|---|---|---|
| *CELASTRACEAE* | | | |
| *Canotia* holacantha T. | SDS | | |
| *Pachystima myrsinites* (P.) R. | PF | | c |
| *ACERACEAE* | | | |
| *Acer grandidentatum* Nutt. | PF | | s |
| *Acer negundo* L. | OW | | |
| *SAPINDACEAE* | | | |
| *Dodonaea viscosa* J. | SDS | | |
| Sapindus *drummondii* H. & Arn. (S. *saponaria* L. *drummondii* (H. & Arn.) L. B.) | G | | |
| *RHAMNACEAE* | | | |
| *Ceanothus fendleri* G. | PP | | u |
| *Ceanothus greggii* G. | | | |
| *Ceanothus integerrimus* H. & Arn. | PP | | u |
| *Rhamnus californica* E. | OW | | |
| *Rhamnus crocea* Nutt. | | | |
| *VITACEAE* | | | |
| *Parthenocissus inserta* (K.) K. F. | PF | | s |
| *Vitis arizonica* Engelm. | PP | | |
| *MALVACEAE* | | | |
| *Abutilon parvulum* G. | | | |
| *Anoda cristata* (L.) S. | PP | | - |
| *Hibiscus coulteri* H. | SDS | | |
| *Iliamna grandiflora* (R.) W. | OW | | |
| *Malva neglecta* Wallr. | MP | | |
| *Sida procumbens* | | | |
| *Sidalcea neomexicana* G. | MP | | |
| *Sphaeracea ambigua* G. | SDS | | |
| *Sphaeralcea rusbyi* G. *rusbyi* | | | |
| *Sphaeralcea rusbyi* G. *gilensis* K. | | | |
| *STERCULIACEAE* | | | |
| *Ayenia pusilla* L. | | | |
| *GUTTIFERAE* | | | |
| *Hypericum formosum* H.B.K. | PP | | |
| *TAMARICACEAE* | | | |
| *Tamarix* pentandra P. | SDS | | |
| *VIOLACEAE* | | | |
| *Hybanthus verticillata* (O.) B. | | | |
| *Viola canadensis* L. | PP | | |
| *Viola nephrophylla* G. | PF | | |
| *Viola aurea* K. *arizonensis* B. & C. | OW | | |
| *LOASACEAE* | | | |
| *Mentzelia albicaulis* Dougl. | | | |
| *Mentzelia pumila* (Nutt.) T. & G. | | | |
| *CACTACEAE* | | | |
| *Cereus giganteus* Engelm. (Carnegiea *gigantea* (Engelm.) B. & R.) | SDS | | u |
| *Echinocereus boyce-thompsoni* O. *boyce-thompsoni* | | | |
| *Echinocereus boyce-thompsoni* O. *bonkerae* (Thornber & B.) P. | G | u | o |
| *Echinocereus fendleri* (Engelm.) Rumpler | G | u | f |
| *Echinocereus triglochidiatus* Engelm. *melanacanthus* (Engelm.) L. B. | | | |
| *Echinocereus triglochidiatus* Engelm. *polyacanthus* (Engelm.) L. B. | | | |
| *Mammillaria arizonica* Engelm. | | | |
| *Mammillaria microcarpa* Engelm. | | | |
| *Opuntia acanthocarpa* Engelm. & Bigel. | SDS | | u |
| *Opuntia chlorotica* Engelm. & Bigel. | | | |
| *Opuntia engelmannii* Salm-Dyck | SDS | | u |
| Opuntia *macrocentra* Engelm. | | | |
| Opuntia *phaeacantha* Engelm. | SDS | | u |
| *Opuntia plumbea* R. | PP | | |
| *Opuntia spinosior* (Engelm. & Bigel.) Toumey | | | |
| LYTERACEAE | | | |
| *Lythrum californicum* T. & G. | | | |
| *ONAGRACEAE* | | | |
| *Epilobium californicum* H. | PF | | |
| *Gaura gracilis* W. & Standl. | MP | | |
| G. *parviflora* Dougl. | | | o |
| *Oenothera caespitosa* Nutt. | | | |
| *Oenothera clavaeformis* T. & F. | SDS | | |
| *Oenothera hookeri* T. & G. | MP | | |
| *Oenothera laciniata* H. | PP | | |
| *Zauschneria latifolia* (H.) G. | PP | | |
| *ARALIACEAE* | | | |
| *Aralia racemosa* L. | P. | | |
| *UMBELLIFERAE* | | | |
| *Bowlesia incana* R. & P. | SDS | | c |
| *Caucalis microcarpa* H. & Arn. | | | |
| *Daucus pusillus* Michx. | | | |
| *Lomatium dissectum* (Nutt.) Mathias & C. | | | |
| *Lomatium nevadense* (Wats.) C. & R. | | | |
| *Lomatium nevadense* (Wats.) C. & R. *parishii* (C. & R.) J. | | | |
| *Osmorhiza chilensis* H. & Arn. | PF | | |
| *Osmorhiza obtusa* (C. & R.) F. | PF | | |
| *Perideridia parishii* (C. & R.) Nels. & M. | PP | | |
| *Pseudocymopterus montanus* (G.) C. & R. | PP | | |
| *CORNACEAE* | | | |
| *Cornus stolonifera* M. | PF | r | o |
| *Garrya flavescens* W. | C | u | o |
| *Garrya wrightii* Torr. | C | u | va |
| *ERICACEAE* | | | |
| *Arctostaphylos pringlei* P. | C | | |
| *Arctostaphylos pungens* H.B.K. | C | | |
| *Chimaphila maculata* (L.) P. | PF | s | |
| *Monotropa latisquama* (R.) H. 6 | PP | | o |
| *Pterospora andromedea* Nutt. | PP | u | o |
| *PRIMULACEAE* | | | |
| *Androsace occidentais* P. | PP | | |
| *FOUQUIERIACEAE* | | | |
| *Fouquieria splendem* Engelm. | SDS | | |
| *OLEACEAE* | | | |
| *Fraxinus velutina* T. *coriacea* (W.) R. | PP | s | |
| *Menodora scabra* G. | G | | |
| *Menodora scoparia* E. | C | | o |

| | Type | Site | Abundance |
|---|---|---|---|
| *CENTIANACEAE* | | | |
| *Centaurium calycosum* (Buckl.) F□□□. | | | |
| *Centiana affinis* Griseb. | MP | | |
| *Swertia radiata* (K□□□□□□) Kuntze | PP | | |
| *APOCYNACEAE* | | | |
| *Apocynum androsaemifolium* L. | OW | | |
| *ASCLEPIDACEAE* | | | |
| *Asclepias asperula* (D□□□□.) Woodson | | | |
| *Asclepias engelmanniana* Woodson | PP | | |
| *Asclepias linaria* Cav. | | | |
| *Asclepias nyctaginifblia* Gray | | | |
| *Asclepias subverticellata* (Gray) Vail | | | |
| *Asclepias tuberosa* L. | PP | | |
| *CONVOLVULACEAE* | | | |
| *Convolvulus arvensis* L. | MP | | |
| *Convolvulus incanus* Vahl | OW | | |
| *Cuscuta indecora* Choisy | | | |
| *Cuscuta umbellata* H.B.K. | | | |
| *Evolvulus sericeus* Swartz | | | |
| *Ipomoea barbatisepala* Gray | | | |
| *Ipomoea coccinea* L. | OW | | |
| *Ipomoea costellata* Torr. | | | |
| *Ipomoea hirsutula* Jacq. f. | OW | | |
| *Ipomoea leptoloma* Torr. | | | |
| *Ipomoea plummerae* Gray | PP | | |
| *POLEMONIACEAE* | | | |
| *Eriastrum diffusum* (Gray) Mason | | | |
| *Eriastrum eremicum* (Jepson) Mason | | | |
| *Cilia aggregata* (Pursh) Spreng. | MP | | a |
| *Cilia gilioides* (Benth.) G□□□□□ | | | |
| *Cilia multiflora* Nutt. | PP | | |
| *Cilia sinuata* Dougl. | | | |
| *Cilia tenuiflora* Benth. | | | |
| *Linanthus aureus* (Nutt.) G□□□□□ | | | |
| *Linanthus bigelovii* (Gray) G□□□□□ | | | |
| *Microsteris gracilis* (Hook.) G□□□□□ | | | |
| *Phlox tenuifolia* E. Nels. | | | |
| *HYDROPHYLLACEAE* | | | |
| *Eriodictyon angustifolium* Nutt. | | | |
| Hydrophynum *occidentale* (Wats.) Gray | PP | | |
| *Phacelia distans* Benth. | SDS | | |
| *Phacelia magellanica (Lam.)* Cov. | | | |
| *Phacelia ramosissima* Dougl. | | | |
| *Pholistoma auritum* (Lindl.) Lilja | SDS | | |
| *BORAGINACEAE* | | | |
| *Amsinckia intermedia* Fisch. & Meyer | SDS | | a |
| *Amsinckia tessellata* Gray | SDS | | a |
| Cryptantha *decipiens* (Jones) Heller | SDS | | |
| *Cryptantha fendleri* (Gray) G□□□□□ | | | a |
| *Harpagonella palmeri* Gray | SDS | | a |
| *Heliotropium phyllostachyum* Torr. | | | |
| *Lithospermum incisum* Lehm. | | | |
| *Lithospermum multiflorum* Torr. | PP | | |
| *Pectocarya linearis* (Ruiz. & Pav.) DC. | SDS | | |
| *Pectocarya platycarpa* Munz & Johnst. | | | |
| *Plagiobothrys arizonicus* (Gray) G□□□□□ | | | a |
| *Plagiobothrys tenellus* (Nutt.) Gray | | | |
| *VERBENA CEAE* | | | |
| *Aloysia wrightii* (Gray) Heller | | | |
| *Verbena wrightii* Gray | | | |
| *LABIATAE* | | | |
| *Agastache wrightii* (G□□□□□□.) Woot. & Standl. | PP | | |
| *Hedeoma hyssopifolium* Gray | PP | | |
| *Hedeoma drummondii* B□□□□. | | | |
| *Hedeoma oblongifolium* (Gray) Heller | | | |
| *Lamium amplexicaule* L. | OW | | |
| *Marrubium vulgare L.* | PP | u | |
| *Moldavica parviflora* (Nutt.) *Britt.* | PF | u | |
| *Monarda austromontana* E□□□□□ | PP | s | |
| *Monarda menthaefolia* Graham | PP | | |
| *Salvia columbariae* Benth. | SDS | u | |
| *Scutellaria potosina* T.S. B□□□□□□. | | | |
| *Stachys coccinea Jacq.* | OW | | |
| *SOLANACEAE* | | | |
| *Datura metel ides* DC. | OW | u | r |
| *Lycium fremontii* Gray | SDS | u | f |
| *Margaranthus solanaceus* Schlecht. | C | u | o |
| *Nicotiana attenuata* Torr. | OW | u | o |
| *Nicotiana glauca* Graham | SDS | s | r |
| *Physalis crassifolia* Benth. | C | u | f |
| *Physalis fendleri* Gray | PP | u | o |
| *Physalis hederaefolia* Gray | PP | u | o |
| *Physalis versicolor* Rydb. | C | u | o |
| *Solanum douglasii* Dunal | OW | u | o |
| *Solanum fendleri* Gray | OW | c | o |
| *Solanum* xanti Gray | OW | u | o |
| *SCROPHULARIACEAR* | | | |
| *Castilleja austromontana* Standl. & Blumer | PF | u | r |
| *Castilleja confusa* G□□□□□ | PP | – | – |
| *Castilleja integra* Gray | C | u | o |
| *Castilleja linariaefolia* Benth. | C | u | o |
| *Castilleja minor* Gray | C | c | o |
| *Cordylanthus wrightii* Gray | PP | u | – |
| *Linaria texana* S□□□□□□ | C | u | o |
| *Maurandya antirrhiniflora* Humb. & Bonpl. | C | u | f |
| *Mimulus guttatus* DC. | PP | r | o |
| *Mimulus nasutus* G□□□□□ | C | a | f |
| *Mimulus rubellus* Gray | C | u | o |
| *Orthocarpus purpurascens* B□□□□. | SDS | u | f |
| *Pedicularis centranthera* Gray | PP | f | f |
| *Penstemon ambiguus* Torr. | C | u | f |
| *Penstemon barbatus* (Cav.) Roth | OW | u | f |
| *Penstemon bridgesii* Gray | PP | c | o |
| *Penstemon linarioides* Gray subsp. *siLeri* (Gray) K□□□ | | | |
| *Penstemon linarioides* Gray var. *viridis* Keck | OW | | |
| *Penstemon pseudospectabilis* Jones subsp. *connatifolius* (A. Nels.) Keck | C | u | – |
| *Penstemon thurberi* Torr. | C | u | f |
| *Schistophragma intermedia* (Gray) Pennell | C | u | – |
| *Scrophularia parviflora* Woot. & Standl. | PP | s | o |
| *Verbascum thapsus* L. | PP | u | o |
| *Veronica americana* (Raf.) S□□□□□□. | MP | s | o |
| *Veronica anagallis-aquatica* L. | PP | r | o |
| *Veronica peregrina* L. | C | r | r |
| *BICNONIACEAE* | | | |
| *Chilopsis linearis* (Cav.) Sweet | SDS | s | |
| *MARTYNIACEAE* | | | |
| *Proboscidea parviflora* (Woot.) Woot. & Standl. | | | |
| *OROBANCHACEAE* | | | |
| *Conopholis mexicana* Gray | OW | | |
| *Orobanche fasciculata* Nutt. | | | |
| *Orobanche ludoviciana* Nutt. var. *cooperi* (Gray) G. Beck | OW | | |
| *ACANTHACEAE* | | | |
| *Anisacanthus thurberi* (Torr.) Gray | | | |

| | T | S | A |
|---|---|---|---|
| *PLANTAGINACEAE* | | | |
| *Plantago lanceolata* L. | MP | | |
| *Plantago purehii* Roem. & S. | SDS | u | va |
| *Plantago rhodosperma* D. | | | |
| *RUBIACEAE* | | | |
| *Galium aparine* L. | OW | c | |
| *Galium fendleri* G. | | | |
| *Galium microphyllum* G. | | | |
| *Galium rothrockii* Gray | | | |
| *Galium stellatum* K. | SDS | □ | |
| *Galium wrightii* G. | | | |
| *Houstonia wrightii* Gray | PP | u | |
| *CAPRIFOLIACEAE* | | | |
| *Lonicera arisonica* R. | PF | □ | |
| *Lonicera interrupta* B. | OW | u | |
| *Sambucus neomexicana* W. | PP | -- | |
| *Symphoricarpos oreophilus* G. | PF | c | |
| *Symphoricarpos rotundifolius* G. | PF | c | |
| *Symphoricarpos utahensis* R. | PP | c | |
| *VALERIANACEAE* | | | |
| *Plectritis ciliosa* (G.) J. | | | |
| *Valeriana arizonica* G. | PF | c | |
| *Valeriana edulis* Nutt. | MP | s | o |
| *CUCURBITACEAE* | | | |
| *Apodanthera undulata* G. | SDS | s | |
| *Cucurbita digitata* G. | SDS | □ | |
| *Cucurbita foetidissima* H.B.K. | PP | u | |
| *Marah gilensis* G. | SDS | c | |
| *CAMPANULACEAE* | | | |
| *Lobelia cardinalis* L. | OW | s | |
| *Triodanis perfoliata* (L.) N. | OW | s | |
| *COMPOSITAE* | | | |
| *Achillea lanulosa* Nutt. | MP | u | |
| *Ambrosia psilostachya* DC. | | | o |
| *Antennaria aprica* G. | PP | u | |
| *Aplopappus* = *Haplopappus* | | | |
| *Artemisia dracunculoides* P. | | | |
| *Artemisia ludoviciana* Nutt. | | | |
| *sulcata* (R.) K. | | | |
| *Artemisia pacifica* Nutt. | | | |
| *Aster aquifolius* (G.) B. | OW | u | |
| *Aster bigelovii* G. | | | |
| *Aster commutatus* (T. & G.) G. | PP | u | |
| *Aster exilis* Ell. | PP | — | |
| *Baccharis glutinosa* P. | SDS | □ | |
| *Baccharis pteronioides* DC. | | | |
| *Baccharis sarothroides* G. | OW | s | |
| *Baeria chrysostoma* Fisch. & M. | SDS | □ | |
| *Bahia biternata* G. | | | |
| *Bahia dissecta* (G.) B. | MP | u | |
| *Baileya multiradiata* Harv. & G. | | | |
| *Bidens bigelovii* G. | OW | u | |
| *Bidens leptocephala* S. | OW | □ | |
| *Brickellia betonicaefolia* G. | OW | □ | |
| *Brickellia californica* (T. & G.) G. | OW | □ | |
| *Brickellia grandiflora* (H.) Nutt. | PP | □ | |
| *Brickellia rusbyi* G. | OW | □ | |
| *Carminatia tenuiflora* DC. | OW | c | |
| *Carphochaete bigelovii* G. | | | |

| | T | S | A |
|---|---|---|---|
| *Chrysopsis foliosa* Nutt. | | | |
| *Cirsium arizonicum* (Gray) P. | PP | □ | |
| *Cirsium neomexicanum* Gray | PP | □ | |
| *Cirsium pulchellum* (G.) W. & Standl. | MP | c | |
| *Cirsium wheeleri* (G.) P. | MP | □ | |
| *Conyza sophiaefolia* | PP | □ | |
| *Encelia frutescens* G. *virginensis* (A. N.) B. | SDS | □ | |
| *Erigeron canadensis* L. | PP | u | |
| *Erigeron concinnus* (Hook. & Arn.) T. & G. | PP | □ | |
| *Erigeron divergens* T. & G. | | | |
| *Erigeron flagellaris* G. | PP | c | |
| *Erigeron macranthus* Nutt. | PP | c | |
| *Erigeron neomexicanus* Gray | PP | □ | |
| *Erigeron oreophilus* G. | | | |
| *Erigeron pringlei* Gray | | | |
| *Eupatorium herbaceum* (G.) G. | OW | c | |
| *Franseria confertiflora* (DC.) R. | | | |
| *Gaillardia pinnatifida* T. | | | |
| *Gnaphalium macounii* G. | PP | □ | |
| *Gnaphalium pringlei* G. | PF | □ | |
| *Gnaphalium wrightii* G. | | | |
| *Grindelia squarrosa* (P.) Dunal | MP | □ | |
| *Gutierrezia sarothrae* (Pursh) B. & Rusby | | | |
| *Haplopappus acradenius* (G.) B. | | | |
| **Haplopappus** *cuneatus* G. | | | |
| **Haplopappus** *gracilis* (Nutt.) G. | | | |
| **Haplopappus** *heterophyllus* (G.) B. | | | |
| *Haplopappus laricifolius* G. | | | |
| *Helianthus annuus* L. | MP | | |
| *Heterotheca subaxillaris* (L.) B. & Rusby | | | |
| *Hieracium fendleri* S. B. | PP | □ | |
| *Hymenoclea monogyra* T. & G. | | | |
| *Hymenothrix wrightii* G. | | | |
| *Hymenoxys bigelovii* (G.) K. F. P. | PP | □ | |
| *Kuhnia rosmarinifolia* V. | | | |
| *Lactuca graminifolia* M. | OW | □ | |
| *Lactuca ludoviciana* (N.) DC. | OW | □ | |
| *Lactuca serriola* L. *serriola* | OW | u | |
| *Lactuca serriola* L. *integrifolia* B. | OW | u | |
| *Malacothrix clevelandi* G. | | | |
| *Melampodium leucanthum* T. & G. | | | |
| *Microseris linearifolia* (DC.) S. B. | | | |
| *Pectis* **papposa** Harv. & G. | | | |
| *Perezia wrightii* G. | SDS | □ | |
| *Perityle ciliata* (L.H. D.) R. | OW | u | |
| *Rafinesquia neomexicana* G. | SDS | □ | |
| *Rudbeckia laciniata* L. | PP | s | |
| *Senecio macdougalii* H. | PP | □ | |
| *Senecio monoensis* G. | | | |
| *Senecio multicapitatus* G. | OW | □ | |
| *Senecio neomexicanus* G. | | | |
| *Senecio wootonii* G. | PF | □ | |
| *Solidago missouriensis* Nutt. | OW | □ | |
| *Solidago sparsiflora* G. | OW | □ | |
| *Solidago wrightii* G. | OW | □ | |
| *Sonchus asper* (L.) H. | PP | □ | |
| *Stephanomeria exigua* Nutt. | | | o |
| *Stephanomeria tenuifolia* (T.) H. M. H. | | | o |
| *Taraxacum officinale* W. | MP | s | |
| *Townsendia exscapa* (R. .) P. | | | |
| *Trixis californica* K. | SDS | □ | |
| *Tragopogon pratensis* L. | PP | □ | |
| *Viguiera annua* (J.) B. | PP | □ | |
| *Wyethia arizonica* G. | PP | u | |

Pase, Charles P. , and Johnson, R. Roy.
1968. Flora and vegetation of the Sierra Ancha Experimental Forest, Arizona. U. S. D. A. Forest Service Research Paper RM-41, 20 pp., illus. Rocky Mountain Forest and Range Experiment Station, Fort Collins, Colorado 80521.

Vegetation types on the 12,820-acre Forest range from desert shrub to mixed conifer. Distinct temperature-precipitation patterns at lower, middle, and high elevations parallel the changes in plant cover.

A checklist of 726 species and 9 varieties of vascular plants collected since 1933 is included. Examination of the ranges of these species indicates that approximately 70 percent are distinctly southwestern or western in origin. Only 13 species, or 1.8 percent, are endemic to Arizona. Two introduced species are new to the Arizona flora.

Key words: Vegetation, checklist, Arizona.

Pase, Charles P., and Johnson, R. Roy.
1968. Flora and vegetation of the Sierra Ancha Experimental Forest, Arizona. U. S. D. A. Forest Service Research Paper RM-41, 20 pp., illus. Rocky Mountain Forest and Range Experiment Station, Fort Collins, Colorado 80521.

Vegetation types on the 12,820-acre Forest range from desert shrub to mixed conifer. Distinct temperature-precipitation patterns at lower, middle, and high elevations parallel the changes in plant cover.

A checklist of 726 species and 9 varieties of vascular plants collected since 1933 is included. Examination of the ranges of these species indicates that approximately 70 percent are distinctly southwestern or western in origin. Only 13 species, or 1.8 percent, are endemic to Arizona. Two introduced species are new to the Arizona flora.

Key words: Vegetation, checklist, Arizona.

Pase, Charles P. , and Johnson, R. Roy.
1968. Flora and vegetation of the Sierra Ancha Experimental Forest, Arizona. U. S. D. A. Forest Service Research Paper RM-41, 20 pp., illus. Rocky Mountain Forest and Range Experiment Station, Fort Collins, Colorado 80521.

Vegetation types on the 12,820-acre Forest range from desert shrub to mixed conifer. Distinct temperature-precipitation patterns at lower, middle, and high elevations parallel the changes in plant cover.

A checklist of 726 species and 9 varieties of vascular plants collected since 1933 is included. Examination of the ranges of these species indicates that approximately 70 percent are distinctly southwestern or western in origin. Only 13 species, or 1.8 percent, are endemic to Arizona. Two introduced species are new to the Arizona flora.

Key words: Vegetation, checklist, Arizona.

Pase, Charles P., and Johnson, R. Roy.
1968. Flora and vegetation of the Sierra Ancha Experimental Forest, Arizona. U. S. D. A. Forest Service Research Paper RM-41, 20 pp., illus. Rocky Mountain Forest and Range Experiment Station, Fort Collins, Colorado 80521.

Vegetation types on the 12,820-acre Forest range from desert shrub to mixed conifer. Distinct temperature-precipitation patterns at lower, middle, and high elevations parallel the changes in plant cover.

A checklist of 726 species and 9 varieties of vascular plants collected since 1933 is included. Examination of the ranges of these species indicates that approximately 70 percent are distinctly southwestern or western in origin. Only 13 species, or 1.8 percent, are endemic to Arizona. Two introduced species are new to the Arizona flora.

Key words: Vegetation, checklist, Arizona.