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**Flora and vegetation of the Tucson Mountains, Pima County,
Arizona**

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The University of Arizona, 1991

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**FLORA AND VEGETATION OF THE TUCSON MOUNTAINS,
PIMA COUNTY, ARIZONA**

by

Renée Jane Rondeau

**A Thesis Submitted to the Faculty of the
DEPARTMENT OF PLANT SCIENCES
In Partial Fulfillment of the Requirements
For the Degree of
MASTERS OF SCIENCE
WITH A MAJOR IN HORTICULTURE
In the Graduate College
THE UNIVERSITY OF ARIZONA**

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ABSTRACT

I compiled the first vascular flora of the Tucson Mountains of southeastern Arizona, part of the Arizona Upland subdivision of the Sonoran Desert. The study area consisted of over 40,000 hectares, with two principal biotic communities: desertscrub and desert-grassland. Over 300 km of trails, ridges, washes, canyons, and peaks were surveyed in a three year period, covering all elevations and habitats. This was supplemented by examination of herbarium records. The area is unusually rich compared to other regional floras in the state of Arizona, including a vascular flora of 605 specific and infraspecific taxa in 331 genera and 80 families. The distribution of life forms is: herbaceous annuals and perennials (73%), shrubs (9%), subshrubs (8%), succulents (4%), and trees (1%). Obligate annuals make up 45% of the flora, of which 62% are obligate spring annuals, 33% obligate summer annuals, and 5% either spring or summer annuals. Historical records from the first part of the century are reviewed and compared with the present day flora; 27 species that were found in the Tucson Mountains prior to 1950 have not been collected since, in spite of increased sampling effort. A disproportionate number of these locally-extirpated species are winter annuals.

INTRODUCTION

The Tucson Mountains form a small range in southeastern Arizona, located west of Tucson, Arizona (Fig. 1), in the Arizona Upland subdivision of the Sonoran Desert (Shreve 1964, Turner and Brown 1982). Approximately 40% of the range is in protected areas, mainly Saguaro National Monument-Tucson Mountain Unit (8,750 hectares) and Tucson Mountain Park (7,075 hectares). Saguaro National Monument (SNM) was set aside in 1961 to "preserve and interpret a remarkable display of relatively undisturbed Sonoran Desert vegetation, including a saguaro stand which equals or surpasses saguaro stands elsewhere in the nation" (from the Presidential Proclamation #3439). Saguaro National Monument occupies the majority of the high peaks and ridges as well as major washes, canyons, and bajadas of the study area. Tucson Mountain Park (TMP) is a county park established as a nature preserve (1920's); this park protects large areas of foothills as well as peaks, ridges, and washes.

Three other reserves of biological importance in the Tucson Mountains are: The Desert Laboratory of the University of Arizona on Tumamoc Hill, Arizona Sonora Desert Museum (ASDM) and Sonoran Desert Station (SDS). Tumamoc Hill is the site of a research institute which has been studying the ecology of the desert nearly continuously since 1903; nineteen permanent plots have been periodically monitored since 1906 making them the longest-monitored plots in ecological history (White 1985). The Arizona Sonora Desert Museum, a unique natural history museum resides within TMP near the center of the Tucson Mountains; it was established in 1952. In 1990 the Sonoran Desert Station was established for the long-term study of insects.

Figure 1. Location of the Tucson Mountain study area. The darker the stipling the higher the elevation. Distribution codes: AC (Arrasta Canyon), ASDM (Arizona Sonora Desert Museum), GC (Gatuño Canyon), GP (Gates Pass), GWP (Greasewood Park), HNT (Hugh Norris Trail), JW (Javelina Wash), KCT (King Canyon Trail), LL (Las Lomas), OT (Old Tucson), OW (Oeste Wash), PF (Pima Farms), PRP (Picture Rocks Pass), RH (Red Hills Information Center), RT (Radio Towers Peak), SC (Safford Canyon), SDS (Sonoran Desert Station), SET (Sendero Esperanza Trail), SH (Starr's Hill), SWT (Sweetwater Trail), TEC (Trails End Canyon).

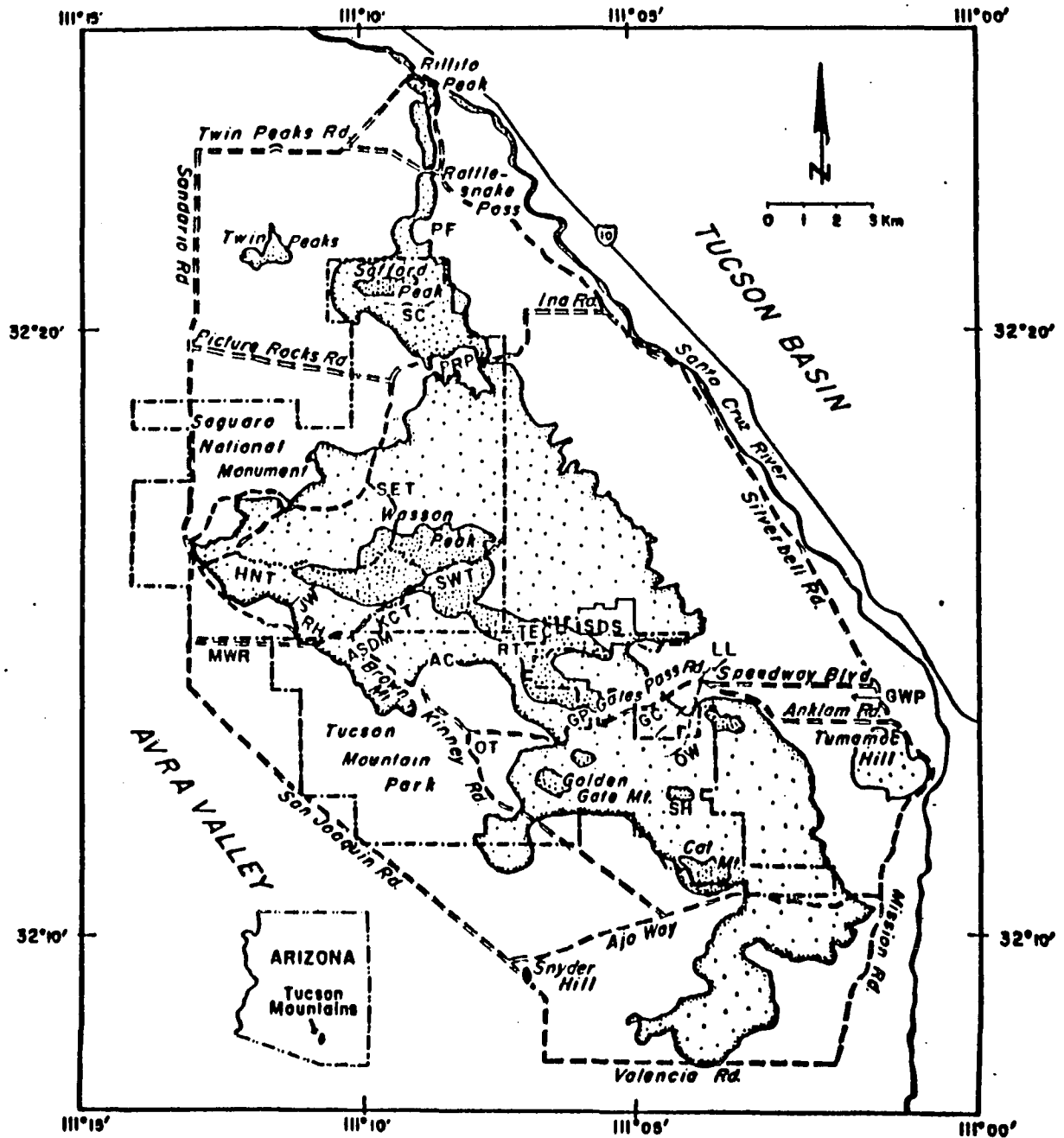


Figure 1 caption on preceding page.

Despite all of the botanical interest in the area, the Tucson Mountains have received surprisingly little floristic study, with the exception of Tumamoc Hill, a small outlying hill on the eastern edge of the area (Spalding 1909, Thornber 1909, Bowers and Turner 1985). The purposes of the present study were to: 1) prepare the first comprehensive checklist of vascular plant species for the entire Tucson Mountain range; 2) characterize each species in terms of distribution, abundance, habit, habitat, and phenology; 3) categorize the plant communities and habitats; 4) identify changes in the plant species composition within the twentieth century; and 5) provide baseline data against which to measure future vegetational changes in the area as it is subjected to progressive urbanization and other long-term ecological changes.

STUDY AREA

Location. The Tucson Mountains (Pima County, Arizona) are within the Santa Cruz River drainage and are situated between the Tucson Basin and Avra Valley (Fig. 1). The trend of the range is mainly north to south, extending 29 km in length and 19.5 km in width. The maximum relief is 780 m ranging from 650 m along the Santa Cruz River at the north end of the range to 1430 m at the summit of Wasson Peak. The principal named summits along and near the crest of the range are, from north to south: Safford Peak (including Panther Peak), Wasson Peak, Radio Towers Peak, Tower Peak, Bren Mountain, Golden Gate Mountain, and Cat Mountain. Separated from the main mass of the mountain are several isolated hills: Twin Peaks (Picachos de Calera) and Snyder Hill on the west side and Tumamoc Hill (including "A" Mountain (Sentinel Peak)) on the east side.

For the purposes of this flora, the Tucson Mountain area encompasses the Tucson Mountains and the surrounding bajadas and flat lands. The easternmost boundary follows that of the Santa Cruz River, both north and south boundaries are at the ends of the range and the western boundary is set to include all of SNM, TMP and Snyder Hill, which includes some non-mountainous terrain (Fig. 1). The area is approximately 40,000 hectares, of which 8,750 hectares are in Saguaro National Monument, 7,075 hectares are in Tucson Mountain County Park, 352 hectares are in the Desert Laboratory research area (Bowers and Turner 1985), and approximately 150 hectares are in the Sonoran Desert Station.

Geology. The Tucson Mountains are a relatively low, jagged, and strongly dissected mountain chain that was carved out of uplifted, tilted, and faulted intrusives, volcanics, and sediments ranging in age from Precambrian to Quaternary (Keith 1974). Lipman and Fridrich (1990)

presented the theory that the Tucson Mountains are the remains of a Mesozoic trap-door caldera that was the source of the Cat Mountain Tuff. The remains of the caldera itself can be seen in few places (Tucson Mountain Chaos formation), as subsequent upheavals have resulted in altering or covering the caldera itself.

The variety of rock types and gradients in the area are reflected in the vegetational types and plant associations. The main mountain mass is a complex geological setting with many major rock types: Cat Mountain Tuff (previously called Cat Mountain Rhyolite), granite, andesite, Amole Arkose, limestone, and basalt on Tumamoc Hill and "A" Mountain (Brown 1939, Keith 1974, and Lipman and Fridrich 1990).

Climate. Generally speaking the year is broken into two main seasons: winter-spring and summer-fall. The winter-spring season is November through April and the summer-fall season is May through October. Precipitation is biseasonal with almost half of the annual precipitation occurring in the summer months July-September (Sellers and Hill 1974). At Tumamoc hill (1907 to 1983), 27.3% of the annual average rainfall (299 mm) fell in the months December-March, and 50.8% fell in the monsoon-dominated months July, August, and September (Bowers and Turner 1985). April, May, and June, called the arid foresummer by Shreve (1911), are months of great moisture stress for all elements of the vegetation. Total annual rainfall varies with elevation and location. Long-term average rainfall records for the area are in the range of 300-350 mm per year (ASDM, SNM, Tumamoc Hill).

Temperatures frequently exceed 38 C in the summer and occasionally drop below freezing in winter. The lowest temperature recorded on Tumamoc Hill was -9.4 C in 1913 (Turnage and Hinckley 1938) and -11 C in 1937 for Tucson (Sellers and Hill 1974) but such low temperatures are rare. Freezing temperatures seldom last longer than 15-20 hours.

METHODS

Most of the field work was conducted in the years 1987-1990. Field work was conducted throughout the year, although greater effort was applied during the seasons of greater reproductive activity. Field surveys were carried out by C. David Bertelsen, Phillip D. Jenkins, Thomas R. and Rebecca K. Van Devender, and the author. A 335 km network of trails, ridges, washes, canyons, and peaks was surveyed for plants; in addition all of the major roads and many of the minor roads have been covered. Many of these sites have been revisited several to many times. For example, the Sendero Esperanza Trail to Wasson Peak was visited 19 times in 1989. All major washes, canyons, trails, and peaks (except Safford Peak) were visited at least two times (spring and fall). Special attention was given to make sure that all the distinct rock types and habitats were examined. The field work consisted of recording the elevation, habitat, rock type, habit, and reproductive status of each observed species, as well as collecting at least one voucher for each taxon. The areas most intensively surveyed during our field work were Saguaro National Monument and Tucson Mountain Park; the habitat least intensively surveyed was the creosotebush flats in the low elevations. The low elevation flats have relatively low species richness; thus our main effort was on the slopes and high elevations.

Voucher specimens have been placed at the University of Arizona herbarium (ARIZ) with duplicates going to ASDM and SNM. Label information for each voucher was entered into a database which included such information as location, rock type, elevation, abundance, and reproductive condition.

The herbarium surveys entailed searching the following herbaria: ARIZ, ASDM, SNM, and Rancho Santa Ana Botanical Garden, in Claremont, California (the repository of Lyman Benson's cactus collection). Label

data from approximately 3500 specimens representing all Tucson Mountain plant taxa were entered into a database.

RESULTS

History

Collecting effort in the Tucson Mountains has fluctuated throughout the Twentieth Century; the first 20 years and the last 30 years were the most active periods for plant collecting (Fig. 2). Until recently the most intensively collected area was the Desert Laboratory (Tumamoc Hill (Thornber 1909; Bowers and Turner 1985)).

In the early part of the century (1901-1933) J. J. Thornber, botanist and curator for the University of Arizona Herbarium, was the primary collector, with over 600 botanical specimens collected between 1901 and 1915 from the Tucson Mountains or "mesas, Tucson" (Thornber considered the area around Tumamoc Hill as mesas [Thornber 1909]). His efforts apparently were directed towards the lower elevations with little if any collecting being carried out on the high peaks and ridges. Forrest Shreve, a plant ecologist with the Desert Laboratory (Bowers 1988) collected over 75 specimens from the Tumamoc Hill region in the years 1908-1941. Lyman Benson, a southwestern botanist, collected 30 specimens, mostly from the "A" Mountain, Gates Pass, and Rattlesnake Pass region.

From 1960 to the present the major collections have been made by J. E. Bowers, A. E. Garwood, P. S. Martin, R. M. Turner, D. K. Warren, and the collaborators of the present study.

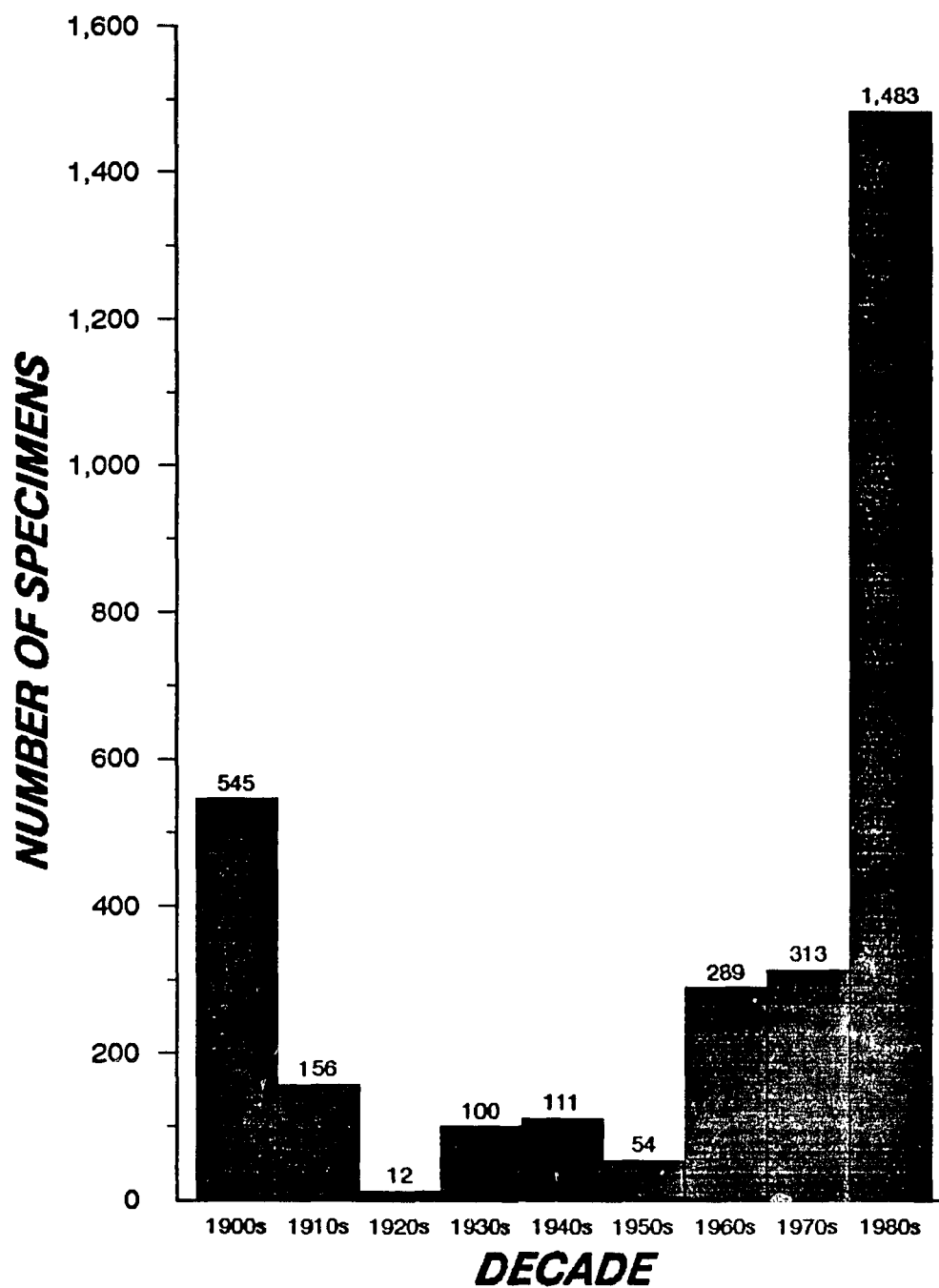


Figure 2. Number of specimens collected per decade from 1900 to 1990.

Vegetation

The Sonoran Desert presents a greater diversity of plant communities and life forms than any other North American Desert (Shreve 1964). Brown and Lowe (1974) and other authors have classified the vegetation of the region into several subdivisions: the vegetation of the Tucson Mountains is most closely related to the Arizona Upland subdivision, with the lowest elevations intermingling with the Lower Colorado River Valley subdivision, and the highest elevations with semidesert-grassland (Turner and Brown 1982).

A vegetation map of the Tucson area by Turner (1974) shows three distinct communities for the Tucson Mountain area: creosotebush and paloverde-saguaro desertscrub of the Sonoran desert community and a woody phase of the grassland community. Low-elevation creosotebush flats give way to paloverde-saguaro desertscrub, which in turn intermingles with semidesert-grassland at higher elevations. The major community of the Tucson Mountains is paloverde-saguaro desertscrub of the Upland Sonoran Desert region described by Shreve (1964). Sharp boundaries between these communities seldom exist within the Tucson Mountains. Transecting the above are linear desert riparian communities which occur locally in canyon bottoms and washes in dendritic patterns. The following descriptions of plant communities and associations in the Tucson Mountains are based on our observations.

Desertscrub Community. Desertscrub occurs throughout the entire elevation range within the study area. This has been further divided into the Lower Colorado River Valley subdivision (creosotebush-bursage association) and the Arizona Upland subdivision. The Arizona Upland subdivision is further broken down into 3 associations: paloverde-saguaro, paloverde-saguaro-ironwood, and jojoba-mixed scrub.

Creosotebush-Bursage association. The Creosotebush-Bursage association is typically found on the least rocky, most level terrain, at elevations of 650 m to 800 m. The even stature and spacing of the ubiquitous creosotebush produce a uniform landscape. This fairly simple association is composed mainly of shrubs and subshrubs with trees and stem succulents generally lacking or at most scattered. The dominant shrub is creosotebush (Larrea divaricata), although along the eastern edge of the study area, near the Santa Cruz River, fourwing saltbush (Atriplex canescens, and Atriplex linearis) and allscale (Atriplex polycarpa) occur with creosotebush. Generally the commonest subshrub is triangleleaf bursage (Ambrosia deltoidea), although in the northwest section white bursage (Ambrosia dumosa) is also present.

Paloverde-Saguaro association. This is the prevalent association throughout the Tucson Mountains; from the base of the mountains to the highest peak (650-1450 m). The association is a diverse, species-rich mosaic of trees, shrubs, subshrubs, numerous cacti, and grasses on well-drained soils of rocky slopes and bajadas. Shrubs are more varied than the trees, and while the understory may be predominantly of a single species such as triangleleaf bursage or brittlebush (Encelia farinosa), there is often a multilayered understory of 5 to 15 or more shrubs and subshrubs. The primary non-riparian trees are foothill paloverde (Cercidium microphyllum), ironwood (Olneya tesota, below 975 m), and saguaro (Carnegiea gigantea). Dominant shrubs include ocotillo (Fouquieria splendens), jojoba (Simmondsia chinensis), whitethorn acacia (Acacia constricta), catclaw acacia (Acacia greggii), wolfberry (Lycium berlandieri), desert hackberry (Celtis pallida), limberbush (Jatropha cardiophylla), and creosotebush. The cactus flora is more diverse in this association than in any of the other associations or communities in the Tucson Mountains, with the primary cacti including: prickly pear

(Opuntia phaeacantha), buckhorn cholla (Opuntia acanthocarpa), staghorn cholla (Opuntia versicolor), Christmas cactus (Opuntia leptocaulis), chainfruit cholla (Opuntia fulgida), teddy bear cholla (Opuntia bigelovii), fishhook pincushion (Mammillaria grahamii), fishhook barrel cactus (Ferocactus wislizenii), and hedgehog cactus (Echinocereus fasciculatus). Common subshrubs are triangleleaf bursage, brittlebush, white ratany (Krameria grayi), and desert zinnia (Zinnia acerosa).

Paloverde-Saguaro-Ironwood association. This association overlaps and interdigitates with the paloverde-saguaro association, especially on the gently sloping alluvium soils of the bajadas in the northwestern areas, but it is limited to low elevations (650-900 m). It is usually a less complex association and it lacks the diversity of shrubs. The association is situated on the gentle sloping alluvium soils of the bajada. The overall appearance is of scattered foothill paloverde and ironwood trees with relatively dense stands of subshrubs and stem succulents. The understory subshrub layer is often a monotypic stand of triangleleaf bursage, although white bursage is in the northwest corner of the study area. Creosotebush is present in fairly high numbers, although the stem succulents generally make up the midstory layer: buckhorn cholla, chainfruit cholla, prickly pear, and saguaro.

Jojoba Mixed-Scrub association. The jojoba mixed-scrub association is most often found on rocky north slopes. It is found from approximately 800 m to 1,430 m, although best developed at high elevations. The area is dominated by sclerophyllous shrubs and small-leaved subshrubs. The dominant shrub is jojoba and the commonest subshrub, at low elevation, is usually triangleleaf bursage. A variety of subshrubs may be dominant at high elevations. Interspersed with the jojoba and bursage is desert zinnia, prickly pear, buckhorn cholla, fishhook barrel cactus, wolfberry, ocotillo, foothill paloverde,

ironwood at low elevations, and occasionally saguaro on steep south slopes.

Semidesert-Grassland Community. Semidesert-grassland is limited in its distribution in the Tucson Mountains, occurring only on the highest peaks and ridges. The most noticeable location is in the Wasson Peak area from 1,125 m to 1430 m. Although it has many grassland species, it intergrades with desertscrub as well. It is characterized by the presence of numerous perennial grasses which flower largely in response to summer rain. The more common ones are: sideoats grama (Bouteloua curtipendula), hairy grama (B. hirsuta), slender grama (B. repens), Arizona cottontop (Digitaria californica), plains lovegrass (Eragrostis intermedia), tanglehead (Heteropogon contortus), curly mesquite grass (Hilaria belangeri), and green sprangletop (Leptochloa dubia). Although many of these grasses are also found in the desertscrub community they become more abundant in the semidesert-grassland community.

Many shrubs and stem succulents occur in semidesert-grassland. Among the more common are ocotillo, Arizona rosewood (Vauquelinia californica), shindagger (Agave schottii), sotol (Dasylirion wheeleri), pancake prickly pear (Opuntia chlorotica), turpentine bush (Ericameria laricifolia), claret cup cactus (Echinocereus triglochidiatus) and hedgehog cactus.

On the north slope of Wasson and Radio Towers peaks are small areas of shrub live oak (Quercus turbinella), skunk bush (Rhus aromatica), and rock sage (Salvia pinquifolia).

The semi-desert grassland community in the Tucson Mountains is not neatly categorized. The presence of oak, Arizona rosewood, rocksage, and others are relictual populations from interior chaparral communities of the late Wisconsin and early Holocene, and are not considered as grassland species (Brown 1978). For the purpose of this flora the term

desert-grassland will be used, which has been used for similar vegetation in the Rincon Mountain flora (Bowers and McLaughlin 1987).

Desert riparian scrub. Riparian vegetation has been defined as that which occurs in or adjacent to drainageways and/or floodplains, and which differs in species and/or lifeforms from that of the immediately surrounding vegetation (Lowe, 1961; Szaro 1989). Only a few artificially impounded riparian areas in the Tucson Mountains have perennial surface water. Desert riparian scrub is restricted to canyons and washes incised into the other communities. The plant assemblages change depending on size, elevation, and gradient of the drainage. The telltale sign of a drainage through any community is a linear assemblage of trees and shrubs along a drainage that are denser and taller than adjacent desert scrub. A typical riparian zone through the foothills paloverde-saguaro association is composed of velvet mesquite (Prosopis velutina), foothill paloverde, and at low elevations, the blue paloverde (Cercidium floridum), and ironwood. Important shrubs are desert hackberry, whitethorn acacia, catclaw acacia, jojoba, and canyon ragweed (Ambrosia ambrosioides). The canyons in the Tucson Mountains are an important refugium for semi-aquatic species. Although there are no perennial streams, pockets of near perennial water can be found in Gatuño, King, Safford, and Sweetwater canyons.

Phytogeography

Species richness. The Tucson Mountains are a floristically rich area, containing 54% more species than expected based on its elevational range, area, and collecting history (Bowers and McLaughlin 1982). The calculation takes into account only the species we have observed or collected in the years 1987 through 1990 (530) and not any of the 57 species previously solely collected by other collectors. The high diversity of the Tucson Mountains is most likely due to several factors.

The biseasonality of the rainfall, the relatively mild winter, and the diversity of habitats are all important factors. Winter rains sustain a rich spring-flowering flora, while summer rains sustain a largely different group. The distinct communities offer a diversity in habitat, microclimates, and available water. Although there are several different rock types found throughout the range, it is not obvious that any of the species are truly edaphically restricted, although some species seem to prefer a particular rock type; for example, helechillo (Notholaena cochisensis) and mariola (Parthenium incanum) seem to do exceptionally well on limestone soil and calcareous caliche.

Compared to other local floras in Arizona (Bowers and McLaughlin 1982) the Tucson Mountain flora ranks as the fourth richest. Table 1 compares the flora of Tucson Mountains with two other southern Arizona regional floras: Organ Pipe Cactus National Monument (Bowers 1980, Pinkava et al. 1991) and White Tank Mountains Regional Park (Keil 1973). All have similar temperature, elevation range, and vegetation; Organ Pipe Cactus National Monument and White Tank Mountain Regional Park are west of Tucson. Organ Pipe Cactus National Monument supports 550 species of plants (390 species shared with Tucson Mountains) and White Tank Mountain Regional Park has 332 species (269 species shared with Tucson Mountains). A major factor for a higher species richness in the Tucson Mountains compared with the other two floras might be due to a higher rainfall as well as a shift towards higher summer rainfall. Shreve (1964) showed that the number of winter-flowering annuals increases from east to west across the Sonoran Desert, along with an increasing ratio of winter to summer precipitation. Both Organ Pipe and White Tank floras reflect this increase in winter-flowering annuals with a higher percentage of winter annuals than summer annuals compared to the Tucson Mountain flora.

Table 1. Comparison of the floras of Organ Pipe Cactus National Monument and White Tank Mountains Regional Park with the Tucson Mountains with relation to area, elevation, and rainfall.

	Organ Pipe	White Tank	Tucson Mts.
Area (ha)	134,000	11,560	40,000
Elevation (m) (range)	305-1466 (1160)	415-1245 (830)	650-1430 (780)
Average rainfall (mm)	230	230-300	300
No. of species	565*	332	587
Species in common with Tucson Mts.	390	269	-
Relative richness (Bowers and McLaughlin 1982)	-5	-4	54
Annuals (% of flora)	31	48	45
winter (% of annuals)	73	75	62
summer (% of annuals)	16	22	33
either (% of annuals)	11	3	5

* this is an approximation using additions to Bowers (1980) flora (Pinkava et al., 1991)

Local Extirpations. Although a substantial number of specimens were collected from the Tucson Mountains during the early part of this century (Fig. 2), just over half (301 of 587) of the species were documented at that time. Nonetheless, 27 species that were reported as present or common have not been reported since 1950. Table 2 provides a list of these 27 species.

Most of the extirpated species are annuals (75%); of which 85% are obligate spring annuals (Fig. 3). In contrast, the species still found in the area consist of 41% annuals of which 60% are obligate spring annuals. A G-test (Sokal and Rohlf 1981) shows this difference in proportions of spring annuals to summer annuals to be highly significant ($G = 6.49$, $df = 1$, $p = 0.002$); the difference in proportion of annuals to perennials is also significant ($G = 9.869$, $df = 1$, $p = 0.011$).

There are several possible reasons for these local extirpations. These plants might still be there but have gone unnoticed and uncollected since 1950. Habitat destruction in the Tucson Mountains due to urban expansion of Tucson has greatly increased in the latter half of this century, which could be a cause for loss of species. Also 12% of the flora are introduced species that may compete with native species. Species such as Bromus rubens, Erodium cicutarium, and Sisymbrium irio are widespread and abundant spring annuals that compete for resources with the native species. It is likely that decreases in winter rainfall through this century (Sellers and Hill 1974) may have caused the ranges of annuals to contract to the north and west.

Table 2. Locally extirpated species collected before 1950. Each species gives family, collector, date collected, and if it is an obligate spring annual or not.

Family/Name	Collector and Date	Spring Annual
Adiantaceae		
<u>Cheilanthes parryi</u>	Humphrey s.n. Feb 1931	No
Boraginaceae		
<u>Plagiobothrys pringlei</u>	Thornber 533 March 1903 Thornber 2206 April 1908	Yes
Compositae		
<u>Chaenactis carphoclinia</u>	Thornber s.n. March 1906 Thornber 5306 April 1905 Thornber s.n. April 1905	Yes
<u>Hemizonia kelloggii</u>	Thornber 386 May 1903 Thornber s.n. April 1905 Thornber s.n. May 1905	Yes
<u>Lasthenia californica</u>	Thornber 7734 April 1915	Yes
<u>Layia glandulosa</u>	Benson 10112 April 1940	Yes
<u>Malacothrix coulteri</u>	Thornber 387 April 1903 Thornber 4621 April 1905	Yes
<u>Prenanthes exiguus</u>	Thornber s.n. May 1903 Spalding & Thornber s.n. April 1906	Yes
<u>Stylocline psilocarphoides</u>	Benson March 1945	Yes

Table 2, continued

Family/Name	Collector and Date	Spring Annual
Cuscutaceae		
<u>Cuscuta salina</u>	Thornber 7516 September 1913	No
Euphorbiaceae		
<u>Chamaesyce serrula</u>	Thornber 47 October 1903	No
	Thornber 8948 August 1917	
	Gould 2552 September 1944	
Gramineae		
<u>Lamarkia aurea</u>	Mrs. Thornber March 1903	Yes
<u>Vulpia myuros</u>	Thornber s.n. March 1906	Yes
	Thornber s.n. March 1907	
Hydrophyllaceae		
<u>Phacelia popei</u>	Mrs. Thornber 4013 March 1903	Yes
Leguminosae		
<u>Lotus greenei</u>	Hinkley s.n. March 1931	No
<u>Lotus salsuginosus</u>	Benson 10620 March 1941	Yes
	Benson 10700 March 1941	
Malvaceae		
<u>Eremalche exilis</u>	Benson 10622 March 1941	Yes
	Thornber 4884 April 1903	
	Thornber 5326 April 1905	
<u>Sphaeralcea hastulata</u>	Fulton & Harris 6818, 6824	No
	6825 April 1930	
Onagraceae		
<u>Oenothera caespitosa</u>	Shreve s.n. March 1933	No

Table 2, continued

Family/Name	Collector and Date	Spring Annual
Papaveraceae		
<u>Argemone ochroleuca</u>	Peebles 6951 May 1930	Yes
Plantaginaceae		
<u>Plantago bigelovii</u> var. <u>californica</u>	Darrow s.n. March 1937	Yes
Polemoniaceae		
<u>Gilia capitata</u>	Thornber s.n. May 1905	Yes
	Thornber s.n. March 1903	
<u>Ipomopsis longiflora</u>	Thornber 4439 August 1901	No
	Thornber s.n. March 1903	
	Thornber 4988 April 1903	
	Thornber 4987 April 1903	
<u>Linanthus aureus</u>	Mrs. Thornber 1903	Yes
Polygonaceae		
<u>Eriogonum reniforme</u>	Thornber s.n. April 1906	Yes
	Thornber s.n. April 1908	
Rhamnaceae		
<u>Condalia corellii</u>	Blumer; March 1911	No
Solanaceae		
<u>Lycium macrodon</u>	Benson 10617a March 1941	No

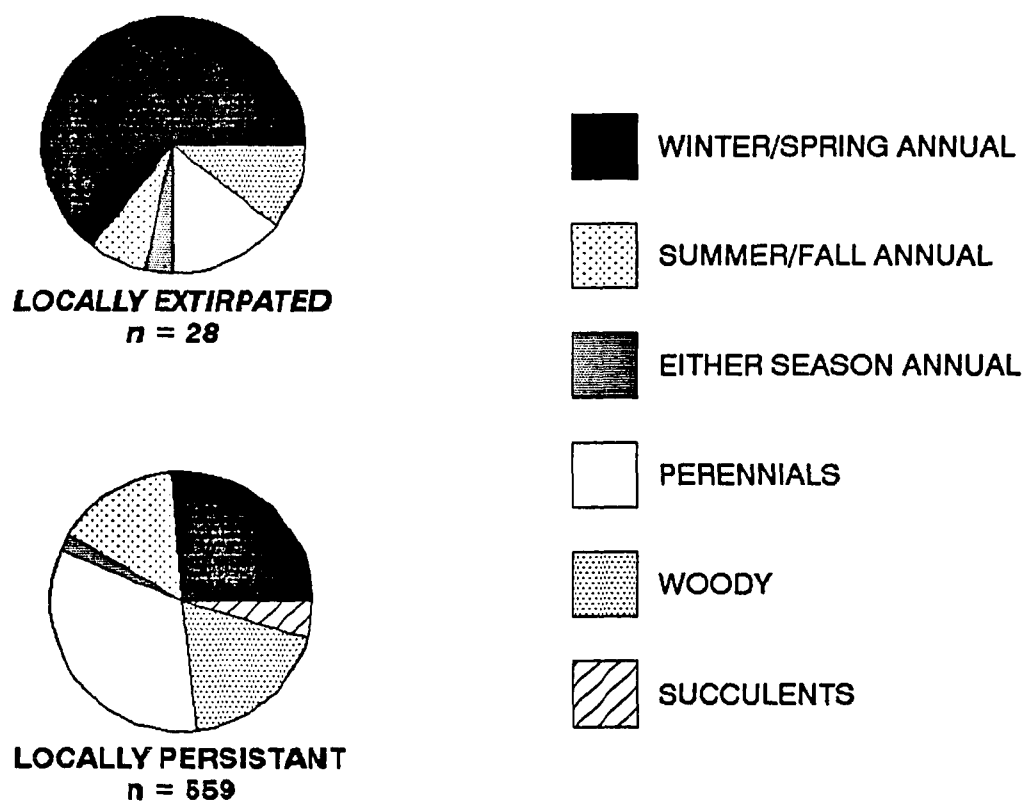


Figure 3. Comparison of life forms between locally extirpated species and locally persistent species.

Pleistocene Relicts

The high peaks in the Tucson Mountains have several species that are relicts of the Pleistocene woodland/chaparral communities (Brown 1978). Shrub live oak, rock sage, squaw bush, and Texas mulberry (Morus microphylla) are restricted to north slopes at the highest elevations in the Tucson Mountains. Other relictual species found at mid to high elevations are: banana yucca (Yucca baccata var. brevifolia), Arizona rosewood, cuneate turpentine bush (Ericameria cuneata), claret cup cactus (Echinocereus triglochidiatus), California barrel cactus (Ferocactus cylindraceus), and pancake prickly pear (Opuntia chlorotica). Remains of these species in three ancient packrat (Neotoma sp.) middens from the study area (T. R. Van Devender, unpublished) document their presence at lower elevations in the Tucson Mountains. Packrat middens dating from 12,430 +/- 400 to 21,000 yr B.P. show that a pinyon-juniper woodland occurred down to 700 m in the Tucson Mountains. A few of the species from these Late Wisconsin middens are: big sagebrush (Artemisia tridentata), juniper (Juniperus osteosperma and J. cf. erythrocarpa), pinyon pine (Pinus monophylla), velvet mesquite, Berberis sp., oak, Arizona rosewood, and blue paloverde.

Van Devender and Spaulding (1979), Van Devender (1990), and others conclude from other similar southwestern packrat middens that the late Wisconsinan climate of the southwest was characterized by mild winter temperatures, reduced summer temperatures, and more winter than summer precipitation, which is in sharp contrast to the present climate of mild winter temperatures, high summer temperatures, and biseasonal precipitation. It is inferred that the woodland retreated to higher elevations and latitudes as the climate changed, and since pinyon pine, big sagebrush, and juniper no longer occur in the Tucson Mountains the

oak and other species mentioned are relictual from the late Wisconsin/early Holocene.

Flora

Cactaceae. Cacti are characteristic of the deserts of North America and many species are markers of the individual deserts (Benson 1982). In the United States cacti are most abundant in Arizona, Texas, and in parts of southeastern California and New Mexico (Benson 1982). Arizona has far more kinds of chollas (Opuntia, subgenus Cylindropuntia) than any other state. Chollas are especially abundant on the low hills and mountain ranges of the deserts in southern Arizona (Benson 1982).

The Tucson Mountains have a conspicuous display of cacti, with the giant saguaro the most spectacular. Twenty-nine percent of the 68 native species (including their varieties, but not hybrids) in Arizona are found in the Tucson Mountains. Hybrids, especially in the chollas, are common in the Tucson Mountains. These hybrids are presently being studied (M. A. Baker et al., unpubl.). Individuals in hybrid populations are often difficult to identify. These hybrid swarms are composed of many individuals that combine in various ways with the original species, varieties, or other taxa entering into the cross (Benson 1982).

The most common barrel cactus seen in the Tucson Mountains is the fishhook barrel cactus. California barrel cactus (Ferocactus cylindraceus) occurs in scattered, pure stands mainly in the northern part of the Tucson Mountain range. Hybrids between the two have a wider range than F. cylindraceus.

Rare and Endangered Species. The Tucson Mountains supports three federally listed threatened or candidate species: Abutilon parishii, Cheilanthes pringlei, and Tumamoca macdougalii. The rarest of these

three species is Abutilon parishii, an herbaceous perennial endemic to Arizona. Prior to the present study it was only known from a few collections prior to 1940. It is now known to occur in the Santa Catalina and Tucson mountains, and Ragged Top, a small hill to the west. We have discovered a few plants in five locations in the Tucson Mountains. It has been found along washes, on rocky slopes, and steep rocky drainages.

Cheilanthes pringleii is a fern which is very common on rhyolitic slopes, cliff faces and under boulders. It is a subtropical fern, common in Sonora, Mexico, and reaching its northern limit in the Tucson Mountains. Most are found in the southern part of the Tucson Mountains from Cat Mountain to Golden Gate Mountain, although small populations have been located in Safford Canyon, and Rattlesnake Pass.

Tumamoc globeberry (Tumamoca macdouglaii) is officially listed as Endangered by the U. S. Fish and Wildlife Service. The type specimen is from Tumamoc Hill. Tumamoc globeberry is an herbaceous perennial vine from an underground tuber, most easily seen in the fall when its fruit turn red. It has been found in the Tumamoc Hill region, Oxbow Road, and in the western portion of SNM.

Undescribed species and additions to Arizona. Two undescribed species and one new species for the state of Arizona were found in the Tucson Mountains. Tucson pigweed (Amaranthus sp. nov.) and Yavapai lipfern (Cheilanthes yavapensis) are undescribed species. Tucson pigweed looks similar to Amaranthus palmeri, although it is monoecious and not dioecious. It is a summer-fall annual. The distribution and abundance in the Tucson Mountains is scattered and common on rocky slopes in desertscrub and desert-grassland. It has also been found in the Santa Catalina Mountains and at Organ Pipe Cactus National Monument.

James Henrickson, at California State University is currently describing this species.

The Yavapai lipfern is similar in appearance to the beaded lipfern (Cheilanthes wootonii). It has only been found in the Tucson Mountains at Radio Towers Peak, where it is common. It has also been found in Yavapai county. Michael Windham at University of Utah is currently describing this species.

Stylocline psilocarphoides is a small hairy annual in the Compositae. Stylocline psilocarphoides was collected by L. Benson in 1941 from "A" Mountain and has not been collected since. This is the only known collection for Arizona. The next nearest stations are in northeast San Bernardino Co., California, and in Washington Co., Utah. There is some doubt as to the validity of the specimen. It consists of a single small plant on a sheet otherwise covered with Stylocline micropoides. There is plenty of other suitable habitat between Tucson and the nearest localities in northeast San Bernardino Co., California, especially at middle elevations adjacent to the Mogollon Rim, from which numerous records of other equally inconspicuous Stylocline and Filago species are known; but not S. psilocarphoides. Like most other Filaginanae, it is semi-weedy, and should now be more widespread if either native or introduced to the Tucson area in 1941 or before. It is possible that plants from some other collection might have gotten mixed in with Benson's "A" Mountain material during processing.

Flora. A vascular flora of 587 species and 18 infraspecific taxa in 331 genera and 80 families are reported here. Most of the flora consist of native species (88%) rather than exotics (12%). Of the exotic species the largest percentage is in the Gramineae (39%) followed by the Compositae (10%). The distribution of life forms is: perennial and annual herbs (73%, of which 21% are grasses), shrubs (9%), subshrubs

(8%), succulents (4%), and trees (1% (Fig. 4.)). Obligate annuals make up 45% of the flora, of which 62% are spring annuals, 33% summer annuals, and 5% either spring or summer annuals (Table 1). The largest families are Compositae (17%) Gramineae (15%) and Leguminosae (8%).

The annotated checklist of vascular plants describes distribution, habit, abundance, habitat, elevational range, flower color, and flowering times (unusual months are in parenthesis) for the Tucson Mountains. Nomenclature for the most part follows Lehr (1978) or Lehr and Pinkava (1980, 1982). Kartesz and Kartesz (1980) are followed for Euphorbiaceae. Current nomenclature for the grasses was provided by John R. and Charlotte G. Reeder. Names used by Kearney and Peebles (1960), Lehr (1978), and Lehr and Pinkava (1980,1982) and not used in this work are given in brackets. Species previously known from the Tucson Mountains but not collected during the course of this project, are marked by a + in the annotated check list.

Distributional categories used in the checklist follow Bowers and McLaughlin (1987). They are: widespread--occurring throughout the Tucson Mountains; scattered--here and there in the range, usually less than 10 locations; local--of limited distribution, usually less than 5 locations, often restricted to special habitats such as water, or north-facing cliffs. Abundance categories have been broken down into a five part system: abundant, very common, common, uncommon, and rare.

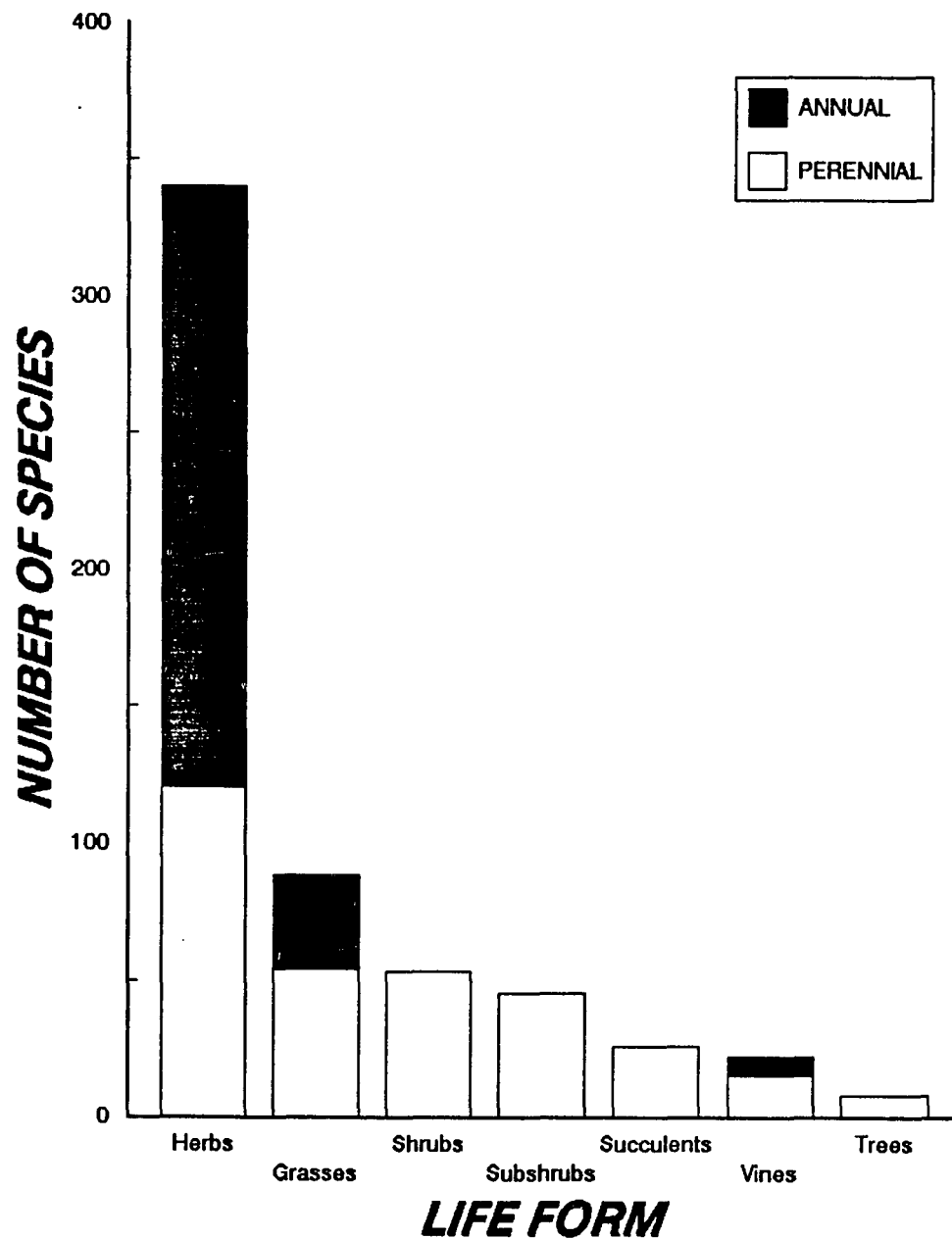


Figure 4. Number of species in each life form.

Annotated Checklist of Vascular Plants of the Tucson Mountains, Pima County, Arizona

* = plants known from the Tucson Mountain District of Saguaro National Monument

+ = plants not collected or observed by the authors

Acanthaceae Acanthus Family

*Anisacanthus thurberi (Torr.) Gray. Desert honeysuckle. Scattered shrub; very common along rocky washes and canyons; 715-1325 m (2350-4350 feet); flowers red-orange, March-June, October-December.

*Carlowrightia arizonica Gray. Scattered subshrub; uncommon on rocky slopes and along washes; 730-1310 m (2400-4300 feet); flowers white with purple veins on throat, March-May.

*Justicia californica (Benth.) D. Gibson. [Beloperone californica Benth.]. Chuparosa. Local subshrub; common along north slope of Safford Peak; 790-885 m (2600-2900 feet); flowers red-orange, March-April (November).

*Ruellia nudiflora (Engelm. & Gray) Urban. Scattered herbaceous perennial; uncommon in washes and canyons, occasionally on rocky slopes; 700-1190 m (2300-3900 feet); flowers purple, April-May, August-October.

*Siphonoglossa longiflora (Torr.) Gray. Widespread subshrub; very common on rocky slopes in desertscrub and desert-grassland; 670-1430 m (2200-4700 feet); flowers white, March-May, August-November.

Adiantaceae Fern Family

- *Cheilanthes lindheimeri Hook. Lindheimer lipfern. Widespread fern; common in crevices on rocky slopes and cliffs in desertscrub and desert-grassland; 790-1430 m (2600-4700 feet).
- +Cheilanthes parryi D. C. Eaton Domin. [Notholaena parryi D. C. Eaton.]. Parry lipfern. Local fern; limestone, south slopes of Twin Peaks ("Picacho Calero" R. R. Humphrey s.n. May 1931).
- *Cheilanthes pringlei Davenp. Pringle lipfern. Scattered fern; common in crevices on rocky slopes and cliffs; 695-1005 m (2280-3300 feet); annotation by J. J. Thornber 2542 in 1905 suggests the Tucson Mts. as the type locality.
- *Cheilanthes wootonii Maxon. Beaded lipfern. Local fern; rare to uncommon in crevices on rocky north slopes, in desert-grassland, Radio Towers and Wasson peaks and Tumamoc Hill; 855-1430 m (2800-4700 feet).
- *Cheilanthes wrightii Hook. Wright lipfern. Widespread fern; common in crevices on rocky slopes and cliffs; 640-1005 m (2100-3300 feet).
- *Cheilanthes yavapensis Windham ined. Yavapai lipfern. Local fern; common in crevices on rocky north slopes in desert-grassland, Radio Towers Peak; 1325-1430 m (4350-4700 feet); very similar to C. wootonii.
- *Notholaena cochisensis Goodd. [Notholaena sinuata (Sw.) Kaulf. var. cochisensis (Goodd.) Weatherby]. Helechillo. Widespread fern; very common on limestone slopes, common on other rock types, in desertscrub and desert-grassland; 640-1430 m (2100-4700 feet).
- *Notholaena sinuata (Sw.) Kaulf. Wavy cloakfern. Widespread fern; common in shady areas on rocky slopes and cliff bases in desertscrub and desert-grassland; 810-1370 m (2650-4500 feet).

- *Notholaena standleyi Maxon. Standley cloakfern. Widespread fern; common in crevices on rocky slopes and cliffs in desertscrub and desert-grassland; 640-1430 m (2100-4700 feet).
- *Pellaea truncata Goodd. [P. longimucronata Hook.]. Cliff brake. Widespread fern; common in crevices on rocky slopes and cliffs in desertscrub and desert-grassland; 640-1370 m (2100-4500 feet).
- Pellaea wrightiana Hook. [P. ternifolia (Cav.) Link var. wrightiana (Hook.) A.F. Tryon]. Local fern; rare in shady crevices on north-facing side of small drainage, 0.5 mile east of Sweetwater Trail trailhead; 295 m (2880 feet).

Agavaceae Agave Family

- Agave americana L. var. expansa (Jacobi) Gentry. Century plant. Local exotic leaf succulent; rare along large wash west of Tumamoc Hill, escape from cultivation; 750 m (2460 feet), flower pale yellow, June-August.
- *Agave schottii Engelm. Shindagger, amole. Local leaf succulent; abundant on rocky slopes in desert-grassland, north of Gates Pass and Wasson Peak area; 1070-1430 m (3500-4700 feet); flowers yellow, May-November.
- Dasyllirion wheeleri Wats. Sotol. Scattered leaf succulent; common on rocky slopes in desertscrub and desert-grassland; 855-1430 m (2800-4700 feet); flowers white, May-August.
- *Yucca baccata Torr. var. brevifolia (Schott ex Torr.) Benson & Darrow. [Y. thornberi McKelvey]. Banana yucca, datil. Local leaf succulent; common on rocky slopes in desertscrub and desert-grassland, Radio Towers and Wasson peaks area; 3660-1430 m (3050-4700 feet); flowers cream, April.

Yucca elata Engelm. Soap-tree yucca. Local leaf succulent; rare; isolated individuals, southwest of Tumamoc Hill and along Kinney Road near the southeast end of Brown Mt.; 745 m (2450 feet), 825 m (2700 feet); flowers white, May-June.

Aizoaceae Carpet Weed Family

Trianthema portulacastrum L. Horse purselane. Scattered exotic annual; uncommon to very common in wet summers on rocky slopes and bajadas, often in disturbed soil; 640-1005 m (2100-3300 feet); flowers purple, August-September.

Amaranthaceae Amaranth Family

*Amaranthus fimbriatus (Torr.) Benth. var. fimbriatus. Fringed amaranth. Widespread annual; common on rocky slopes and along washes and canyons; 640-1310 m (2100-4300 feet); August-November.

*Amaranthus fimbriatus (Torr.) Benth. var. denticulatus (Torr.) Uline & Bray. Local annual; rare on gravelly flats, Las Lomas and southwest corner of SNM; 715-790 m (2340-2600 feet); August-September.

*Amaranthus palmeri Wats. Pigweed, quelite. Widespread annual; common on rocky slopes, roadsides, disturbed sites, and along washes; 640-1430 m (2100-4700 feet); August-November.

*Amaranthus sp. nov. Tucson pigweed. Scattered annual; common on rocky slopes in desert scrub and desert-grassland; 790-1430 m (2600-4700 feet); September-November.

Gomphrena sonorae Torr. Ball clover, globe amaranth. Local herbaceous perennial; rare on west-facing cliff base on Starr's Hill and Kinney Road north of Gates Pass Road; 815-980 m (2680-3220 feet); September-October.

- *Tidestromia lanuginosa (Nutt.) Standl. Espanta vaqueras. Widespread annual; very common on rocky slopes and along washes and canyons in desertscrub and desert-grassland; 640-1430 m (2100-4700 feet); August-November.

Anacardiaceae Cashew Family, Sumac Family

- *Rhus aromatica Ait. var. pilosissima (Engler in DC.) Shinnars. [R. trilobata Nutt.]. Squaw bush. Local shrub; common in desert-grassland, northeast slope of Wasson Peak and uncommon at Radio Towers Peak; 1310-1430 m (4300-4700 feet); April-May.
- Rhus lancea L. African sumac. Local exotic tree; rare along washes, west of Tumamoc Hill and wash near Speedway Blvd., escape from cultivation; 745-780 m (2450-2550 feet); February-March.

Apocynaceae Dogbane Family

- *Haplophyton crooksii L. Cockroach plant. Widespread subshrub; common on rocky slopes in desertscrub and desert-grassland; 670-1430 m (2200-4700 feet); flowers yellow, March-April and July-November.

Aristolochiaceae Birthwort Family

- *Aristolochia watsoni Woot. & Standl. Pipe vine. Scattered herbaceous perennial vine; uncommon on flats and along washes; 715-975 m (2350-3200 feet); flowers purple, (April) August-October.

Asclepiadaceae Milkweed Family

- *Asclepias nyctaginifolia Gray. Four o'clock milkweed. Local herbaceous perennial; rare along washes, Oeste Wash, Picture Rocks Retreat Wash, and Tumamoc Hill; 715-885 m (2350-2900 feet); flowers greenish yellow, July-September.

*Cynanchum arizonicum (Gray) Shinn. [Metastelma arizonicum Gray].

Milkweed vine. Widespread woody vine climbing on shrubs; common on rocky slopes and along washes in desertscrub and desert-grassland; 670-1325 m (2200-4350 feet); flowers cream, April-May, August-December; in 1906 J. J. Thornber designated Tumamoc Hill as the type locality (Sierra Tucson, C. G. Pringle s.n. in April or May of 1884).

Matelea parvifolia (Torr.) Woods. [Gonolobus parvifolius Torr.].

Milkweed vine. Widespread woody vine climbing on shrubs; uncommon on rocky slopes in desertscrub and desert-grassland; 730-1430 m (2400-4700 feet); flowers dark purple, March-April.

*Matelea producta Woodson. [Gonolobus productus Torr.]. Local woody perennial vine climbing on shrubs; rare, on east slope of Wasson Peak; 1400 m (4600 feet); flowers pale green, August.

Sarcostemma cynanchoides Decne. ssp. cynanchoides. [Funastrum cynanchoides (Decne.) Schlechter]. Climbing milkweed. Local herbaceous perennial vine; rare, along moist ditch near northeast corner of Desert Lab. and at Greasewood Park; 730-760 m (2400-2500 feet); flowers purple and white, August.

*Sarcostemma cynanchoides Decne. ssp. hartwegii (Vail) Holm. [Funastrum heterophyllum (Engelm.) Standl.]. Climbing milkweed. Scattered herbaceous perennial vine climbing on shrubs and trees; uncommon along washes and canyons; 670-945 m (2200-3100 feet); flowers purple and white, March-May, September-October.

Bignoniaceae Bignonia Family

Chilopsis linearis (Cav.) Sweet. Desert willow. Local shrub; uncommon along washes and roadside, west of Tumamoc Hill; 730 m (2400 feet); flowers pink, May-August.

*Tecoma stans (L.) H.B.K. Yellow trumpet bush. Local shrub; common on rocky slopes and in steep drainages in desertscrub and desert-grassland, Gates Pass, Hugh Norris and King Canyon Trail, and Safford Peak area; 825-1400 m (2700-4600 feet); flowers yellow, August-November.

Boraginaceae Borage Family

*Amsinckia intermedia F. & M. Fiddleneck. Widespread annual; very common on rocky slopes, bajadas, gravelly flats and along washes in desertscrub and desert-grassland; 640-1325 m (2100-4350 feet); flowers orange, January-April.

*Amsinckia tessellata Gray. Fiddleneck. Local annual; rare along sandy wash near Ez-kim-in-zin picnic area and Sendero Esperanza Trail; 915 m (3000 feet); flowers orange, January-April.

*Cryptantha angustifolia (Torr.) Greene. Narrowleaf nievitas. Local annual; uncommon on sandy flats, bajadas, and along sandy washes, Kinney Road in SNM and Oeste Wash; 670-790 m (2200-2600 feet); flowers white, March-May.

*Cryptantha barbigera (Gray) Greene. Bearded nievitas. Widespread annual; very common on rocky slopes, flats, and along canyons and washes in desertscrub and desert-grassland; 640-1430 m (2100-4700 feet); flowers white, February-April.

*Cryptantha decipiens (Jones) Heller. Gravel nievitas. Local annual; uncommon along sandy washes, roadsides, and on disturbed sandy

soil, Kinney Road in SNM and Sendero Esperanza Trail; 670-1310 m (2200-4300 feet); flowers white, March-April.

Cryptantha maritima Greene. Whitehair nievitas. Local annual; uncommon on limestone hill north of Twin Peaks; 640-670 m (2100-2200 feet); flowers white, February.

+Cryptantha micrantha (Torr.) Johnst. Purpleroot nievitas. Local annual; collected on foothills and high sandy mesas, Tucson Mts. (J. J. Thornber 443 & 5780 in 1903) and near a large wash, west of Tumamoc Hill (D. K. Warren & R. M. Turner 68-94 in 1968); April.

*Cryptantha nevadensis Nels. & Kenn. Nevada nievitas. Scattered annual; uncommon on sandy flats and along washes and canyons; 685-1310 m (2250-4300 feet); flowers white, February-April.

*Cryptantha pterocarya (Torr.) Greene. Wingnut nievitas. Widespread annual; very common on rocky slopes, bajadas, gravelly flats, and along washes in desertscrub and desert-grassland; 640-1325 m (2100-4350 feet); flowers white, January-April.

*Harpagonella palmeri Gray. Widespread annual; uncommon to common on gravelly flats and gentle gravelly slopes; 685-1295 m (2250-4250 feet); flowers white, February-April.

*Lappula redowskii (Hornem.) Greene. Stickseed. Scattered annual; common on gravelly flats and along washes; 730-975 m (2400-3200 feet); flowers white or pale blue, February-April.

+Lappula texana (Scheele) Britt. Stickseed. Local annual; very common on mesas, Tucson (J. J. Thornber s.n. in April 1903 & March 1908) and flats southwest of Tumamoc Hill (J. E. Bowers in 1983); 755 m (2480 feet); flowers white or pale blue, March-April.

*Pectocarya platycarpa Munz & Johnst. Broadnut combbur. Scattered annual; common in disturbed areas and on gravelly slopes (often

with P. recurvata) in desertscrub and desert-grassland; 640-1220 m (2100-4000 feet); flowers white, February-March.

*Pectocarya recurvata Johnst. Archnut combbur. Widespread annual; very common on rocky slopes, gravelly flats, and along washes in desertscrub and desert-grassland; 640-1430 m (2100-4700 feet); flowers white, February-April.

*Plagiobothrys arizonicus (Gray) Greene. Blood weed. Scattered annual; uncommon on gravelly and rocky slopes and in canyons in desertscrub and desert-grassland; 685-1310 m (2250-4300 feet); flowers white, February-April.

+Plagiobothrys pringlei Greene. Popcorn flower. Local annual; common on mesas, Tucson (J. J. Thornber 533, 2206 in 1903 & 1908); flowers white, March-April.

*Tiquilia canescens (DC.) A. Richardson. [Coldenia canescens DC.]. Scattered subshrub; common on rocky slopes and gravelly flats; 730-975 m (2400-3200 feet); flowers lavender, (April) July-August.

Cactaceae Cactus Family

*Carnegiea gigantea (Engelm.) Britt. & Rose. [Cereus giganteus Engelm.]. Saguaro. Widespread stem succulent; abundant on rocky slopes and bajadas; 640-1400 m (2100-4600 feet); flowers white, April-August, especially May.

*Echinocereus fasciculatus (Engelm.) Benson. Hedgehog cactus. Widespread stem succulent; common on rocky slopes and bajadas in desertscrub and desert-grassland; 640-1430 m (2100-4700 feet); flowers pink, March-July.

*Echinocereus triglochidiatus Engelm. Claret cup. Local stem succulent; common on rocky slopes in desertscrub and desert-

grassland, Gates Pass and Radio Towers and Wasson peaks; 975-1430 m (3200-4700 feet); flowers red, May-August.

*Ferocactus cylindraceus Orcutt. [Ferocactus acanthodes (Lemaire) Britt. & Rose]. California barrel cactus. Local stem succulent; rare on rocky slopes, Panther and Safford peaks area; 640-975 m (2100-3200 feet); flowers yellow, April-June (August-September).

*Ferocactus cylindraceus Orcutt. x F. wislizenii (Engelm.) Britt. & Rose. Scattered stem succulent; common on rocky slopes in desertscrub and desert-grassland, particularly on south slope of ridge north of Picture Rocks Road; 640-1400 m (2100-4600 feet); flowers yellow or orange, April-June, August-September.

*Ferocactus wislizenii (Engelm.) Britt. & Rose. Fishhook barrel cactus. Widespread stem succulent; common on rocky slopes and bajadas in desertscrub and desert-grassland; 640-1430 m (2100-4700 feet); flowers orange, occasionally red, July-September (November).

*Mammillaria grahamii Engelm. [M. microcarpa Engelm.]. Fishhook pincushion. Widespread stem succulent; very common on rocky slopes, bajadas, and boulder crevices in desertscrub and desert-grassland; 640-1430 m (2100-4700 feet); flowers pink, March-September.

*Mammillaria thornberi Orcutt. Thornber pincushion. Local stem succulent; uncommon on sandy bajadas near western boundary of SNM; 670-715 m (2200-2350 feet); flowers pink with white edges, April and September.

*Mammillaria viridiflora (Britt. & Rose.) Bodeker. Fishhook pincushion. Local stem succulent; rare on rocky slopes in desertscrub and desert-grassland, Hugh Norris and Sweetwater Trails and on Radio Towers Peak; 1005-1325 m (3300-4350 feet); flowers green-white, July.

*Opuntia acanthocarpa Engelm. & Bigel. var. major (Engelm. & Bigel.) L.

Benson. Buckhorn cholla. Widespread stem succulent; abundant on rocky slopes, bajadas, and gravelly flats in desertscrub and desert-grassland; 640-1430 m (2100-4700 feet); flowers variable, March-May (August-September).

Opuntia acanthocarpa Engelm. & Bigel. x O. versicolor Engelm. Hybrid cholla. Local stem succulent; rare on rocky slopes and gravelly flats, Gates Pass, Ina Road, and King Canyon Trail; 670-900 m (2200-2960 feet); flowers variable, April-May.

*Opuntia arbuscula Engelm. Pencil cholla. Local stem succulent; very common on bajadas, west of Red Hills Information Center (SNM), in Sanctuary Cove area, and west of Silverbell Road north of Ina Road; 670-945 m (2200-3100 feet); flowers green, May.

Opuntia cf. arbuscula Engelm. x O. versicolor Engelm. Hybrid Cholla. Local stem succulent very common in desertscrub 0.6 miles west of Silverbell Road along Ina Road; 675 m (2210 feet); flowers burnt orange, May.

*Opuntia bigelovii Engelm. Teddy bear cholla. Scattered stem succulent; very common on rocky slopes; 670-1325 m (2200-4350 feet); flowers green, April-May.

*Opuntia chlorotica Engelm. & Bigel. Pancake prickly pear. Scattered stem succulent; common on rocky slopes in desertscrub and desert-grassland; 730-1430 m (2400-4700 feet); flowers yellow, April-June.

*Opuntia fulgida Engelm. var. fulgida. Chainfruit cholla. Widespread stem succulent; very common on rocky slopes, bajadas, and gravelly flats; 670-1220 m (2200-4000 feet); flowers pink, May-November.

Opuntia fulgida Engelm. var. mammillata (Schott) Coult. Local stem succulent; rare on bajada, near jct. of Kinney and Sandario roads; 715 m (2345 feet); flowers pink.

Opuntia imbricata Haw. x O. versicolor Engelm. Hybrid Cholla. Local stem succulent; single plant in disturbed area, Las Lomas; 790 m (2600 feet), escape from cultivation, April-May.

*Opuntia Xkelvinensis Grant & Grant. [Opuntia fulgida Engelm. XO. spinosior (Engelm.) Toumey]. Hybrid cholla. Local stem succulent; common on rocky slopes and bajadas around southwestern part of SNM; 700-790 m (2300-2600 feet); flowers magenta, May-June.

*Opuntia leptocaulis DC. Christmas cactus. Widespread stem succulent; common under trees and shrubs on rocky slopes, bajadas, and gravelly flats; 670-1310 m (2200-4300 feet); flowers pale yellow, March-May and August.

Opuntia leptocaulis DC. x O. spinosior (Engelm.) Toumey. Hybrid pencil cholla. Local stem succulent; rare on flats near Sanctuary Cove, uncommon on Santa Cruz River flood plain south of Ina Road and east of Silverbell Road; 655 m (2150 feet); flowers pinkish white, May.

Opuntia lindheimeri Engelm. var. linguiiformis (Griffiths) L. Benson. [O. engelmannii Salm-Dyck var. linguiiformis (Griffiths) Parfitt & Pinkava]. Cow's tongue prickly pear. Local exotic stem succulent; uncommon, Oeste Wash and SNM west of Sandario Road, escape from cultivation; 670-780 (2200-2550 feet), flowers yellow, April-May.

Opuntia microdasys (Lehm.) Pfeifl. Bunny ears, nopal cegador. Local exotic stem succulent; common along banks of Oeste Wash north of

Speedway Blvd., escape from cultivation; 790 m (2600 feet);
flowers yellow with red tint, April-May.

*Opuntia phaeacantha var. discata (Griffiths) Benson & Walkington. [O. engelmannii Salm-Dyck var. engelmannii]. Engelmann's prickly pear. Widespread stem succulent; abundant on rocky slopes and bajadas in desertscrub and desert-grassland; 670-1430 m (2200-4700 feet); flowers yellow, March-May.

*Opuntia phaeacantha Engelm. var. major Engelm. Sprawling prickly pear. Widespread stem succulent; abundant on rocky slopes and bajadas; 670-1100 m (2200-3600 feet); flowers yellow, March-June.

Opuntia santa-rita (Griffiths & Hare) Rose. [O. violacea Engelm. var. santa-rita (Griffiths & Hare) L. Benson]. Santa Rita prickly pear. Local stem succulent; rare on bajada 0.6 mile west of Silverbell Road on Ina Road, escape from cultivation; 670 m (2200 feet); flowers yellow, May.

*Opuntia spinosior (Engelm.) Toumey. Cane cholla. Scattered stem succulent; common on bajadas; 655-945 m (2150-3100 feet); flowers variable, April-May (August).

Opuntia spinosior (Engelm.) Toumey x O. versicolor Engelm. Hybrid cholla. Local stem succulent; uncommon on lower bajadas of Tumamoc Hill, abundant near Camino de Oeste and Sweetwater Drive, rare on steep slopes along Sweetwater Trail; 7250-1005m (2380-3300 feet); flowers variable, April-May.

Opuntia Xtetracantha Toumey. [O. kleiniae DC. var. tetracantha (Toumey) W. T. Marshall, O. leptocaulis DC. x O. versicolor Engelm.]. Hybrid pencil cholla. Local stem succulent; rare on rocky slopes, opposite ASDM, Camp Cooper and on Tumamoc Hill; 750-870 m (2400-2850 feet); May.

- *Opuntia versicolor Engelm. Staghorn cholla. Widespread stem succulent; abundant on rocky slopes of southeastern part of range; 750-1070 m (2400-3500 feet); flowers variable, April-May (August).
- Peniocereus greggii (Engelm.) Britt. & Rose. [Cereus greggii Engelm.]. Desert night-blooming cereus, reina de la noche. Probably scattered, but easily overlooked stem succulent; rare on gravelly flats; 745-790 m (2450-2600 feet); flowers white, June.

Campanulaceae Bellflower Family

- *Nemacladus glanduliferus Jeps. Thread plant. Probably scattered, but easily overlooked, annual; uncommon on rocky slopes and along washes, King Canyon, flats near Oeste Wash, and Picture Rocks Pass area; 715-1145 m (2350-3750 feet); March-April.
- +Triodanis biflora (R. & P.) Greene. Local annual, east of Starr Pass (A. E. Garwood 4435 in 1973); 825 m (2700 feet); flowers blue or purple, April.

Capparidaceae Caper Family

- Koeberlinia spinosa Zucc. Allthorn. Scattered shrub; uncommon on rocky slopes in southern half of range; 730-915 m (2400-3000 feet); flowers whitish, May-August.
- Polanisia dodecandra (L.) DC. ssp. trachysperma (T. & G.) Iltis. [P. trachysperma T. & G.]. Western clammyweed. Local annual; uncommon along wash west of Tumamoc Hill, Las Lomas, and Oeste Wash; 715-870 m (2350-2850 feet); flowers white, May-August.

Caprifoliaceae Honeysuckle Family

Sambucus mexicana Presl. Mexican elder. Local shrub; rare on septic tank northwest of the Desert Laboratory main building on Tumamoc Hill, possibly a remnant of Santa Cruz River riparian population: 810 m (2650 feet); flowers white, November.

Caryophyllaceae Pink Family

+Herniaria cinerea DC. Burstwort. Local exotic annual; flats northwest of Tumamoc Hill (J. E. Bowers 2220 in 1983); 730 m (2400 feet), March.

+Loeflingia squarrosa Nutt. Local annual; just west of ASDM (A. E. Garwood in 1973), Tumamoc Hill (J. E. Bowers in 1983); 745-855 m (2450-2800 feet), February-April.

*Silene antirrhina L. Sleepy catchfly. Widespread annual; uncommon on rocky slopes and along washes in desertscrub and desert-grassland; 730-1310 m (2400-4300 feet); flowers pink, February-April.

Chenopodiaceae Goosefoot Family

*Atriplex canescens (Pursh) Nutt. Fourwing Saltbush, wingscale. Scattered shrub; common on gravelly and sandy flats, uncommon on rocky slopes; 670-1430 m (2200-4700 feet); March-May, August-November.

*Atriplex linearis Wats. [A. canescens (Pursh) Nutt. ssp. linearis Hall & Clements]. Narrowleaf wingscale. Local shrub; common on gravelly flats near Santa Cruz River, rare on north slope of Safford Peak; 660-885 m (2170-2900 feet); September.

*Atriplex elegans (Moq.) D. Dietr. ssp. elegans. Scattered annual or perennial herb; uncommon on rocky slopes, disturbed soils, and

along roadsides; 730-1430 m (2400-4700 feet); (March) August-October.

Atriplex polycarpa (Torr.) Wats. Allscale. Local shrub; rare, jct. of Greasewood Road and Ironwood Hills Drive and jct. of Mile Wide and Sandario roads; common on gravelly flats, Santa Cruz River flood plain; 655-780 m (2150-2550 feet).

*Chenopodium incanum (Wats.) Heller. [C. fremontii Wats. var. incanum Wats.]. Goosefoot. Local annual; rare on rocky slopes in desertscrub and desert-grassland, Wasson Peak area; 1390-1430 m (4560-4700 feet); May-August.

Chenopodium murale L. Nettleleaf goosefoot. Local exotic annual; rare on roadsides and disturbed soils, Las Lomas and Tumamoc Hill; 790-870 m (2600-2850 feet); February.

*Chenopodium neomexicanum Standl. New Mexican goosefoot. Widespread annual; common on rocky slopes and along washes in desertscrub and desert-grassland; 640-1430 m (2100-4700 feet); leaves fish-scented; (March) August-November.

*Monolepis nuttalliana (Schult.) Greene. Poverty weed. Local annual; uncommon, near Red Hills Information Center (SNM) and Tumamoc Hill; 750-870 m (2400-2850 feet); February-March.

*Salsola australis R. Br. [S. iberica Sennen & Pau, S. kali L. var. tenuifolia (Tausch.) Aellen]. Russian thistle, tumbleweed. Widespread exotic annual; very common on disturbed soils; uncommon on rocky slopes and along washes in desertscrub and desert-grassland; 640-1430 m (2100-4700 feet); March-June, August-November.

Compositae Sunflower Family

- *Acourtia nana (Gray) Reveal & King. [Perezia nana Gray]. Desert holly. Scattered herbaceous perennial; common on flats under shrubs and trees; 760-915 m (2500-3000 feet); flowers purple, March-April (November).
- *Acourtia wrightii (Gray) Reveal & King. [Perezia wrightii Gray]. Brownfoot. Widespread herbaceous perennial; uncommon on rocky slopes and gravelly flats, often under trees and shrubs in desertscrub and desert-grassland; 640-1325 m (2100-4350 feet); flowers purple, March-May (October).
- *Ambrosia ambrosioides (Cav.) Payne. [Franseria ambrosioides Cav.]. Canyon ragweed. Widespread shrub; very common along washes and canyons; 640-1310 m (2100-4300 feet); January-April, July-September.
- *Ambrosia confertiflora DC. [Franseria confertiflora (DC.) Rydb.]. Slimleaf bursage. Scattered herbaceous perennial; common on disturbed areas in desertscrub and desert-grassland; 670-1220 m (2200-4000 feet); (May) July-November.
- *Ambrosia cordifolia (Gray) Payne. [Franseria cordifolia Gray]. Sonoran bursage. Scattered subshrub; very common on rocky slopes and in canyons, mostly in southern part of range and Sweetwater Canyon; 760-1005 m (2500-3300 feet); February-March (November).
- *Ambrosia deltoidea (Torr.) Payne. [Franseria deltoidea Torr.]. Triangleleaf bursage. Widespread subshrub; abundant on rocky slopes, bajadas, and gravelly flats; 640-1160 m (2100-3800 feet); March-May.
- *Ambrosia dumosa (Gray) Payne. [Franseria dumosa Gray]. White bursage, burro weed. Local subshrub; common on flats near northwest boundary of SNM; 670-745 m (2200-2450 feet); April (August).

- *Artemisia ludoviciana Nutt. ssp. albula (Wooton) Keck. White sage.
Local herbaceous perennial; rare at northwest of Trails End Canyon; 1325 m (4350 feet); September.
- *Artemisia ludoviciana Nutt. ssp. sulcata (Rydb.) Keck. White sage.
Scattered herbaceous perennial; common on shaded slopes in desertscrub, common on rocky slopes, canyons, and washes in desert-grassland; 670-1430 m (2200-4700 feet); September-November.
- +Aster subulatus Michx. var. liquilatus Shinnery. [A. exilis Ell.].
Local annual; edge of pond near Tumamoc Hill landfill (J. E. Bowers 2731 in 1983); 750 m (2460 feet); rays white, September.
- *Baccharis brachyphylla Gray. Shortleaf baccharis. Local shrub; rare in desertscrub, Las Lomas area and wash north of Hugh Norris Trail; 730-1050 m (2400-3450 feet); flowers whitish, September-October.
- *Baccharis salicifolia (R. & P.) Pers. [B. glutinosa Pers.]. Seep willow. Local shrub; very common in King Canyon, uncommon at Radio Towers, Tumamoc Hill, and windmill at White horse Canyon; 745-1325 m (2450-4350 feet); flowers whitish, July-September.
- *Baccharis sarothroides Gray. Desert broom. Widespread shrub; very common in disturbed areas; 640-1005 m (2100-3300 feet); flowers whitish, October-November.
- *Bahia absinthifolia Benth. Widespread herbaceous perennial; common on rocky slopes, bajadas, and gravelly flats in desertscrub and desert-grassland; 730-1430 m (2400-4700 feet); flowers yellow, August-May.
- *Baileya multiradiata Harv. & Gray. Desert marigold. Scattered herbaceous perennial; uncommon on dry slopes, flats, roadsides, and along washes; 670-1310 m (2200-4300 feet); flowers yellow, February-June, August-December.

- *Bebbia juncea (Benth.) Greene. var. aspera Greene. Sweetbush, chuckwalla's delight. Scattered subshrub; common on rocky slopes, bajadas, flats, and along washes in desertscrub and desert-grassland; 670-1370 m (2200-4500 feet); flowers yellow, August-May.
- *Brickellia baccharidea Gray. Brickell-bush. Local subshrub; rare on rocky slopes and in boulder crevices, Hugh Norris Trail and Starr's Hill; 760 m (2500 feet), 975 m (3200 feet); flowers whitish, September-November.
- *Brickellia californica (T. & G.) Gray. Brickell-bush. Scattered shrub; rare to common on rocky slopes, canyons, and on cliff faces in desertscrub and desert-grassland; 730-1370 m (2400-4500 feet); flowers whitish, October-December.
- *Brickellia coulteri Gray. Brickell-bush. Widespread herbaceous perennial; very common on rocky slopes, gravelly flats, and along washes in desertscrub and desert-grassland; 640-1430 m (2100-4700 feet); flowers whitish, August-May.
- *Calycoseris wrightii Gray. Tackstem. Scattered annual; uncommon on rocky slopes and along washes; 745-1310 m (2450-4300 feet); flowers white, February-May.
- Centaurea melitensis L. Malta starthistle. Scattered exotic annual; common along roadsides; 730-990 m (2400-3250 feet); flowers yellow, March-May.
- +Chaenactis carphoclinia Gray. Pincushion flower. Local annual; west of Cat Mt. along Quijotoa Road [Ajo Way] (J. J. Thornber 5306, s.n. in April 1905) and Tucson Mts. (J. J. Thornber s.n. in April 1906); flowers white.

- *Chaenactis stevioides H. & A. Pincushion flower. Scattered annual; very common on rocky slopes, bajadas, and along washes; 730-1265 m (2400-4150 feet); flowers white, February-April.
- *Cirsium neomexicanum Gray. Thistle. Scattered herbaceous perennial (biennial); common on rocky slopes in desert scrub and desert-grassland; 790-1430 m (2600-4700 feet); flowers deep pink, March-June.
- +Conyza bonariensis (L.) Cronq. [Eriqeron linifolius Willd.]. Local exotic annual; moist ditch at northeast base of Tumamoc Hill (J. E. Bowers 2723 in 1983); 730 m (2400 feet); flowers whitish, August.
- *Conyza canadensis (L.) Cronq. [Eriqeron canadensis L.]. Horseweed. Local annual; rare, King Canyon Wash and moist ditch near northeast base of Tumamoc Hill; 730-930 m (2400-3050 feet); flowers whitish, (May) August-September.
- Conyza coulteri Gray. Local annual; common near water on Las Lomas and edge of pond near Tumamoc landfill; 730-790 m (2400-2600 feet); flowers whitish, September.
- *Dimorphotheca sinuata DC. [D. aurantiaca Hort., not DC.]. African daisy. Local exotic annual; rare on gravelly flats, along washes, and ridge tops, Hugh Norris Trail, Kinney Road near ASDM, and flats west of Tumamoc Hill, escape from cultivation; 745-1220 m (2450-4010 feet); flowers yellow, March.
- Dyssodia acerosa DC. [Thymophylla acerosa (DC.) Strother]. Local subshrub; flats near Tumamoc Hill landfill; 745 m (2450 feet); flowers yellow, May.
- Dyssodia concinna (Gray) Rob. Local annual; mesas along road at foot of Cat Mt. (J. J. Thornber s.n. in May 1905 & s.n. in April 1913) and Tumamoc Hill landfill (P. D. Jenkins observation in 1987), 745 m

(2450 feet); rays white; April-May; K. & P. suggest these areas were the type locality [Arizona, mesas near Tucson, C. G. Pringle in 1884].

- *Dyssodia pentachaeta (DC.) Rob. Parvialena. Widespread annual or perennial herb; common on roadsides, occasionally rocky slopes; 780-915 m (2550-3000 feet); flowers yellow, February-May, August-November.
- *Dyssodia porophylloides Gray. San Felipe fetid marigold. Widespread subshrub; very common on rocky slopes in desertscrub, and uncommon on flats; 670-1370 m (2200-4500 feet); aromatic; rays yellow-orange, all months but July.
- *Encelia farinosa Gray. var. farinosa. Brittlebush, incienso. Widespread subshrub; very common to abundant on rocky slopes; 640-1370 m (2100-4500 feet); flowers yellow, November-May.
- *Encelia frutescens Gray. Green brittlebush. Local subshrub; rare on flats in southwest and junction of Sandario and Manville Roads; 670-810 m (2200-2650 feet); flowers yellow, April and August.
- *Ericameria cuneata (Gray) McClatchie. [Haplopappus cuneatus Gray]. Cuneate turpentine bush. Local subshrub or shrub; common among rocks and crevices, Rattlesnake Pass, Safford Peak, and Starr's Hill; 700-975 m (2300-3200 feet); flowers yellow, August-February.
- *Ericameria laricifolia (Gray) Shinnery. [Haplopappus laricifolius Gray]. Turpentine bush. Widespread subshrub; very common to abundant on rocky slopes in desertscrub and desert-grassland; 640-1430 m (2100-4700 feet); leaves turpentine scented; flowers yellow, August-May.
- *Eriogon divergens T. & G. Fleabane daisy. Scattered annual; uncommon on rocky slopes, bajadas, and along washes; 760-1100 (2500-3600

feet); rays white or purple, occasionally very short, February-May, September-November.

*Erigeron lobatus A. Nels. Fleabane daisy. Local annual; uncommon on rocky slopes and along wash at Safford Canyon and Peak; 685-915 m (2250-3000 feet); rays white, February-May.

*Eriophyllum lanosum Gray. Woolly eriophyllum. Scattered annual; common on rocky slopes, bajadas, and flats; 640-1100 m (2100-3600 feet); rays white, February-April.

*Eupatorium solidaginifolium Gray. Boneset. Widespread herbaceous perennial; common on rocky slopes in desert scrub and desert-grassland; 640-1430 m (2100-4700 feet); flowers white, August-May.

Evax multicaulis DC. Rabbit tobacco. Local annual; rare, Tumamoc Hill; 790 m (2600 feet); March-April.

*Filago arizonica Gray. Arizona filago. Local annual; rare, King Canyon and ridge above Safford Canyon; 945-1005 m (3100-3300 feet); March-April.

*Filago californica Nutt. California filago. Scattered annual; rare except common on limestone hill north of Twin Peaks; 640-1005 m (2100-3300 feet); February-April.

*Filago depressa Gray. Dwarf filago. Local annual; rare in disturbed wash near Signal Hill; 745 m (2440 feet); March.

+Gaillardia arizonica Gray. Blanket flower. Local annual; rare, Tumamoc Hill and flats west of Tumamoc Hill (F. Shreve s.n. in April 1935 and May 1939; D.K. Warren & R. M. Turner 68-61 in 1968; D. E. Goldberg & R. M. Turner 78-7 in 1978; J.E. Bowers 2428 in 1983); 745 m (2450 feet); flowers yellow, March-May.

Gaillardia pulchella Foug. Blanket flower. Local annual; rare, Anklam Road near Starr Pass (P. D. Jenkins observation in 1987); 785 m (2580 feet); flowers orange, April.

- Gnaphalium leucocephalum Gray. White cudweed, gordolobo. Local herbaceous perennial; rare, Oeste Wash and atop Golden Gate Mt.; 780-1295 m (2550-4250 feet); flowers pearly white, September-October.
- Gnaphalium purpureum L. Purple cudweed. Local annual or perennial herb; rare under mesquite in rocky area, Las Lomas; 790 m (2600 feet); flowers purplish or brownish, April.
- *Gnaphalium wrightii Gray. Gordolobo, everlasting. Local herbaceous perennial; rare in desertscrub and desert-grassland, Sweetwater Canyon, north slope of Safford Peak, and on Wasson Peak, common on Starr's Hill; 810-1430 m (2650-4700 feet); flowers white, (February) September-December.
- *Gutierrezia arizonica (Gray) Lane. [Greenella arizonica Gray]. Scattered annual; rare on bajadas and flats; 670-790 m (2200-2600 feet); rays white, April.
- Gutierrezia microcephala (DC.) Gray. [incl. G. linioides Greene, G. lucida Greene]. Snakeweed. Local subshrub; common on rocky slopes, Gates Pass, Las Lomas, Kinney Road, and Tumamoc Hill; 790-1005 m (2600-3300 feet); flowers yellow, August-November.
- *Gymnosperma glutinosum (Spreng.) Less. [Selloa glutinosa Spreng.]. Tatalencho. Scattered subshrub; uncommon to common on rocky slopes and along washes in desertscrub and desert-grassland; 945-1430 m (3100-4700 feet); flowers yellow, (May) September-January.
- Helianthus annuus L. Sunflower. Local annual; common along edge of disturbed field west of Rattlesnake Pass; 730 m (2400 feet); rays yellow, disk brown, August.
- Helianthus petiolaris Nutt. Sunflower. Local annual; rare on Kinney Road near ASDM; rays yellow, disk brown, August-October.

- +Hemizonia kelloggii Greene. Tarweed. Local exotic annual; common weed about houses on mesas, Tucson (J. J. Thornber 386 in 1903 & s.n. in April and May 1905); flowers yellow, April-May.
- *Heterotheca psammophila Wagenkn. [H. subaxillaris (Lam.) Britt. & Rusby sensu K. & P.]. Camphor weed, telegraph plant. Widespread annual; very common on roadsides and disturbed areas; 700-975 m (2300-3200 feet); flowers yellow, August-October.
- *Hymenoclea salsola T. & G. var. pentalepis (Rydb.) L. Benson. Cheesebush. Scattered subshrub; common on sandy flats and along washes; 670-1310 m (2200-4300 feet); March-April.
- *Hymenothrix wislizenii Gray. Widespread annual; common on roadsides and disturbed areas; 715-1005 (2350-3300 feet); flowers yellow, June-January.
- *Isocoma tenuisecta Greene. [Haplopappus tenuisectus (Greene) Blake]. Burro weed. Widespread subshrub; uncommon on rocky slopes and flats, common on disturbed soils and roadsides; 640-975 m (2100-3200 feet); flowers yellow, (June) August-December.
- *Iva ambrosiaefolia Gray. Scattered annual; uncommon along sandy washes and disturbed areas; 770-825 m (2520-2700 feet); September-November.
- Lactuca serriola L. Prickly lettuce. Local exotic annual; rare on gravelly flats, Las Lomas; 790 m (2600 feet); flowers pale yellow, April, August.
- +*Lasthenia californica DC. [Baeria chrysostoma F. & M.]. Goldfields. Local annual; Picture Rocks (J. J. Thornber 7734 in 1915) and Tumamoc Hill (J. J. Thornber 5307 in 1903); ca. 730 m (2400 feet); flowers yellow, April.
- +Layia glandulosa (Hook.) H. & A. Tiddy tips. Local annual; Gates Pass (L. Benson 10112 in 1940); rays white, April.

- Leucelene ericoides (Torr.) Greene. [Aster hirtifolius Blake, A. arenosus (Heller) Blake]. Local herbaceous perennial; rare on rocky and sandy slopes, Greasewood Park; rays white, April.
- *Machaeranthera gracilis (Nutt.) Shinnars. [Haplopappus gracilis (Nutt.) Gray]. Local annual; rare, Gates Pass and King Canyon; 885-1005 m (2900-3300 feet); flowers yellow, February-November.
- *Machaeranthera pinnatifida (Hook.) Shinnars var. pinnatifida. [Haplopappus spinulosus (Pursh) DC.]. Spiny haplopappus. Widespread herbaceous perennial; uncommon on rocky slopes, gravelly flats, and disturbed areas; 640-1160 m (2100-3800 feet); flowers yellow, August-May.
- *Machaeranthera tagetina Greene. [Aster tagetinus (Greene) Blake]. Scattered annual; common on rocky slopes, gravelly flats, and roadsides; 790-1005 m (2600-3300 feet); rays purple, disk yellow, August-November.
- *Malacothrix californica DC. var. glabrata Gray ex DC. Eaton. [M. glabrata Gray]. Desert dandelion. Scattered annual; uncommon on rocky slopes and flats; 685-1310 m (2250-4300 feet); flowers yellow, often striped with purple below, March-April.
- *Malacothrix clevelandii Gray. [M. sonorae Davis & Raven]. Yellow saucers. Scattered annual; rare under shade on rocky slopes and along washes and canyons; 700-1005 m (2300-3300 feet); flowers pale yellow to white, March-April; holotype of M. sonorae from the Tucson Mts. (J. J. Thornber 362 in 1903).
- +Malacothrix coulteri Gray. Snakes head. Local annual; Tucson Mts. (J. J. Thornber 387, 4621 in 1903 & 1905); 790 m (2600 feet); flowers light yellow, April.

Matricaria matricarioides (Less.) Porter. Pineapple weed. Local exotic annual; rare, Tumamoc Hill (J. Schoenwetter in 1958), south of Ajo Way (1989); March.

*Microseris linearifolia (DC.) Schultz Bip. Silver puffs. Widespread annual; uncommon on rocky slopes, roadsides, and disturbed areas in desertscrub and desert-grassland; 790-1430 m (2600-4700 feet); flowers pale yellow, March-April.

*Monoptilon bellioides (Gray) H.M. Hall. Desert star. Scattered annual; common on rocky gentle slopes and along washes; 640-915 m (2100-3000 feet); flowers white to lavender, February-April.

*Parthenium incanum H.B.K. Mariola. Widespread subshrub; abundant on limestone and caliche, uncommon on other rock types, on rocky slopes and in canyons; 730-1220 m (2400-4000 feet); flowers white, August-November.

Pectis cylindrica (Fern.) Rydb. Local annual; rare, Picture Rocks Retreat and Sonoran Desert Station; leaves aromatic; flowers yellow, September.

*Pectis filipes Harv. & Gray. Local annual; rare on rocky slopes and in canyons in desertscrub and desert-grassland, King Canyon and Wasson Peak area; 975-1370 m (3200-4500 feet); flowers yellow, August-November.

*Pectis linifolia L. Local annual; rare on steep rocky slopes in desertscrub and desert-grassland, Gates Pass and Hugh Norris Trail; 915-1430 m (3000-4700 feet); flowers yellow, September-October.

*Pectis papposa Harv. & Gray. Chinchweed. Widespread annual; common in wet years on rocky slopes, flats, and beside washes; 640-1175 m (2100-3850 feet); leaves lemon scented, flowers yellow, August-November.

- *Perityle emoryi Torr. Rock daisy. Local annual; rare on steep rocky slopes and in boulder crevices; 620-825 m (2240-2700 feet); rays white, January-April.
- *Perityle lemmonii (Gray) Macbride. [Laphamia dissecta Torr.]. Rock daisy. Local subshrub; common in crevices on cliffs at Rattlesnake Pass, rare in Safford Canyon; 730-975 m (2400-3200 feet); flowers yellow, January-June.
- *Porophyllum gracile Benth. Odora. Widespread herbaceous perennial; common on rocky slopes and gravelly flats; 670-1100 m (2200-3600 feet); aromatic; flowers purple-white, all months but June.
- +Prenanthes exigua (Gray) Rydb. [Lygodesmia exigua Gray]. Local annual; west base of Cat Mt. (V. M. Spalding & J. J. Thornber s.n. in April 1906), foothills, Tucson Mts. (J. J. Thornber s.n. in May 1903); 760 m (2500 feet); April-May.
- *Psilostrophe cooperi (Gray) Greene. Paper flower. Widespread herbaceous perennial; very common on rocky slopes and flats; 640-1310 m (2100-4300 feet); flowers yellow, August-May.
- *Rafinesquia californica Nutt. California chicory. Local annual; rare on steep rocky north slopes, Safford Peak; 990 m (3240 feet); flowers white, April.
- *Rafinesquia neomexicana Gray. Desert dandelion. Widespread annual; very common on rocky slopes in desert scrub and desert-grassland; 670-1430 m (2200-4700 feet); flowers white with purple veins on underside, February-May.
- Sanvitalia abertii Gray. Local annual; common in sand along small wash, near Oeste Wash; 790 m (2600 feet); flowers yellow, August-October.
- *Senecio douglasii DC. var. monoensis (Greene) Jepson. [S. monoensis Greene]. Sand wash groundsel. Widespread annual; uncommon on

flats and along washes; 730-1310 m (2400-4350 feet); flowers yellow, January-April.

*Senecio lemmonii Gray. Groundsel. Widespread herbaceous perennial; common on rocky slopes and along washes in desertscrub and desert-grassland; 730-1430 m (2400-4700 feet); flowers yellow, October-May.

*Sonchus asper (L.) Hill. Spiny sow thistle. Local exotic annual; uncommon in washes and canyons, King Canyon and Oxbow Road; 715-975 m (2350-3200 feet); flowers yellow, February-April.

*Sonchus oleraceus L. Sow thistle. Local exotic annual; uncommon in disturbed areas, washes, and canyons, King Canyon Trail, Sweetwater Wash, and Tumamoc Hill; 715-975 m (2350-3200 feet); flowers yellow, March-April, October.

*Stephanomeria pauciflora (Torr.) A. Nels. Desert straw. Widespread herbaceous perennial; common on rocky slopes, gravelly flats, and along washes in desertscrub and desert-grassland; 640-1430 m (2100-4700 feet); flowers pale lavender to purple, January-December.

Stylocline gnaphalioides Nutt. Everlasting nest straw. Local annual; rare, limestone hill north of Twin Peaks; 670 m (2200 feet); February.

*Stylocline micropoides Gray. Desert nest straw. Scattered annual; uncommon on rocky slopes and along washes; 790-975 m (2600-3200 feet); March-April.

+Stylocline sonorensis Wiggins. Sonoran nest straw. Local annual; sandy plain west of Tumamoc Hill (C. T. Mason Jr. & R. M. Turner 68-146 in 1968); 745 m (2450 feet); April.

*Trixis californica Kellogg. Widespread subshrub; very common on rocky slopes, often under trees in desertscrub and desert-grassland; 640-1430 m (2100-4700 feet); flowers yellow, August-May.

Verbesina encelioides (Cav.) Benth. & Hook. Cowpen daisy. Local herbaceous perennial; rare on rocky slopes and gravelly flats, ASDM, Gates Pass, Oxbow Road, and Tumamoc Hill; 715-915 m (2350-3000 feet); flowers yellow, (April) August-September.

*Viguiera annua (Jones) Blake. Annual goldeneye. Local annual; uncommon on rocky western slopes, King Canyon Road and Sweetwater Trail; 975-1170 m (3200-3840 feet); flowers yellow, September-November.

*Zinnia acerosa (DC.) Gray. [Zinnia pumila Gray]. Desert zinnia. Widespread subshrub; very common on rocky slopes and gravelly flats in desertscrub and desert-grassland; 640-1430 m (2100-4700 feet); rays white, March-May, August-December.

Convolvulaceae Morning Glory Family

Convolvulus arvensis L. Field bindweed. Local exotic herbaceous perennial; uncommon, south side of "A" Mt.; 750 m (2460 feet); flowers white with pink veins, April.

*Evolvulus alsinoides L. Arizona blue eyes, dio de vibora. Widespread herbaceous perennial; common on rocky slopes and along washes in desertscrub and desert-grassland; 670-1430 m (2200-4700 feet); flowers blue-purple, occasionally albino, February-May, July-November.

*Evolvulus nuttallianus Roemer & Schultes. [Evolvulus pilosus Nutt.]. Local herbaceous perennial; uncommon on ridgetops in desertscrub and desert-grassland, jct. of King and Sweetwater Canyon trails, common between jct. of Hugh Norris and King Canyon trails and

Wasson Peak; 1005-1430 m (3300-4700 feet); flowers purple, (April) July-September.

*Ipomoea barbatiseipala Gray. Morning glory. Scattered annual vine climbing on shrubs and trees; common in wet summers on rocky slopes and along washes in desertscrub and desert-grassland; 640-1310 m (2100-4300 feet); flowers purple, August-November.

*Ipomoea cristulata Hallier f. [Ipomoea coccinea L.]. Scarlet creeper. Local annual vine climbing on other plants; common on rocky slopes and along washes and canyons in desertscrub and desert-grassland, Panther, Radio Towers, and Wasson peaks, and King Canyon; 1035-1430 m (3400-4700 feet); flowers red, August-September.

*Ipomoea costellata Torr. Morning glory. Local annual vine; rare on rocky north slope, Wasson Peak; 1060 m (3480 feet); flowers purple, September.

Ipomoea hederacea (L.) Jacq. [Ipomoea hirsutula Jacq. f., in part]. Morning glory. Scattered annual vine; common on rocky slopes and along washes and canyons; 790-1005 m (2600-3300 feet); flowers purple, September-December.

Merremia dissecta (Jacq.) H. G. Hallier. Mile-a-minute vine. Local exotic woody vine; rare along wash, Tucson Estates, escape from cultivation; 800 m (2630 feet).

Crassulaceae Orpine Family

*Tillaea erecta H. & A. Pigmy weed. Local annual; common on flats near Oeste Wash and in Safford Canyon in damp soil; 745-855 m (2450-2800 feet); February.

Crossosomataceae Crossosoma Family

- *Crossosoma bigelovii Wats. Ragged rockflower. Widespread shrub; common on rocky slopes and in canyons and crevices of cliff faces in desert scrub and desert-grassland; 685-1430 m (2250-4700 feet); flowers white, February-April, August-November.

Cruciferae Mustard Family

- *Arabis perennans Wats. Rock cress. Widespread herbaceous perennial; common on rocky slopes, rock crevices and along washes in desert scrub and desert-grassland; 670-1430 m (2200-4700 feet); flowers purple, February-May.
- Brassica eruca L. Local exotic annual; rare on grounds of ASDM; 865 m (2840 feet); flowers white, February.
- +Brassica nigra L. Koch. Black mustard. Local exotic annual; vicinity of Snyder Hill, ca. 7 miles west of Tucson (A. E. Garwood 5112 in 1978); 800 m (2630 feet); flowers bright yellow, January.
- *Brassica tournefortii Gouan. Mustard. Scattered exotic annual; common on disturbed sites, uncommon on undisturbed rocky slopes; 640-1310 m (2100-4300 feet); flowers yellow, January-March.
- *Capsella bursa-pastoris (L.) Medic. Shepherd's purse. Local exotic annual; uncommon on rocky slope and roadsides, Hugh Norris Trail; 715-1050 m (2350-3450 feet); February-March.
- *Caulanthus lasiophyllus (H. & A.) Payson. [Thelypodium lasiophyllum (H. & A.) Greene]. Widespread annual; very common on rocky slopes, gravelly flats, and along washes; 670-1100 m (2200-3600 feet); flowers white, January-April.
- *Descurainia pinnata (Walt.) Britt. Tansy mustard. Widespread annual; very common on rocky slopes, bajadas, gravelly flats, and along

washes in desertscrub and desert-grassland; 640-1430 m (2100-4700 feet); flowers pale yellow, February-May.

*Draba cuneifolia Nutt. Whitlow grass. Widespread annual; common on rocky slopes, bajadas, and along washes, often under trees; 640-975 m (2100-3200 feet); flowers white, January-March.

*Dryopetalon runcinatum Gray. Scattered annual; common on rocky slopes and among boulders in canyons in desertscrub and desert-grassland; 745-1325 m (2450-4350 feet); flowers white, February-April.

*Lepidium lasiocarpum Nutt. Sand peppergrass. Widespread annual; very common on rocky slopes, gravelly flats, disturbed soils, and along washes in desertscrub and desert-grassland; 640-1430 m (2100-4700 feet); flowers white, December-May.

*Lepidium medium Greene. Peppergrass. Scattered annual; common along Sweetwater Trail; 700-1280 m (2300-4200 feet); flowers white, January-April.

*Lesquerella gordonii (Gray) Wats. Gordon bladderpod. Widespread annual; common on rocky slopes, flats, and along washes and canyons in desertscrub and desert-grassland; 640-1310 m (2100-4300 feet); flowers yellow, January-April.

*Lesquerella purpurea (Gray) Wats. White bladderpod. Widespread herbaceous perennial; common on rocky slopes and along washes and canyons in desertscrub and desert-grassland; 790-1370 m (2600-4500 feet); flowers white with purple throat, November-April (August).

Matthiola bicornis (Sibth. & Smith) DC. Evening stock. Local exotic annual; common on disturbed soils, south side of Tumamoc Hill; 745-975 m (2450-3200 feet); flowers purple with white, February-April.

*Sisymbrium irio L. London rocket. Widespread exotic annual; common in all communities; 640-1370 m (2100-4500 feet); flowers yellow, January-May.

Sisymbrium orientale L. Tumble mustard. Local exotic annual; rare, Speedway Blvd. near Anklam Road and Trails End Road; 745-1005 m (2450-3300 feet); flowers yellow, February-March.

*Streptanthus carinatus Wright. [incl. Streptanthus arizonicus Wats.]. Silverbell. Widespread annual; very common on rocky slopes, gravelly flats, and along washes in desertscrub and desert-grassland; 640-1430 m (2100-4700 feet); flowers cream, January-April.

*Thysanocarpus curvipes Hook. [Thysanocarpus amplectans Greene]. Lacepod. Widespread annual; common on rocky slopes and along washes in desertscrub and desert-grassland; 670-1430 m (2200-4700 feet); flowers white, January-April.

Cucurbitaceae Gourd Family

*Apodanthera undulata Gray. Melon loco, Coyote melon. Local herbaceous perennial vine; single plant on north-facing rocky granitic slope along Hugh Norris Trail, ca. 10 miles west of Tucson (A. E. Garwood 3808 in 1971), and mesas, Tucson (J. J. Thornber 5259 in 1903); 1005 m (3300 feet), 810 m (2650 feet); flowers yellow, July.

*Citrullis vulgaris Schrad. Watermelon. Local exotic annual; rare in Tohono O'odham Indian saguaro fruit harvest area; 715 m (2340 feet).

*Cucurbita digitata Gray. Coyote gourd. Scattered herbaceous perennial vine, often climbing up other plants; uncommon on sandy flats and

along washes; 695-1005 m (2280-3300 feet); flowers yellow, July-August.

*Echinopepon wrightii (Gray) Wats. Wild balsam apple. Local annual vine; common on steep rocky slope at base of cliffs, Safford Peak; 990-1005 m (3250-3300 feet); flowers white, July-October.

*Tumamoca macedougalii Rose. Tumamoc globeberry. Probably scattered but easily overlooked, herbaceous perennial vine, climbing on shrubs and trees; uncommon in desert scrub, near Mile Wide Road at west boundary of SNM, Oxbow Road, near Pima Community College, and north base of Tumamoc Hill; 655-790 m (2150-2600 feet); flowers pale yellow to greenish yellow, July-September; Tumamoc Hill is the type locality (D. T. MacDougal s.n. in July 1908).

Cuscutaceae Dodder Family

+Cuscuta salina Engelm. Dodder. Local annual parasite; mesas, near Tucson (J. J. Thornber 7516 in 1913); flowers whitish, September.

Cuscuta tuberculata Brandegee. Dodder. Local annual parasite on Boerhaavia erecta; very common 0.3 miles south of ASDM on Kinney Road; 855 m (2800 feet); flowers white, August.

Cuscuta umbellata H.B.K. var. reflexa (Coult.) Yunker. Dodder. Local annual parasite on Tribulus terrestris and Atriplex elegans; very common at intersection of Silverbell and St. Mary's roads, disturbed soil; flowers whitish, August.

Cuscuta umbellata H.B.K. var. umbellata. Dodder. Local annual parasite on Trianthema portulacastrum; common on Tumamoc Hill landfill; 750 m (2460 feet); flowers white, August.

Cyperaceae Sedge Family

- +Cyperus alternifolius L. Flat sedge. Local exotic herbaceous perennial; along moist ditch northeast of Tumamoc Hill (R. M. Turner 83-10 in 1983), escape from cultivation; 730 m (2400 feet); April.
- *Cyperus esculentus L. Yellow nutsedge. Local herbaceous perennial; abundant in wet area in King Canyon, 925-940 m (3040-3080 feet); September.
- Cyperus rotundus L. Purple nutsedge. Local herbaceous perennial; common on roadside 0.25 mile west of Silverbell Road on Speedway Blvd; 715 m (2340 feet); September.
- Cyperus squarrosus L. [Cyperus aristatus Rottb.]. Flatsedge. Local annual; common in canyons (Gatuño, Safford, and Sweetwater canyons) 885-945 m (2900-3100 feet); August-September.
- +Scirpus maritimus L. var. paludosus (A. Nels.) Koyama. [S. paludosus A. Nels.]. Salt marsh bulrush. Local herbaceous perennial; Tumamoc Hill landfill (T. L. Burgess 6269 in 1981; J. E. Bowers 2729 in 1983); 750 m (2460 feet); September-November.

Ephedraceae Joint fir Family

- *Ephedra nevadensis Wats. var. aspera (Engelm.) L. Benson. [E. aspera Engelm.]. Mormon tea. Scattered shrub; common on rocky slopes and along washes, especially near Safford Canyon; 685-1295 m (2250-4250 feet); February-April.
- *Ephedra trifurca Torr. Longleaf jointfir. Scattered shrub; common on flats and along washes, especially in the southern part of the range; 715-885 m (2350-2900 feet); January-April.

Euphorbiaceae Spurge Family

- *Acalypha neomexicana Muell. Arg. Three-seeded mercury. Local annual; rare on rocky slopes in desertscrub and desert-grassland, King Canyon and Hugh Norris and Sweetwater trails; 1145-1370 m (3750-4500 feet); October-November.
- *Bernardia incana Morton. Scattered shrub; uncommon on steep rocky north slopes, mostly at higher elevations in desertscrub and desert-grassland; 745-1430 m (2450-4700 feet); March-April, August-September.
- *Chamaesyce abramsiana (L. C. Wheeler) Burch. [Euphorbia abramsiana L. C. Wheeler]. Spurge. Scattered annual; very common in wet summers on flats, bajadas, and along washes, occasionally on rocky slopes; 640-730 m (2100-2400 feet); August-September.
- +Chamaesyce albomarginata (T. & G.) Small. [Euphorbia albomarginata T. & G.]. Rattlesnake weed. Local herbaceous perennial; 10 miles west of Tucson in Avra Valley (A. E. Garwood s.n. in March 1976); 825 m (2700 feet); March.
- *Chamaesyce arizonica (Engelm.) Arthur. [Euphorbia arizonica Engelm.]. Spurge. Widespread annual or perennial herb; very common on rocky slopes and along washes in desertscrub and desert-grassland; 670-1430 m (2200-4700 feet); February-May, July-December.
- *Chamaesyce capitellata (Engelm.) Millsp. [Euphorbia capitellata Engelm.]. Spurge. Widespread herbaceous perennial; very common in all communities; 655-1340 m (2150-4400 feet); January-December.
- *Chamaesyce florida (Engelm.) Millsp. [Euphorbia florida Engelm.]. Spurge. Widespread annual; common on rocky slopes, flats, and along washes; 640-1310 m (2100-4300 feet); August-November.

*Chamaesyce gracillima (Wats.) Millsp. [Euphorbia gracillima Wats.].

Spurge. Scattered annual; common on flats and along washes; 670-840 m (2200-2750 feet); August-November.

*Chamaesyce hyssopifolia (L.) Standl. [Euphorbia hyssopifolia L.].

Hyssop spurge. Scattered annual; uncommon on rocky slopes, gravelly flats, roadsides, and along washes; 670-1130 m (2200-3700 feet); August-November.

*Chamaesyce melanadenia (Torr.) Millsp. [Euphorbia melanadenia Torr.].

Spurge. Widespread herbaceous perennial; very common on rocky slopes in desertscrub and desert-grassland; 670-1430 m (2200-4700 feet); all year.

*Chamaesyce micromera (Boiss.) Wooton & Standley. [Euphorbia micromera

Boiss.]. Sonoran sandmat. Scattered annual; uncommon on sandy and gravelly flats and bajadas; 685-1175 m (2250-3850 feet); August-September.

*Chamaesyce pediculifera (Engelm.) Rose & Standl. [Euphorbia

pediculifera Engelm.]. Spurge. Widespread annual or perennial herb; uncommon to abundant on rocky slopes, flats, roadsides, and along washes; 670-870 m (2200-2850 feet); February-May, August-November.

*Chamaesyce polycarpa (Benth.) Millsp. [Euphorbia polycarpa Benth.].

Smallseed sandmat. Local annual or perennial herb; uncommon on sandy flats and roadsides, Sendero Esperanza Trail and Sandario Road; 670-1005 m (2200-3300 feet); April-August (November).

Chamaesyce prostrata (Ait.) Small. [Euphorbia chamaesyce L., E.

prostrata Ait.]. Ground fig spurge. Local annual; rare, ASDM and Oxbow Road; 715-870 m (2350-2850 feet); September-November.

+Chamaesyce serrula (Engelm.) Woot. & Standl. [Euphorbia serrula

Engelm.]. Sawtooth spurge. Local annual; common on mesas, Tucson

(J. J. Thornber 47 and 8948 in 1903 & 1917) gravelly roadside 2 1/2 miles west of Tucson (F. W. Gould 2552 in 1944); 730 m (2400 feet); August-October.

*Chamaesyce setiloba (Engelm.) Millsp. ex Parish. [Euphorbia setiloba Engelm.]. Bristlelobe sandmat. Widespread annual; common on rocky slopes, flats, and along washes in desertscrub and desert-grassland; 670-1370 m (2200-4500 feet); (April) August-November.

*Ditaxis lanceolata (Benth.) Pax & Hoffmann. [Argythamnia lanceolata (Benth.) Muell. Arg.]. Lanceleaf ditaxis. Widespread herbaceous perennial; uncommon on rocky slopes and gravelly flats; 670-1325 m (2200-4350 feet); February-May, August.

*Ditaxis neomexicana (Muell. Arg.) Heller. [Argythamnia neomexicana Muell. Arg.]. Widespread annual or perennial herb; common on rocky slopes, gravelly flats, and along washes in desertscrub and desert-grassland; 640-1430 m (2100-4700 feet); February-May, August-November.

Euphorbia eriantha Benth. Desert poinsetta. Scattered herbaceous perennial; uncommon on rocky slopes and along washes; 655-1310 m (2150-4300 feet); February-March, June-August, November.

Euphorbia exstipulata Engelm. Spurge. Local annual; uncommon on north slope near crest of Radio Towers Peak; 1325 m (4350 feet); September.

*Jatropha cardiophylla (Torr.) Muell. Arg. Limber bush. Widespread shrub; very common on rocky slopes; 670-1310 m (2200-4300 feet); May-September.

*Poinsettia heterophylla (L.) Klotzsch & Garcke var. heterophylla. [Euphorbia heterophylla L.]. Painted spurge. Scattered annual; uncommon on rocky slopes and along washes in desertscrub and desert-grassland; 730-1340 m (2400-4580 feet); August-September.

*Tragia nepetaefolia Cav. Noseburn. Scattered herbaceous perennial; uncommon on rocky slopes and along washes in desertscrub and desert-grassland; 790-1430 m (2600-4700 feet); April-May, August-November.

Fagaceae Beech Family

*Quercus turbinella Greene. Shrub live oak. Local shrub; on north slopes in desert-grassland, uncommon on Radio Towers Peak, common on Wasson Peak; 1160-1430 m (3800-4700 feet) (mostly above 4300 feet)); April.

Fouquieriaceae Ocotillo Family

*Fouquieria splendens Engelm. Ocotillo. Widespread shrub; very common on gentle and steep rocky slopes in desertscrub and desert-grassland; 640-1430 m (2100-4700 feet); flowers red, January-May (August-September, November-December).

Fumariaceae Fumitory Family

+Corydalis aurea Willd. Golden corydalis. Local annual or perennial herb; mesas, Tucson (J. J. Thornber 4003 in 1903), sandy wash west of Tumamoc Hill (R. M. Turner & J. E. Bowers 2224 in 1983); 745 m (2450 feet); March.

Gentianaceae Gentian Family

*Centaurium calycosum (Buckl.) Fern. Centaury. Local annual; common in moist sand, King Canyon; 915- 945 m (3000-3100 feet); flowers pink, February-May.

Geraniaceae Geranium Family

- *Erodium cicutarium (L.) L'Her. Filaree. Widespread exotic annual; abundant in all communities; 640-1430 m (2100-4700 feet); flowers lavender, January-May.
- *Erodium texanum Gray. Largeflower stork's bill. Widespread annual; common in spring of 1990, uncommon in spring of 1989, on gravelly flats, roadsides, and along washes in desertscrub and desert-grassland; 640-1430 m (2100-4700 feet); flowers magenta, February-April.

Gramineae Grass Family

- *Aristida adscensionis L. Six weeks threeawn. Widespread annual; very common on rocky slopes, roadsides, and along washes and canyons in desertscrub and desert-grassland; 640-1430 m (2100-4700 feet); February-April, August-November.
- *Aristida hamulosa Henr. Threeawn spider grass. Widespread perennial; common on rocky slopes in desertscrub and desert-grassland; 640-1430 m (2100-4700 feet); March-April, July-November.
- *Aristida parishii A. S. Hitchc. Threeawn. Scattered perennial; common on rocky slopes and along washes; 760-1370 m (2500-4350 feet); March.
- +Aristida purpurea Nutt. var. longiseta (Steud.) Vasey. Red threeawn. Local perennial; Flat-top Mt. [Tumamoc Hill] and Tucson Mts. (J. J. Thornber s.n. April 22 & 30 in 1905 & April 1906), April.
- *Aristida purpurea Nutt. var. nealleyi (Vasey) Allred. [A. glauca (Nees) Walp.]. Reverchon threeawn. Widespread perennial; common on roadside; 640-1325 m (2100-4350 feet); August.
- *Aristida purpurea Nutt. var. purpurea Nutt. Purple threeawn. Widespread perennial; common on rocky slopes in desertscrub and

desert-grassland; 640-1430 m (2100-4700 feet); spikelets reddish, February-April, August-November.

*Aristida ternipes Cav. Spider grass. Widespread perennial; common on rocky slopes and sandy and gravelly flats; 640-1325 m (2100-4350 feet); February-May, August-November.

*Arundo donax L. Giant cane. Local exotic perennial; uncommon on seep in King Canyon (removed in October 1990 flood), escape from ASDM grounds; 930 m (3060 feet); September-November.

*Avena fatua L. Wild oat. Scattered exotic annual; uncommon on rocky slopes and sandy flats; 745-945 m (2450-3100 feet); March.

*Bothriochloa barbinodis (Lag.) Herter. [Andropogon barbinodis Lag.]. Cane beardgrass. Scattered perennial; uncommon on rocky slopes and along washes in desertscrub and desert-grassland; 730-1430 m (2400-4700 feet); May, August-December.

Bothriochloa ischaemum (L.) Keng. King Ranch bluestem. [Andropogon ischaemum L.]. Local exotic perennial; near Earth Sciences Center of ASDM; 865 m (2840 feet).

*Bouteloua aristidoides (H.B.K.) Griseb. Six weeks needle grama. Widespread annual; uncommon to abundant on rocky slopes, gravelly flats, and in canyons in desertscrub and desert-grassland; 640-1310 m (2100-4300 feet); August-October.

*Bouteloua barbata Lag. Six weeks grama. Scattered annual; uncommon on sandy flats and along washes; 640-810 m (2100-2650 feet); August-September.

*Bouteloua chondrosioides (H.B.K.) Benth. Sprucetop grama. Local perennial; common on rocky slopes in desertscrub and desert-grassland, Gates Pass, Oeste Wash, and rare to uncommon on Wasson Peak; 870-1430 m (2850-4700 feet); August-November.

- *Bouteloua curtipendula (Michx.) Torr. Sideoats grama. Widespread perennial; very common on rocky and gravelly slopes and in canyons in desertscrub and desert-grassland; 670-1430 m (2200-4700 feet); March-May, July-November.
- *Bouteloua eriopoda (Torr.) Torr. Black grama. Local perennial; common on rocky slopes and in crevices in canyons in desertscrub and desert-grassland; King Canyon, Hugh Norris Trail, Oeste Wash, and Wasson Peak; 790-1430 m (2600-4700 feet); August-November.
- Bouteloua gracilis (H.B.K.) Lag. ex Steud. Blue grama. Local perennial; common along Trails End Road; 1005 m (3300 feet); April, August.
- *Bouteloua hirsuta Lag. Hairy grama. Local perennial; very common on north slope in desert-grassland, jct. of King Canyon and Sweetwater Trails; 1160-1220 m (3800-4000 feet); (April) August-October.
- *Bouteloua repens (H.B.K.) Scribn. & Merr. [B. filiformis (Fourn.) Griffiths]. Slender grama. Widespread perennial; very common on rocky slopes and along washes and canyons in desertscrub and desert-grassland; 670-1430 m (2200-4700 feet); February-June, August-December.
- Bouteloua rothrockii Vasey. Rothrock grama. Local perennial; uncommon on sandy flats, roadsides, and along washes, King Canyon, Kinney Road, and Tumamoc Hill; 745-885 m (2450-2900 feet); August-October.
- *Bouteloua trifida Thurb. Red grama. Scattered perennial; uncommon on rocky slopes, mostly limestone; 640-1005 m (2100-3300 feet); February-March, August-October.
- *Brachiaria arizonica (Scribn. & Merr.) S. T. Blake. [Panicum arizonicum Scribn. & Merr.]. Arizona panicgrass. Widespread

annual; very common on rocky slopes, bajadas, and gravelly flats in desertscrub and desert-grassland; 640-1430 m (2100-4700 feet); August-November.

*Bromus carinatus H. & A. [incl. B. arizonicus (Shear) Stebbins].

Arizona brome. Scattered annual; common on rocky slopes and in shady areas along washes; 685-975 m (2250-3200 feet); March-April.

Bromus catharticus Vahl. [B. willdenowii Kunth]. Rescue grass. Local exotic annual; rare, along wash near jct. of Picture Rocks and Sandario roads, and base of Tumamoc Hill; 670-790 m (2200-2600 feet); March-May.

*Bromus rubens L. Foxtail chess; red brome. Widespread exotic annual; abundant on rocky slopes and gravelly flats in desertscrub and desert-grassland; 640-1430 m (2100-4700 feet); January-May.

+Bromus tectorum L. Cheat grass; downy chess. Local exotic annual; disturbed area near buildings on Tumamoc Hill (R. M. Turner 79-78 in 1979); 815 m (2670 feet); May.

*Chloris virgata Swartz. Feather fingergrass. Widespread annual; uncommon on rocky slopes in desertscrub and desert-grassland; 695-1220 m (2280-4000 feet); August-October.

+Cortaderia selloana (Schult.) Asch. & Graebn. Pampas grass. Local exotic perennial; rare, Tumamoc Hill (J. E. Bowers 2969 in 1984); 730 m (2400 feet), escape from cultivation.

*Cottea pappophoroides Kunth. Cotta grass. Scattered perennial; uncommon on rocky slopes, sandy flats, and along washes and canyons; 790-1190 m (2600-3900 feet); August-November.

*Cynodon dactylon (L.) Pers. Bermuda grass. Scattered exotic perennial; common in moist soil along washes, canyons, and roadsides; 700-1310 m (2300-4300 feet); February-May, August.

- *Digitaria californica (Benth.) Henr. [Trichachne californica (Benth.) Chase]. Arizona cottontop. Widespread perennial; very common on rocky slopes and in canyons in desertscrub and desert-grassland; 640-1430 m (2100-4700 feet); March-May, August-November.
- *Digitaria insularis (L.) Mez ex Ekman. [Trichachne insularis (L.) Nees.]. Sourgrass. Local perennial; rare on rocky slopes and along cliff bases and canyons, Starr's Hill and Trails End Canyon; 980-1190 m (3220-3900 feet); (May) August-November.
- *Echinochloa colonum (L.) Link. Jungle ricegrass. Scattered exotic annual; uncommon in disturbed areas, often seasonally wet with fine soil; 715-915 m (2340-3000 feet); May-October.
- *Elymus elymoides (Raf.) Swezey. [Sitanion hystrix (Nutt.) J. G. Smith]. Squirrel tail. Scattered perennial; uncommon on rocky slopes and gravelly flats; 745-1325 m (2450-4350 feet); March-May.
- Enneapogon cenchroides (Roem. & Schult.) C. E. Hubb. [E. mollis Lehm.]. Local exotic perennial; rare in sandy soil of Oeste Wash; 810 m (2650 feet); October.
- *Enneapogon desvauxii Beauv. Spike pappusgrass. Widespread perennial; common on rocky slopes and gravelly flats in desertscrub and desert-grassland; 640-1430 m (2100-4700 feet); February-March, August-November.
- Eragrostis barrelieri Daveau. Mediterranean lovegrass. Local exotic annual; common on disturbed soil, Central Arizona Project right-of-way near Sandario Road and flats west of Tumamoc Hill; 700-745 m (2300-2450 feet); September-October.
- *Eragrostis cilianensis (All.) Vign.-Lutati ex Janchen. Stink grass. Scattered exotic annual; uncommon on rocky slopes, sandy flats, and along washes in desertscrub and desert-grassland; 745-1430 m (2450-4700 feet); August-November.

- Eragrostis curvula (Schrad.) Nees var. conferta Nees. [Eragrostis chloromelas Steud.]. Weeping lovegrass. Local exotic perennial; rare at ASDM; 870 m (2850 feet).
- *Eragrostis echinochloidea Stapf. Lovegrass. Scattered exotic perennial; uncommon on rocky slopes, disturbed soils, and along washes; 700-1310 m (2300-4300 feet); September-October.
- *Eragrostis intermedia A. S. Hitchc. Plains lovegrass. Local perennial; uncommon on rocky slopes in desertscrub and desert-grassland, Radio Towers and Wasson peaks and Starr's Hill; 855-1430 m (2800-4700 feet); August-November.
- *Eragrostis lehmanniana Nees. Lehmann lovegrass. Widespread exotic perennial; uncommon on gravelly flats, disturbed soils, and along sandy washes in desertscrub and desert-grassland; 670-1430 m (2200-4700 feet); February-May, August-November.
- +Eragrostis pectinacea (Michx.) Nees. Lovegrass. Local annual; mesas, Tucson (J. J. Thornber 5261 in 1903) and in sandy wash northwest of Tumamoc Hill (J. E. Bowers 2711 in 1983); 725 m (2380 feet); July-August.
- Eriochloa acuminata (Presl.) Kunth. [E. gracilis (Fourn.) Hitchc., E. lemmoni Vasey & Scribn. var. gracilis (Fourn.) Gould]. Cupgrass. Local annual; rare, Las Lomas and Tumamoc Hill; 790 m (2600 feet); August-September.
- *Erioneuron pulchellum (H.B.K.) Tateoka. [Tridens pulchellus (H.B.K.) A. S. Hitchc.]. Fluff grass. Widespread annual or perennial; very common on rocky slopes and gravelly flats in desertscrub and desert-grassland; 640-1430 m (2100-4700 feet); March-April, August-November.
- *Heteropogon contortus (L.) Beauv. Tanglehead. Widespread perennial; very common on rocky and gravelly slopes and along washes in

desertscrub and desert-grassland; 670-1430 m (2200-4700 feet);
February-May, August-November.

*Hilaria belangeri (Steud.) Nash. Curly mesquite grass. Widespread perennial; very common on rocky and gravelly slopes in desertscrub and desert-grassland; 685-1325 m (2250-4350 feet); February-May, July-December.

Hilaria mutica (Buckl.) Benth. Tobosa. Scattered perennial; uncommon on rocky slopes and sandy flats, southeastern part of range; 730-1005 m (2400-3300 feet); August-November.

*Hordeum murinum L. ssp. glaucum (Steud.) Tzvel. [H. leporinum Link]. Wild barley. Widespread exotic annual; common on rocky slopes, disturbed soils, and along washes; 685-1325 m (2250-4350 feet); February-May.

*Hordeum pusillum Nutt. Little barley. Local annual; common on disturbed soils, rocky ridge tops, and shaded areas along washes, Safford Canyon, Speedway Blvd., and Tumamoc Hill; 730-930 m (2400-3050 feet); March-April.

+Lamarckia aurea (L.) Moench. Goldentop. Local exotic annual; mesas, Tucson (Mrs. J. J. Thornber s.n. in March 1903).

*Leptochloa dubia (H.B.K.) Nees. Green sprangletop. Scattered perennial; uncommon on rocky slopes and along washes and canyons in desertscrub and desert-grassland; 790-1430 m (2600-4700 feet); August-November.

+Leptochloa fascicularis (Lam.) Gray. Beaded sprangletop. Local annual; in water at edge of clay quarry, west of Tumamoc Hill (J. E. Bowers 2716 in 1983), August.

*Leptochloa filiformis (Lam.) Beauv. Red sprangletop. Widespread annual; common on rocky slopes and along sandy washes in

desertscrub and desert-grassland; 670-1325 m (2200-4350 feet);
August-November.

+*Leptochloa uninervia (Presl.) A. S. Hitchc. Mexican sprangletop.

Local annual; below dam in King Canyon (B. Perrill 5698 in 1984);
915 m (3000 feet); August.

Lycurus setosus (Nutt.) C. G. Reeder. [L. phleoides H.B.K. var.

glaucifolius Beal]. Wolftail. Local perennial; rare on rocky
slopes and in canyons, Gatuño Canyon and Starr's Hill; 915-990 m
(3000-3250 feet); July-November.

*Muhlenbergia emersleyi Vasey. Bull grass. Local perennial; common on
rocky slopes in desertscrub and desert-grassland, Safford and
Wasson peaks, Starr's Hill, and Sweetwater Trail; 810-1340 m
(2650-4400 feet); October-November.

*Muhlenbergia microsperma (DC.) Kunth. Littleseed muhly. Scattered
annual; common on rocky slopes and along washes; 745-1325 m (2450-
4350 feet); October-May.

*Muhlenbergia porteri Scribn. Bush muhly. Widespread perennial; very
common on rocky slopes and along washes and canyons in desertscrub
and desert-grassland; 640-1430 m (2100-4700 feet); March-May,
August-November.

*Muhlenbergia rigens (Benth.) A. S. Hitchc. Deer grass. Local
perennial; uncommon, King and Sweetwater canyons; 915-1070 m
(3000-3500 feet); (March) October-November.

Panicum hirticaule Presl. [P. capillare L. var. hirticaule (Presl.)
Gould]. Witchgrass. Scattered annual; common on rocky slopes,
bajadas, and along washes; 640-1325 m (2100-4350 feet); August-
September.

Panicum miliaceum L. Broomcorn millet. Local exotic annual; uncommon
in disturbed areas near buildings, Las Lomas, 10 mi. west of

Tucson, escape from bird feed; 790-825 m (2600-2700 feet); August-October.

Panicum obtusum H.B.K. Vine mesquite. Local perennial; common along rocky drainages, Gatuño Canyon and Starr's Hill; 885 m (2900 feet); August-October.

*Pappophorum vaginatum Buckl. [P. mucronulatum Nees.]. Pappus grass. Scattered perennial; common along washes and canyons, uncommon on ridge tops; 670-975 m (2200-3200 feet); August-November.

*Pennisetum ciliare (L.) Link. Buffel grass. Scattered exotic perennial; common on rocky slopes, bajadas, roadsides, and along washes; 670-295 m (2200-2800 feet); (May) August-November.

*Pennisetum setaceum (Forsk.) Chiov. Fountain grass. Scattered exotic perennial; common along roadsides, washes and canyons, escape from cultivation; 640-1150 m (2100-3760 feet); February-May, August-December.

*Phalaris minor Retz. Littleseed canary grass. Local exotic annual; uncommon on steep rocky slopes, disturbed soils, and along washes, Gates Pass, Safford Peak area, and Tumamoc Hill; 745-990 m (2450-3250 feet); April.

Phragmites australis (Cav.) Trin. ex Steud. [P. communis Trin.]. Common reed. Local perennial; uncommon in moist soil in clay pit northwest of Tumamoc Hill; 745 m (2450 feet).

*Poa bigelovii Vasey & Scribn. Bigelow's bluegrass. Widespread annual; common on rocky slopes, bajadas, gravelly flats, and in canyons; 685-1005 m (2250-3300 feet); February-April.

*Polypogon monspeliensis (L.) Desf. Rabbitfoot grass. Local exotic annual; uncommon in moist soil, King Canyon, Las Lomas, and Tumamoc Hill; 745-945 m (2450-3100 feet); April-May.

- *Rhynchelytrum repens (Willd.) C.E. Hubb. [R. roseum Nees]. Natal grass. Scattered exotic perennial; uncommon on rocky slopes, roadsides, and in canyons; 730-990 m (2400-3250 feet); spikelets pink or white, February-March, August-December.
- *Schismus barbatus (L.) Thell. [incl. S. arabicus Nees]. Mediterranean grass. Widespread exotic annual; very common in wet springs on rocky slopes and gravelly flats in desertscrub and desert-grassland; 640-1310 m (2100-4300 feet); January-April.
- Scleropogon brevifolius Phil. Burro grass. Local perennial; common on gentle north slope, Starr's Hill; 990 m (3240 feet); September-October.
- Setaria adhaerans (Forssk.) Chiov. Bur bristlegrass. Local exotic perennial; common on disturbed soils, ASDM, Las Lomas, and near St. Mary's Hospital; 715-870 m (2350-2850 feet); September-December.
- +Setaria arizonica Roem. Local annual; 10 miles west of Tucson on San Joaquin Road (A. E. Garwood 4725 in October 1974); 805m (2640 feet).
- *Setaria grisebachii Fourn. Grisebach bristlegrass. Local annual; common on rocky north slopes in desertscrub and desert-grassland, Radio Towers and Wasson peaks and Sweetwater Trail; 640-1400 m (2100-4600 feet); August-November.
- *Setaria leucopila (Scribn. & Merr.) K. Schum. [S. macrostachya H.B.K. in part]. Bristlegrass. Widespread perennial; common on rocky slopes and along washes and canyons; 640-1430 m (2100-4700 feet); August-November (April).
- Setaria liebmannii Fourn. Bristlegrass. Scattered annual; uncommon on rocky slopes, roadsides, and in canyons; 790-1035 m (2600-3400 feet); August-November.

*Setaria macrostachya H.B.K. Plains bristlegrass. Scattered perennial; common on rocky slopes and along washes; 640-1005 m (2100-3300 feet); (April) August-October .

Sorghum halepense (L.) Pers. Johnson grass. Scattered exotic perennial; common on roadsides and disturbed areas; 715-885 m (2350-2900 feet); April and July-September.

*Sporobolus airoides Torr. Alkali sacaton. Local perennial; uncommon along washes, Picture Rocks Retreat Wash; 760 m (2500 feet); August.

*Sporobolus contractus A. S. Hitchc. Spike dropseed. Scattered perennial; uncommon on rocky slopes, roadsides, and along washes; 715-825 m (2350-2700 feet); October.

*Sporobolus cryptandrus (Torr.) Gray. Sand dropseed. Local perennial; uncommon on rocky and gravelly slopes, disturbed areas, and along washes on Speedway Blvd. and Tumamoc Hill; 885-975m (2900-3200 feet); April-May, August-November.

*Sporobolus wrightii Munro ex Scribn. Sacaton. Local perennial; common along washes, King Canyon, Oeste Wash, and Tumamoc Hill; 745-975 m (2450-3200 feet); August-September.

*Stipa speciosa Trin. & Rupr. Desert needlegrass. Local perennial; rare on rocky north slopes, Panther and Safford peaks; 945 m (3100 feet); March-April.

Tridens eragrostoides (Vasey & Scribn.) Nash. Local perennial; rare along wash, Oeste Wash and Sonoran Desert Station; 825-855 m (2700-2800 feet); September-November.

*Tridens muticus (Torr.) Nash. Slim tridens. Widespread perennial; common on rocky slopes, bajadas, and along washes in desertscrub and desert-grassland; 640-1430 m (2100-4700 feet); March-April, August-November.

- +Trisetum interruptum Buckl. Prairie trisetum. Local annual; Tucson Mts. (J. J. Thornber s.n. April in 1905 & 1906), along road to top of Tumamoc Hill (L. J. Toolin 1934 in 1983), moist soil near Tumamoc Hill landfill (R. M. Turner & J. E. Bowers 2211 in 1983); 745-760 m (2450-2500 feet); March-April.
- *Vulpia microstachys (Nutt.) Benth. var. ciliata (Beal) Lonard & Gould. [Festuca microstachys Nutt. var. ciliata Beal, F. eastwoodiae Piper, F. grayi (Abrams) Piper.] Small fescue. Local annual; uncommon on rocky slopes, Safford Peak, and Sweetwater Trail; 945-975 m (3100-3200 feet); March-April, August.
- +Vulpia myuros (L.) K. C. Gmelin. [Festuca myuros L.]. Rattail fescue. Local exotic annual; about corral and on the mesas, 12 miles northwest of Tucson (J. J. Thornber s.n. in March 1906 & 1907); March.
- *Vulpia octoflora (Walt.) Rydb. [Festuca octoflora Walt.]. Sixweeks fescue. Widespread annual; common on rocky slopes in desert scrub and desert-grassland; 640-1325 m (2100-4350 feet); February-April.

Hydrophyllaceae Water leaf Family

- *Eucrypta chrysanthemifolia (Benth.) Greene. Torrey eucrypta. Widespread annual; common on rocky slopes, often under shade of trees and boulders; 670-1035 m (2200-3400 feet); flowers lavender, sometimes white, February-April.
- *Eucrypta micrantha (Torr.) Heller. Smallflower eucrypta. Widespread annual; common on rocky slopes, often under shade of trees and boulders; 640-1220 m (2100-4000 feet); flowers lavender, sometimes white, February-April.

- **Nama demissum* Gray. Purple mat. Local annual; common in washes, Ez-kim-in-min picnic area; 885-990 m (2900-3250 feet); flowers purple with yellow throat, February-April.
- **Nama hispidum* Gray. Sand bells. Local annual; uncommon on flats and along washes, west of Gates Pass Road and flats west of Tumamoc Hill; 745-825 m (2450-2700 feet); flowers purple with yellow throat, February-April.
- +*Phacelia affinis* Gray. Purple bell phacelia, caterpillar weed. Local annual; Tucson Mts. (D. Griffiths 2486 in 1901), west of Tumamoc Hill along margin of large wash (D. K. Warren & R. M. Turner 68-96 in 1968); 750 m (2460 feet); flowers pale lavender or whitish with yellow throat, March-April.
- Phacelia campanularia* Gray. Desert Canterbury bells. Local exotic annual; uncommon, on disturbed area near Anklam Road, wash east of Starr Pass development, and flats west of Tumamoc Hill near Greenwood Road, escape from cultivation; 760 m (2500 feet); flowers blue, March-April.
- **Phacelia coerulea* Greene. Caterpillar weed. Scattered annual; common on rocky slopes and along washes; 730-1035 m (2400-3400 feet); flowers purple, February-April.
- **Phacelia bombycina* Woot. & Standl. [*Phacelia crenulata* Torr. sensu K. & P. in part]. Caterpillar weed. Widespread annual; uncommon on rocky slopes, gravelly flats, and roadsides in desertscrub and desert-grassland; 670-1430 m (2200-4700 feet); flowers purple, February-April.
- **Phacelia distans* Benth. Caterpillar weed. Widespread annual; very common on rocky slopes, gravelly flats, and along roadsides in desertscrub and desert-grassland; 670-1430 m (2200-4700 feet); flowers purple, February-May.

- +Phacelia popei Torr. & Gray var. arizonica (Gray) Voss [P. arizonica Gray]. Caterpillar weed. Local annual; mesas, Tucson (Mrs. J. J. Thornber 4013 in 1903); flowers pale lavender or white, March.
- *Pholistoma auritum (Lindl.) Lilja. Widespread annual; common under shade of trees and boulders on rocky slopes and along washes and canyons; 715-1325 m (2350-4350 feet); flowers purple, February-April (October).

Krameriaceae Ratany Family

- *Krameria erecta Willd. [K. parvifolia Benth.]. Range ratany. Widespread subshrub; common at the higher elevations on rocky slopes and gravelly flats in desertscrub and desert-grassland; 700-1430 m (2300-4700 feet); flowers magenta, April-June, August-November.
- *Krameria grayi Rose & Painter. White ratany. Widespread subshrub; common on rocky slopes and gravelly flats; 640-1325 m (2100-4350 feet); flowers magenta, March-June, August.

Labiatae Mint Family

- *Hedeoma nanum (Torr.) Briq. Mock pennyroyal. Local annual or perennial herb; rare, Greasewood Park and Wasson Peak; 760 m (2500 feet), 1415 m (4650 feet); flowers light purple, April, November.
- *Hyptis emoryi Torr. Desert lavender. Widespread shrub; uncommon on rocky slopes and along canyons, very common on granitic slopes; 640-1310 m (2100-4300 feet); flowers light purple, August-May.
- Lamium amplexicaule L. Henbit. Local exotic annual; rare, near buildings, Las Lomas; 790 m (2600 feet); flowers purple, February.
- Molucella laevis L. Shell flower, bells of Ireland. Local exotic annual; in wash near Oxbow Road and flats west of Tumamoc Hill;

715-730 m (2350-2400 feet); flowers white tipped with pink, March-April.

*Salvia columbariae Benth. Chia. Widespread annual; common in wet springs on gravelly flats and along washes in desertscrub and desert-grassland; 670-1430 m (2200-4700 feet); flowers deep purple, February-April.

*Salvia pinguifolia (Fern.) Woot. & Standl. Rock sage. Local shrub; uncommon on steep, rocky, north slopes in desert-grassland, Radio Towers and Wasson peaks; 1160-1430 m (3800-4700 feet); flowers light purple, August-November.

Teucrium cubense Jacq. Small coast germander. Local annual, watered areas near Ajo Way and Tucson Estates Parkway and sandy wash west of Tumamoc Hill; 745-780 m (2450-2550 feet); flowers white, March.

Leguminosae Pea Family

Acacia angustissima (Mill.) Kuntze. White ball acacia, fern acacia. Local subshrub; rare on steep rocky slopes and drainages, southeast of Gates Pass; 730-945 m (2400-3100 feet); flowers pale yellow, July-September.

*Acacia constricta Benth. Whitethorn acacia. Widespread shrub; very common on rocky slopes, gravelly flats, and along washes and canyons in desertscrub and desert-grassland; 670-1430 m (2200-4700 feet); flowers bright yellow, April-October.

Acacia farnesiana (L.) Willd. [A. minuta (M. E. Jones) Beauch., A. smallii Isely]. Sweet acacia, huisache. Local shrub; just south of ASDM, on Kinney Road, escape from cultivation; 855 m (2800 feet); flowers yellow, fragrant, March.

*Acacia greggii Gray. Catclaw acacia. Widespread shrub; very common on rocky slopes, gravelly flats, and along washes and canyons in

desertscrub and desert-grassland; 670-1430 m (2200-4700 feet);
flowers yellow-white, March-August (November).

Astragalus allochrous Gray var. playanus (M. E. Jones) Isely. [A. wootonii Sheldon]. Locoweed. Local annual; uncommon on flats, north of Ajo Way near Central Arizona Project water treatment plant and west of Tumamoc Hill; 745-775 m (2450-2540 feet); flowers purple or white, March-May.

*Astragalus lentiginosus Dougl. var. australis Barneby. Locoweed. Local herbaceous perennial; on sandy flats and along washes Ez-kim-in-zin and Signal Hill picnic areas and along Sandario Road; 670-1100 m (2200-3600 feet); flowers purple, February-May.

*Astragalus nuttallianus DC. var. austrinus (Small) Barneby. Locoweed. Scattered annual; common on rocky slopes and gravelly flats; 730-1310 m (2400-4300 feet); flowers purple, February-April.

Caesalpinia gilliesii Wall. Yellow bird-of-paradise. Local exotic shrub; common on flats, along Anklam Road west of Greasewood Road and west of Tumamoc Hill, escape from cultivation; 740-750 m (2425-2460 feet); petals yellow, pistils and stamens red, April-September.

*Calliandra eriophylla Benth. Fairy duster. Widespread shrub; very common on rocky slopes, gravelly flats, and beside washes and canyons; 670-1430 m (2200-4700 feet); flowers pink, February-April, August-November.

Calliandra schottii Torr. Local shrub; common on rocky north slopes, north of Cat Mt. to Gates Pass area; 945-1005 m (3100-3300 feet); flowers white with pink tips, August-September (April).

Cassia artemisioides Gaud. Feathery cassia. Local exotic shrub; rare on roadsides, roadcut across Speedway Blvd. from Las Lomas, escape from cultivation; 790 m (2600 feet); flowers yellow, March-April.

*Cercidium floridum Benth. Blue paloverde. Scattered tree; common along roadsides and large washes; 640-975 m (2100-3200 feet); flowers yellow, March-May (October).

Cercidium floridum Benth. x Parkinsonia aculeata L. Hybrid paloverde. Local tree; rare at jct. of Bilby and Cardinal roads, and Speedway near Paint Hills Road; 775 m (2540 feet); flowers yellow.

*Cercidium microphyllum (Torr.) Rose & Johnst. Foothills paloverde. Widespread tree; abundant on rocky slopes and gravelly flats; 640-1400 m (2100-4600 feet); flowers yellow with one white petal, (January, September) April-June.

Cercidium microphyllum (Torr.) Rose & Johnst. X Parkinsonia aculeata L. Hybrid paloverde. Local tree; rare in disturbed areas, Old Tucson, and Speedway Blvd. 1/2 mile east of Las Lomas; 780-790 m (2550-2600 feet); flowers yellow, May, July.

*Coursetia glandulosa Gray. [C. microphylla Gray]. Baby bonnets. Local shrub; very common along washes, especially King Canyon; 715-975 m (2350-3200 feet); flowers white, yellow, and pink, March-May, November.

Dalea grayi (Vail) L. O. Williams. Local herbaceous perennial; rare on ridgetop of Starr's Hill; 870-975 m (2850-3200 feet); flowers purple, May.

Dalea neomexicana (Gray) Cory. Local herbaceous perennial; common on sandy and gravelly disturbed soil, 22nd Street and Trails End Road; 745-855 m (2450-2800 feet); flowers white with crimson tip, February-April, August.

*Dalea poqonathera Gray. Hierba del corazon. Local herbaceous perennial; common on Starr's Hill and Sweetwater Trail, uncommon in Gates Pass area; 790-1160 m (2600-3800 feet); flowers purple, April, August-September, December.

Dalea pringlei Gray. Local herbaceous perennial; common on rocky slopes, and sandy banks, Oeste Wash and Starr's Hill; 790-915 m (2600-3150 feet); flowers purple, February-April, August-October.

*Dalea wrightii Gray. Local herbaceous perennial; common on rocky slopes and ridge top in Wasson Peak area; 1425 m (4680 feet); flowers yellow, (April) September-November.

Desmanthus covillei (Britt. & Rose) Wiggins ex Turner. Bundleflower. Local herbaceous perennial; rare in rocky canyons and drainages, Gates Pass, Oeste Wash, and Trails End Canyon; 840-1190 m (2750-3900 feet); flowers pale yellow, August-September.

*Desmodium procumbens (Mill.) A. S. Hitchc. Scattered annual; abundant in wet summers at cliff bases, Gates Pass, Hugh Norris Trail, and Rillito Peak, rare to common elsewhere; 640-1325 m (2100-4350 feet); flowers light pink, August-November.

*Galactia wrightii Gray. Local herbaceous perennial; abundant on rocky slopes and along washes, Starr's Hill area, uncommon in Sweetwater Canyon; 790-975 m (2600-3200 feet); flowers light purple, July-October.

*Hoffmanseggia glauca (Ort.) Eifeort. [H. densiflora Benth.]. Hog potato. Local herbaceous perennial; very common on disturbed sandy roadside, ca. 1 mile west of Picture Rocks Pass; 685-760 m (2250-2490 feet); flowers yellow, April-May, August.

+Lotus greenei (Woot. & Standl.) Ottley. Deer vetch. Local herbaceous perennial; Tumamoc Hill (A. L. Hinckley s.n. in March 1931); flowers yellow with pink on back, March.

*Lotus humistratus Greene. Hill locust. Scattered annual; common on rocky slopes and gravelly flats in desertscrub and desert-grassland; 670-1310 m (2200-4300 feet); flowers yellow, February-April.

- *Lotus rigidus (Benth.) Greene. Desert rock pea. Local herbaceous perennial; common on rocky slopes in desert-grassland, Hugh Norris Trail; 1130-1250 m (3700-4100 feet); flowers yellow with red veins, February-March (November).
- +Lotus salsuginosus Greene. var. brevivexillus Ottley. [L. humilis Greene]. Deer vetch. Local annual; Silverbell Road at Rattlesnake Pass (L. Benson 10620, 10700 in 1941); 760 m (2500 feet); flowers yellow, March.
- *Lotus strigosus (Nutt.) Greene var. tomentellus (Greene) Isely. [Lotus tomentellus Greene]. Hairy deer vetch. Scattered annual; uncommon on flats and along washes; 730-1310 m (2400-4300 feet); flowers yellow, February-April, August-December.
- *Lupinus concinnus Agardh. Elegant lupine. Local annual; uncommon on rocky slopes and flats in desertscrub and desert-grassland, Ez-kim-in-zin picnic area, Hugh Norris Trail, west of Sandario Road, and Tumamoc Hill; 670-1340 m (2200-4400 feet); flowers deep pink, February-April.
- *Lupinus sparsiflorus Benth. Arizona lupine. Widespread annual; very common on rocky slopes, roadsides, and along washes in desertscrub and desert-grassland; 670-1340 m (2200-4400 feet); flowers purple, February-May.
- *Marina parryi (T. & G.) Barneby. [Dalea parryi T. & G.]. Parry dalea. Widespread herbaceous perennial or annual; very common on rocky slopes and roadsides in desertscrub and desert-grassland; 670-1430 m (2200-4700 feet); flowers purple, August-May.
- Medicago polymorpha L. var. vulgaris (Benth.) Shinnars. [M. hispida Gaertn.]. Bur clover. Local exotic annual; roadside at Las Lomas (P. D. Jenkins observation in 1988), in moist area near building

on Tumamoc Hill (R. M. Turner 78-4 in 1978); 815 m (2670 feet); flowers yellow, March.

*Medicago sativa L. Alfalfa. Local exotic herbaceous perennial; uncommon on roadsides, Ajo Way and Picture Rocks Road near Cambah picnic area; 760-870 m (2500-2850 feet); flowers purple, April-May.

+*Melilotus indicus (L.) All. Alfalfilla. Local exotic annual; ASDM (A. E. Garwood 4866 in 1976), King Canyon (A. E. Garwood 5208 in 1978), Tumamoc Hill landfill (R. M. Turner & J. E. Bowers 2210 in 1983); 745-915 m (2450-3000 feet); flowers yellow, March, September.

*Mimosa biuncifera (Benth.) Britt. and Rose. Wait-a-minute bush. Local shrub; rare to abundant on rocky slopes and along canyons, north of Cat Mt. and Safford Canyon; 760-975 m (2500-3200 feet); flowers white, April, August-October.

Mimosa laxiflora Benth. Gatuño, garabatillo. Local shrub; common on slopes, north of Cat Mt. to Gates Pass area; 885-1035 3400 feet); flowers pink, August-October.

*Nissolia schottii (Torr.) Gray. Widespread woody vine, climbing on shrubs; uncommon to common on rocky slopes and along washes; 715-1430 m (2350-4700 feet); flowers yellow, August, November.

*Olneya tesota Gray. Ironwood. Widespread tree; very common on rocky slopes and bajadas, and along washes and canyons; 670-975 m (2200-3200 feet); flowers purple with white, March-June.

Parkinsonia aculeata L. Mexican paloverde. Scattered tree; rare on roadsides, disturbed soils, and along washes, escape from cultivation; 790 m (2600 feet); flowers yellow, April-June (August, November).

*Phaseolus acutifolius Gray var. latifolius Freeman. Tepary bean.

Local annual vine; rare in disturbed desertscrub, Tohono O'odham Indian saguaro fruit harvest area, escaped cultivar; 715 m (2340 feet); flowers lavender, August-September.

*Phaseolus acutifolius Gray. var. tenuifolius Gray. Wild bean. Local annual vine; rare on steep, rocky, north slopes, Sweetwater Trail and Wasson Peak; 1115-1340 m (3650-4400 feet); flowers lavender, August-September.

*Phaseolus filiformis Benth. [P. wrightii Gray]. Local herbaceous annual or perennial vine; uncommon to common on rocky slopes and in canyon bottoms in the northern part of the range; 790-915 m (2600-3000 feet); flowers pink, February-April.

*Prosopis velutina Woot. Velvet mesquite. Widespread tree; abundant along washes, uncommon on slopes and flats in desertscrub and desert-grassland; 640-1430 m (2100-4700 feet); flowers pale yellow, April-June, August.

*Rhynchosia senna Gill. [R. texana T. & G.]. Rosary bean. Local herbaceous perennial vine; common on rocky slopes, north of Gates Pass, Rattlesnake Pass, Sweetwater Trail, and Wasson Peak; 730-1430 m (2400-4700 feet); flowers yellow, August-November.

*Senna bauhinioides (Gray) Irwin & Barneby. [Cassia bauhinioides Gray]. Twoleaf desert senna. Local herbaceous perennial; rare on Wasson Peak and mesas, Tucson (J. J. Thornber s.n. in December 1902, s.n. in May 1903); 1430 m (4685 feet); flowers yellow, May, August-September.

*Senna covesii (Gray) Irwin & Barneby. [Cassia covesii Gray]. Desert senna. Widespread herbaceous perennial; common on gravelly flats and roadsides, uncommon on rocky slopes in desertscrub and desert-

grassland; 640-1430 m (2100-4700 feet); flowers yellow, March-May, August-November.

Sphinctospermum constrictum (Wats.) Rose. Local annual; rare on rocky slopes and in canyons and washes, northeast of Gates Pass, Oeste Wash, Starr's Hill, and Tumamoc Hill; 810-975 m (2650-3200 feet); flowers green and gray-purple, August-October.

Tephrosia tenella Gray. Local herbaceous perennial or annual; common on rocky slopes, Starr's Hill area; 840-990 m (2750-3250 feet); flowers violet, January, April-May, August-November.

*Vicia ludoviciana Nutt. [V. exiqua Nutt.]. Vetch. Scattered annual vine, climbing on shrubs; common on rocky slopes and along washes; 810-975 m (2650-3200 feet); flowers purple, March-April.

Liliaceae Lily Family

*Allium macropetalum Rydb. Wild onion. Scattered herbaceous perennial; common on rocky slopes and gravelly flats; 685-1070 m (2250-3500 feet); flowers white or light pink, February-April.

*Calochortus kennedyi Porter. Desert mariposa lily. Scattered herbaceous perennial; very common on rocky slopes, on ridge south of Safford Peak and Sweetwater Trail; 730-1160 m (2400-3800 feet); flowers orange, March-April.

*Dichelostemma pulchellum (Salisb.) Heller. Bluedick. Widespread herbaceous perennial; very common on rocky slopes in desert scrub and desert-grassland; 670-1325 m (2200-4350 feet); flowers purple, occasionally albino (Sweetwater and King canyons, Tumamoc Hill), February-April.

*Zephyranthes longifolia Hemsl. Rain lily. Local herbaceous perennial; abundant in some years (1989) on rocky slopes in desert-grassland,

Wasson Peak area; 1220-1430 m (4000-4700 feet); flowers yellow, July-October.

Linaceae Flax Family

- *Linum lewisii Pursh. Blue flax. Local annual or perennial; rare on rocky slopes, near Greasewood and 22nd Street, Picture Rocks Pass, and east of Sweetwater Trail head; 755-910 m (2480-2980 feet); flowers blue, March-April.

Loasaceae Stickleaf Family

- *Mentzelia affinis Greene. Blazing star, stickleaf. Widespread annual; common on rocky slopes, roadsides, and along washes and canyons in desertscrub and desert-grassland; 760-1310 m (2500-4300 feet); flowers yellow, February-April.
- *Mentzelia albicaulis Dougl. Smallflower blazing star. Local annual; uncommon on gravelly flats and along washes, Ez-kim-in-zin picnic area, King Canyon, and Tumamoc Hill; 730-975 m (2400-3200 feet); flowers yellow, March.
- *Mentzelia jonesii (U. & G.) Thompson & Roberts. [M. nitens Greene var. jonesii (Urban & Gilg.) J. Darl.]. Blazing star. Local annual; common on steep rocky slopes and in canyons, Hugh Norris Trail, King Canyon, and Tumamoc Hill; 945-1160 m (3100-3800 feet); flowers yellow, February-April.
- Mentzelia multiflora (Nutt.) Gray. ssp. multiflora. [M. pumila (Nutt.) T. & G. var. multiflora Urban & Gilg.]. Stickleaf. Scattered annual; uncommon on roadsides and disturbed soils; 730-790 m (2400-2600 feet); flowers yellow, March-May, August-September.

- *Mentzelia texana Urb. & Gilb. [M. asperula Woot. & Standl.]. Blazing star. Local annual; uncommon on steep rocky slope, Sweetwater Trail; 1120 m (3680 feet); flowers yellow, August-September.

Malpighiaceae Malpighia Family

- *Janusia gracilis Gray. Desert vine. Widespread subshrub or more commonly a vine, often climbing on shrubs, very common on rocky slopes and gravelly flats in desertscrub and desert-grassland; 640-1430 m (2100-4700 feet); flowers yellow, March-May, July-November.

Malvaceae Mallow Family

- *Abutilon abutiloides (Jacq.) Strong. [A. californicum Benth. sensu K. & P.]. Indian mallow. Local herbaceous perennial; rare beside wash, 3/4 mile west of Red Hills Information Center (1990) and Snyder Hill (J. J. Thornber s.n. in April 1908); 760 m (2500 feet); flowers yellow, August.
- *Abutilon incanum (Link) Sweet. Indian mallow, pelotazo. Widespread subshrub; very common on rocky slopes in desertscrub and desert-grassland; 670-1325 m (2200-4350 feet); flowers yellow or cream with maroon basal spot, pinkish on outside; March-April, August-November.
- *Abutilon malacum Wats. Indian mallow. Scattered subshrub; common on rocky slopes, especially on limestone; 670-975 m (2200-3200 feet); flowers orange-yellow, August-November.
- *Abutilon parishii Wats. Pima indian mallow. Scattered herbaceous perennial; rare to uncommon on rocky slopes and among boulders in steep canyons and drainages, Gates Pass, Golden Gate Mt., Hugh Norris Trail, Safford Peak, and Sweetwater Canyon; 930-1400 m

(3050-4600 feet); flowers yellow-orange, March-April, August-December.

*Abutilon parvulum Gray. Indian mallow. Local herbaceous perennial; rare on rocky slopes in desert-grassland, Radio Towers and Wasson peaks area; 1100-1400 m (3600-4600 feet); flowers golden yellow, not pink or brick-red as reported by J. Fryxell (1983) or P. Fryxell (1988), April-May, August-October.

Anoda pentaschista Gray. Local annual; uncommon on rocky slopes, Tumamoc Hill; 815 m (2670 feet); flowers yellow, August-November.

+Eremalche exilis (Gray) Greene. [Malvastrum exile Gray]. Local annual; mesas, Tucson (J. J. Thornber 4884, 5326 in 1903 & 1905), Rattlesnake Pass (L. Benson 10622 in 1941); 760 m (2500 feet); flowers whitish to pink or lavender, March-April.

*Herissantia crispa (L.) Brizicky. [Gayoides crispum (L.) Small]. Widespread herbaceous perennial or subshrub; very common on rocky slopes and in canyons in desertscrub and desert-grassland; 640-1430 m (2100-4700 feet); flowers yellow, August-May.

*Hibiscus biseptus Wats. Sonoran rose mallow. Local herbaceous perennial; uncommon on rocky slopes in desertscrub and desert-grassland, Hugh Norris Trail, Radio Towers and Wasson peaks, and Rattlesnake Pass; 730-1430 m (2400-4700 feet); flowers yellow, September-November.

*Hibiscus coulteri Harv. Desert rose mallow. Widespread subshrub; common on rocky slopes, gravelly flats, and along canyons, often among shrubs; 670-1340 m (2200-4400 feet); flowers yellow, February-May, July-November.

*Hibiscus denudatus Benth. Rock rose mallow. Widespread subshrub; common on rocky slopes and gravelly flats, abundant on King Canyon

Trail; 670-1340 m (2200-4400 feet); flowers lavender; March-May, August-November.

*Horsfordia newberryi (Wats.) Gray. Yellow felt plant. Local shrub; single plant on rocky south slope, Safford Canyon; 855 m (2800 feet); flowers yellow, February.

Malva parviflora L. Little mallow. Scattered exotic annual or biennial; common on roadsides and disturbed areas; 730-1430 m (2400-4700 feet); flowers pink, March-April.

Malvastrum bicuspidatum (Wats.) Rose. Local subshrub; rare in rocky canyon, Trails End Canyon; 1035-1190m (3400-3900 feet); flowers yellow, September.

*Sida abutifolia Miller. [S. filicaulis T. & G., S. procumbens Sw.]. Scattered herbaceous perennial; uncommon on rocky slopes and gravelly flats in desertscrub and desert-grassland; 745-1415 m (2450-4650 feet); flowers yellow, February-April, August-December.

Sida physocalyx Gray. [Rhynchosida physocalyx (Gray) Fryxell]. Tuberous sida. Local herbaceous perennial; uncommon on gravelly flats, disturbed soils, and along washes, Oeste Wash, near Old Tucson, and Tumamoc Hill; 745-1035 m (2450-3400 feet); flowers pale yellow or orange, August.

*Sphaeralcea ambigua Gray var. rosacea (Munz & Johnst.) Kearney. Desert globe mallow. Widespread subshrub; common on rocky slopes in desertscrub and desert-grassland; 640-1310 m (2100-4300 feet); flowers lavender, March-May, August-November; var. ambigua with red-orange flowers seeded along Anklam Road, Speedway Blvd., and ASDM.

+Sphaeralcea angustifolia (Cav.) G. Don. Narrowleaf globe mallow. Local subshrub; rare on sandy, disturbed soil, flats west of

Tumamoc Hill (J. E. Bowers 2735 in 1983); 745 m (2450 feet);
flowers pale orange-pink, not lavender as in Texas, September.

*Sphaeralcea coulteri (Wats.) Gray. Coulter globe mallow. Scattered
annual; common on sandy flats and roadsides; 640-990 m (2100-3250
feet); flowers orange, February-April.

*Sphaeralcea emoryi Torr. var. californica (Parish) Shinnars [S. e.
var. variabilis (Ckll.) Kearney]. Emory globe mallow. Local
subshrub; rare on rocky slopes, Picture Rocks Pass and Tumamoc
Hill; 730-825 m (2400-2700 feet); flowers lavender, March; very
similar to and hybridizes with sympatric widespread S. ambigua
var. rosacea.

+Sphaeralcea hastulata Gray. [S. subhastata Coult. var. thyrsoides
Kearney]. Globe mallow. Local subshrub; rare on flats, 10 miles
southwest of Tucson (Fulton & Harrison 6818, 6824, 6825, 6826 in
1930, the type series); flowers orange-red, April.

*Sphaeralcea laxa Woot. & Standl. Caliche globe mallow. Widespread
subshrub; very comon on rocky slopes, gravelly flats, and
roadsides in desertscrub and desert-grassland; 670-1430 m (2200-
4700 feet); flowers orange, all months.

Meliaceae Melia Family

Melia azedarach L. Chinaberry. Local exotic tree; rare, in gravel
floodplain along wash, in Greasewood Park, and Tumamoc Hill
landfill, escape from cultivation; 735-750 m (2420-2460 feet);
flowers purple, March.

Molluginaceae Mollugo Family

*Mollugo cerviana (L.) Seringe. Threadstem carpet weed. Local annual; uncommon in granitic grass, Hugh Norris Trail; 1175 m (3850 feet); flowers white, August-October.

Mollugo verticillata L. Indian chick weed. Local annual; rare, Oeste Wash and Sonoran Desert Station; 780 m (2550 feet); flowers white, October.

Moraceae Mulberry Family

*Morus microphylla Buckl. Texas mulberry. Local shrub; single shrub on rhyolite scree slope, Wasson Peak; 1395 m (4580 feet); April.

Nyctaginaceae Four o'clock Family

*Allionia incarnata L. Trailing four-o'clock, windmills. Widespread herbaceous perennial; common on rocky slopes, disturbed areas, and along washes in desert scrub and desert-grassland; 640-1430 m (2100-4700 feet); flowers pink, occasionally albino (King Canyon and Wasson Peak), February-December.

*Boerhaavia coccinea Mill. Red spiderling. Scattered herbaceous perennial; uncommon on rocky slopes, gravelly flats, and along washes; 745-1310 m (2450-4300 feet); flowers red, March-May, July-November.

Boerhaavia coulteri (Hook. f.) Wats. Spiderling. Local annual; uncommon on rocky slopes and sandy flats west, Rillito Peak and Tumamoc Hill; 640-790 m (2100-2600 feet); flowers light pink, August.

Boerhaavia erecta L. var. erecta. Spiderling. Local annual; uncommon on rocky slopes and along washes, Rillito Peak and San Joaquin Road; 640-700 m (2100-2300 feet); flowers pink, August-November.

- *Boerhaavia erecta L. var. intermedia (Jones) K. & P. [B. intermedia Jones]. Spiderling. Widespread annual; common on rocky slopes, disturbed soils, and along washes in desertscrub and desert-grassland; 700-1430 m (2300-4700 feet); flowers pink, August-November.
- +*Boerhaavia gracillima Heimerl. Spiderling. Local herbaceous perennial; King Canyon (A. E. Garwood 4991 in 1976); flowers red.
- *Boerhaavia megaptera Standl. Winged spiderling. Scattered annual; uncommon on rocky slopes and along washes and canyons in desertscrub and desert-grassland, common on Wasson Peak ridge; 730-1430 m (2400-4700 feet); flowers pink, August-November; Tumamoc Hill is the type locality (J. J. Thornber 162 in 1903).
- *Boerhaavia spicata Choisy. Spiderling. Local annual; very common on rocky slopes and along washes in desertscrub and desert-grassland; Hugh Norris Trail, Oeste Wash, and Tumamoc Hill; 790-1430 m (2600-4700 feet); flowers pink, August-November.
- *Boerhaavia wrightii Gray. Fourwing spiderling. Scattered annual; common on rocky slopes, roadsides, and along washes in desertscrub; 640-1005 m (2100-3300 feet); flowers pink, August-September.
- *Commicarpus scandens (L.) Standl. Bush spiderling. Widespread subshrub; common on rocky slopes and along washes and canyons; 640-1325 m (2100-4350 feet); flowers pale green, March-November.
- *Mirabilis bigelovii Gray. Wishbone bush. Widespread herbaceous perennial, or subshrub; common on rocky slopes and in canyons in desertscrub and desert-grassland, 640-1430 m (2100-4700 feet); flowers white with pink, February-May, August-November.
- *Mirabilis multiflora (Torr.) Gray. Colorado four o'clock. Local herbaceous perennial; rare at base of cliffs in desert-grassland,

just below jct. of Hugh Norris and King Canyon Trails, common on northeast slope of Wasson Peak; 1370-1400 m (4500-4600 feet); flowers magenta, August.

- *Oxybaphus coccineus Torr. [Mirabilis coccineus (Torr.) B. & H.]. Red four-o'clock. Local herbaceous perennial; uncommon on rocky north slopes, Radio Towers and Wasson peaks area; 1100-1340 m (3600-4400 feet); flowers magenta, April-May, August-November.

Oleaceae Olive Family

- *Forestiera shrevei Standl. [F. phillyreoides (Benth.) Torr.]. Desert olive. Scattered shrub; uncommon on rocky slopes and along washes and canyons; 670-1430 m (2200-4700 feet); flowers white, January-March.
- *Menodora scabra Gray. Twinberry. Widespread subshrub; very common on rocky slopes and gravelly flats in desert scrub and desert-grassland; 640-1430 m (2100-4700 feet); flowers yellow, March-May, August-November.

Onagraceae Evening Primrose Family

- *Camissonia californica (Nutt. ex Torr. & Gray) Raven. [Oenothera leptocarpa Greene]. Scattered annual; common on rocky slopes and along washes; 730-1310 m (2400-4300 feet); flowers pale yellow with red spots, February-May.
- *Camissonia chamaenerioides (Gray) Raven. [Oenothera chamaenerioides Gray]. Longcapsule primrose. Widespread annual; uncommon on rocky slopes and along washes and canyons; 640-1310 m (2100-4300 feet); flowers yellow, February-April.
- Camissonia clavaeformis (Torr. & Frem.) Raven. [Oenothera clavaeformis Torr. & Frem.]. Browneye primrose. Local annual; common on flats

west of Tumamoc Hill, rare in King Canyon; 700-975 m (2300-3200 feet); flowers white, March-May.

*Gaura parviflora Dougl. Lizard tail. Local annual or biennial; common in King Canyon and Oeste Wash; 780-945 m (2550-3100 feet); flowers white with pink, March-May, July.

+Oenothera caespitosa Nutt. Large white desert primrose. Local herbaceous perennial; Tumamoc Hill (F. Shreve s.n. in March 1931); flowers white, March.

*Oenothera primiveris Gray. Yellow desert primrose. Widespread annual; uncommon on rocky slopes and gravelly flats in desert scrub and desert-grassland; 670-1370 m (2200-4500 feet); flowers yellow, February-April.

Orobanchaceae Broom Rape Family

*Orobanche ludoviciana Nutt. var. cooperi (Gray) G. Beck. [O. cooperi (Gray) Heller]. Broom rape, burro weed strangler. Scattered herbaceous perennial root parasite; rare on rocky slopes; 730-915 m (2400-3000 feet); flowers purple, March.

Papaveraceae Poppy Family

Argemone gracilenta Greene. Crested prickly poppy. Widespread annual; common on roadsides and disturbed areas; 745-810 m (2450-2650 feet); flowers white, February-May, August-October.

+Argemone ochroleuca Sweet. [Argemone pleiacantha Greene sensu K. & P. suppl., in part]. Yellow prickly poppy. Local annual; Tucson Mts. (R. H. Peebles & H. F. Loomis 6951 in 1930); flowers yellow, May.

*Eschscholtzia mexicana Greene. Mexican gold poppy. Widespread annual; very common in wet springs on rocky slopes, ridgetops and

roadsides in desertscrub and desert-grassland; 670-1430 m (2200-4700 feet); flowers yellow-orange, February-May.

Pedaliaceae Unicorn Plant Family

*Proboscidea altheaeifolia (Benth.) Decne. [incl. P. arenaria (Engelm.)

Decne.]. Devil's claw, desert unicorn plant. Scattered herbaceous perennial; common on bajadas, sandy flats, and along washes; 715-790 m (2350-2600 feet); flowers yellow, July-August.

Proboscidea parviflora (Woot.) Woot. & Standl. Devil's claw. Local annual; uncommon, Sweetwater Trail and Tumamoc Hill landfill; 745-1130 m (2450-3700 feet); flowers pink-purple, August-November.

Plantaginaceae Plantain Family

+Plantago bigelovii Gray. [P. heterophylla Nutt. ssp. californica (Greene) Bassett]. Manyseed plantain. Local annual; in desertscrub, north of Rattlesnake Pass on Silverbell Road (R. A. Darrow s.n. in March 1937); 760 m (2500 feet).

*Plantago fastigiata Morris. [P. insularis Eastw. sensu K. & P.]. Indian wheat. Widespread annual; common on rocky slopes and sandy and gravelly flats; 640-1220 m (2100-4000 feet); February-April.

*Plantago patagonica Jacq. [P. purshii R. & S.]. Pursh plantain. Widespread annual; very common on rocky slopes in desertscrub and desert-grassland; 685-1430 m (2250-4700 feet); February-May.

Plantago rhodosperma Decne. Redseed plantain. Local annual; common on rocky slopes in desertscrub, Tumamoc Hill; 790-815 m (2600-2670 feet); March-April.

Plumbaginaceae Plumbago Family

- *Plumbago scandens L. Hierba de alacrán. Local herbaceous perennial; rare on steep rocky slopes and at base of cliffs, Safford Peak area and Starr's Hill; 730-975 m (2400-3200 feet); flowers white, April-May, September-November.

Polemoniaceae Phlox Family

- *Eriastrum diffusum (Gray) Mason. Widespread annual; common on rocky slopes and flats in desertscrub and desert-grassland; 670-1430 m (2200-4700 feet); flowers blue with yellow throat; February-May.
- +Gilia capitata Sims. Local annual; 12 miles northwest of Tucson, Tucson Mts. (J. J. Thornber s.n. in March 1908), mesas, Tucson (J. J. Thornber s.n. in May 1905); March-May.
- *Gilia flavocincta A. Nels. ssp. australis (A. & V. Grant) Day & Grant. [G. sinuata sensu K. & P., in part]. Scattered annual; uncommon on rocky slopes; 670-1310 m (2200-4300 feet); flowers purple, February-May.
- *Gilia stellata Heller. Widespread annual; common on rocky slopes, gravelly flats, and along washes in desertscrub and desert-grassland; 670-1430 m (2200-4700 feet); flowers purple, February-April.
- +Ipomopsis longiflora (Torr.) V. Grant. [Gilia longiflora (Torr.) G. Don]. Whiteflower gilia. Local annual; abundant in depressions on mesas, Tucson (J. J. Thornber 4439, s.n. in 1901 and March 1903); flowers pale blue to white, March-April, August.
- +Linanthus aureus (Nutt.) Greene. Local annual; mesas, Tucson (Mrs. J. J. Thornber 2970 in 1903); flowers yellow with orange to purplish throats, April.

*Linanthus bigelovii (Gray) Greene. Scattered annual; probably uncommon on rocky slopes, gravelly flats, and along washes; 640-1005 m (2100-3300 feet); flowers whitish, February-April.

*Phlox tenuifolia E. Nels. Scattered herbaceous perennial; common on rocky slopes and banks of washes; 780-1370 m (2550-4500 feet); flowers white, March-May, August-December.

Polygalaceae Milkwort Family

*Polygala macradenia Gray. Milkwort. Scattered subshrub; common on rocky slopes and ridges, especially on limestone and caliche, in desertscrub and desert-grassland; 670-1430 m (2200-4700 feet); flowers purple with yellow and white, February-May, August-November.

Polygonaceae Buckwheat Family

*Chorizanthe brevicornu Torr. Brittle spineflower. Scattered annual; common on gentle slopes, gravelly flats, and along washes; 685-945 m (2250-3100 feet); February-April.

*Chorizanthe rigida (Torr.) T. & G. Rigid spineflower. Local annual; common on gravelly and sandy flats, Camboh picnic area and Signal and Tumamoc Hills; 730-760 m (2400-2500 feet); March-May.

*Eriogonum abertianum Torr. Wild buckwheat. Widespread annual; very common on rocky slopes, gravelly flats, and along washes in desertscrub and desert-grassland; 670-1430 m (2200-4700 feet); flowers pale pink to red, February-November.

*Eriogonum deflexum Torr. Skeleton weed. Widespread annual; common on roadsides, disturbed soils, and along washes; 715-1325 m (2350-4350 feet); flowers pale pink, February-May, August-November.

+*Eriogonum inflatum Torr. & Frem. Desert trumpet, cigaret plant.

Local herbaceous perennial; rare on north-facing slope, Picture Rocks Pass (M. C. Fritts 8352B in 1983); 780 m (2550 feet); stems not inflated as in Mohave Desert, flowers yellow, March.

*Eriogonum maculatum Heller. Anglestem buckwheat, spotted buckwheat.

Scattered annual; rare to uncommon on bajadas and gravelly flats; 745-975 m (2450-3200 feet); flowers white with purple spot, March-May.

*Eriogonum palmerianum Reveal. [E. densum sensu K. & P.]. Skeleton

weed. Scattered annual; common on rocky slopes, ridgetops, and along washes; 715-1340 m (2350-4400 feet); flowers white to pale pink; April-November.

Eriogonum polycladon Benth. Sorrel buckwheat. Local annual; very common on roadside near jct. of Anklam Road and Speedway Blvd. and Tumamoc Hill; 780 m (2550 feet); flowers pink, August-November.

+Eriogonum reniforme Torr. & Frem. Kidneyleaf buckwheat. Local annual; abundant on limestone hills near foot of Cat Mt. (J. J. Thornber s.n. in April 1906), mesas between limestone hills (Snyder Hill) and Tucson Mts. (J. J. Thornber s.n. in April 1908); flowers yellow, April.

*Eriogonum thurberi Torr. Thurber buckwheat. Local annual; uncommon on rocky slopes, Hugh Norris Trail and flats west of Tumamoc Hill; 745-1250 m (2450-4100 feet); flowers rose pink, March-April.

Eriogonum trichopes Torr. Little trumpet. Local annual; common on roadsides, rocky slopes, gravelly flats, and along washes, Tumamoc Hill area; 730-790 m (2400-2600 feet); flowers yellow, April-May, August-September.

*Eriogonum wrightii Torr. var. wrightii. Wild buckwheat. Widespread subshrub; common on rocky slopes and rocky banks of washes, very

common on granitic slopes; 670-1430 m (2200-4700 feet); flowers white to pink; June-February.

Portulacaceae Portulaca Family

- *Calandrinia ciliata (R. & P.) DC. Red maids. Local annual; rare on rocky slopes, Sweetwater Trail; 915 m (3150 feet); flower magenta, March.
- *Calyptridium monandrum Nutt. Sand cress. Local annual; common on rocky ridge tops, sandy flats, and along washes, Picture Rocks Pass, Tumamoc Hill, Wasson Peak area, and Yuma Mine Trail; 745-1310 m (2450-4300 feet); March-April.
- Portulaca oleracea L. [incl. P. retusa Engelm.]. Common purslane, verdolaga. Scattered exotic annual; common on flats in wet years, uncommon on rocky slopes in desertscrub and desert-grassland; 640-1340 m (2100-4400 feet); flowers yellow, August-September.
- *Portulaca suffrutescens Engelm. Scattered herbaceous perennial; uncommon on rocky slopes, sandy flats, and roadsides in desertscrub and desert-grassland; 790-1430 m (2600-4700 feet); flowers peach to orange, August-September.
- *Portulaca umbraticola H.B.K. [P. coronata Small]. Scattered annual; common on rocky slopes and roadsides in desertscrub and desert-grassland; 790-1430 m (2600-4700 feet); flowers yellow, August-September.
- *Talinum aurantiacum Engelm. Flame flower. [incl. T. angustissium (Gray) Woot. & Small]. Scattered herbaceous perennial; uncommon on rocky slopes, often under shrubs or boulders in desertscrub and desert-grassland; 790-1370 m (2600-4500 feet); flowers orange, February-May, August-October.

- *Talinum paniculatum (Jacq.) Gaertn. Pink baby breath. Local herbaceous perennial; uncommon on rocky north slopes in desertscrub and desert-grassland, Gates Pass, Gatuña Canyon, and Sweetwater Trail; 885-1100 m (2900-3600 feet); flowers pink, August-September.

Primulaceae Primrose Family

- *Androsace occidentalis Pursh. Scattered annual; common on rocky slopes and along washes; 730-1310 m (2400-4350 feet); flowers white, February-April.

Ranunculaceae Crowfoot Family

- *Anemone tuberosa Rydb. Windflower, desert anemone. Widespread herbaceous perennial; common on rocky slopes; 640-1250 m (2100-4100 feet); flowers white, February-March.
- Clematis drummondii T. & G. Texas virgin's bower, barbas de chivato. Local woody vine; uncommon along washes, Las Lomas and west of Tumamoc Hill; 715-790 m (2350-2600 feet); flowers white, April-May.
- *Delphinium scaposum Greene. Barestem larkspur. Widespread herbaceous perennial; common on rocky slopes and banks of washes and canyons; 670-1100 m (2200-3600 feet); flowers blue-purple, February-April.
- *Myosurus cupulatus Wats. Mousetail. Local annual; abundant on rocky slopes and in canyons, Gates Pass, Picture Rocks, Safford Canyon, and Sonoran Desert Station; 730-1005 m (2400-3300 feet); flowers white, February-April.

Resedaceae Mignonette Family

Oligomeris linifolia (Vahl) Macbr. Linearleaf cambess. Scattered annual; common on gravelly flats, roadsides, and along washes; 855-885 m (2800-2900 feet); March-April.

Rhamnaceae Buckthorn Family

+Condalia correllii M. C. Johnst. Bluewood. Local shrub; under cliff on north side of Cat Mt. (J. C. Blumer 4278 in 1911); 915 m (3000 feet); July-October.

*Condalia warnockii M. C. Johnst. Mexican crucillo. [Condalia spathulata Gray sensu K. & P.]. Widespread shrub; common on rocky slopes and gravelly flats; 670-1430 m (2200-4700 feet); (May) August-October.

*Ziziphus obtusifolia (Hook. ex. T. & G.) Gray var. canescens (Gray) M. C. Johnst. [Condalia lycioides (Gray) Trel.]. Graythorn. Widespread shrub; common on rocky slopes, gravelly flats, and along washes; 670-1325 m (2200-4350 feet); March-June (October).

Rosaceae Rose Family

*Vauquelinia californica (Torr.) Sarg. Arizona rosewood. Local shrub; uncommon to common on north slopes of Cat Mt., Radio Towers and Wasson peaks, and Safford Canyon; in desert-grassland; 760-1430 m (2500-4700 feet); flowers white, June.

Rubiaceae Madder Family

*Galium aparine L. Bedstraw. Widespread exotic annual; common on rocky slopes and along washes and canyons, usually under trees or shade of boulders in desertscrub and desert-grassland; 670-1430 m (2200-4700 feet); flowers white, February-April.

*Galium proliferum Gray. Bedstraw. Widespread annual; common on rocky slopes and along washes, often under trees or shade of boulders in desertscrub and desert-grassland; 670-1250 m (2200-4100 feet); flowers white, February-April.

*Galium stellatum Kell. var. eremicum Hilend & Howell. Bedstraw. Widespread subshrub; common on rocky slopes in desertscrub and desert-grassland, very common at the higher elevations; 640-1370 m (2100-4500 feet); flowers cream, March-May.

Rutaceae Rue Family

*Thamnosma texana (Gray) Torr. Local herbaceous perennial; uncommon on gravelly flats and along washes and canyons, often under trees, Oeste Wash, Picture Rocks Pass, Tumamoc Hill, and wash near Yuma Mine Trail; 670-810 m (2200-2650 feet); flowers yellowish or purplish, February-April.

Salicaceae Willow Family

*Populus fremontii Wats. Fremont cottonwood. Local tree; rare along washes, south of Camino del Cerro and Javelina Wash; 760-825 m (2500-2700 feet).

Sapindaceae Soapberry Family

Dodonaea viscosa Jacq. Hopbush. Local shrub; rare, single plant on Trails End Road, possible escape from cultivation; 1005 (3300 feet); February-October.

Scrophulariaceae Figwort Family

- *Antirrhinum nuttallianum Benth. Nuttall snapdragon. Local annual; rare in moist sand, King and Safford canyons; 760-915 m (2500-3000 feet); flowers purple, March.
- *Linaria texana Scheele. Texas toad flax. Local annual; rare on rocky slopes and in rock crevices, Apache Peak, Cat Mt., and northwest of the Red Hills Visitor Center; 840-945 m (2750-3100 feet); flowers purple, February-March.
- *Maurandya antirrhiniflora H. & B. Snapdragon vine. Scattered herbaceous perennial vine; common on rocky slopes and margins of washes and canyons; 730-1310 m (2400-4300 feet); flowers purple with yellow throat, March-April, August-September.
- *Mimulus guttatus DC. Monkey flower. Scattered herbaceous perennial; uncommon in moist sand of canyons; 855-1035 m (2800-3400 feet); flower yellow with red spots, February-April.
- *Mimulus nasutus Greene. Monkey flower. Local annual; rare in moist gravel, Safford Canyon; 855-1035 m (2800-3400 feet); flowers yellow with red spots, February.
- Mimulus rubellus Gray. Red-stemmed Mimulus. Local annual; common along sandy, gravelly flats near Oeste Wash; flowers yellow with red spots, March.
- +*Orthocarpus purpurascens Benth. Owl clover. Local annual; common in wet years, on rocky slopes, gravelly flats, and along washes, Picture Rocks Pass (K. F. Parker 7891a in 1952; G. Yatskievych 82-125 & C. T. Mason 1982; G. Starr 56 1982) and Tumamoc Hill (D. K. Warren & R. M. Turner 68-13 in 1968), and Tucson Mts. (J. J. Thornber 2476, s.n. in 1905 and March 1906); 730-825 m (2400-2700 feet); flowers pink-purple, March-May.

- *Penstemon parryi Gray. Parry beard tongue. Widespread herbaceous perennial; common on rocky slopes, roadsides, and along washes in desertscrub and desert-grassland; 715-1430 m (2350-4700 feet); flowers pink, January-May (September).
- *Penstemon subulatus Jones. Little beardtongue. Local herbaceous perennial; common on rocky slopes and along washes, Radio Towers Peak, Sendero Esperanza Trail, Sweetwater Trail, and windmill near Yuma Mine Trail; 760-1370 m (2500-4350 feet); flowers red, March-April.
- +Veronica anagallis-aquatica L. Water speedwell. Local exotic annual; ASDM (V. Phelps s.n. in April 1983) and Snyder Hill (A. E. Garwood 4447 in 1973); 810-870 m (2650-2850 feet); flowers pale lavender, March-June.
- *Veronica peregrina L. ssp. xalapensis (H.B.K.) Pennell. Necklace weed. Local annual; abundant at mouth of Gates Pass Canyon, rare in Safford and Sweetwater canyons; 730-890 m (2400-2920 feet); flowers whitish, February.

Selaginellaceae Selaginella Family

- *Selaginella arizonica Maxon. Spike moss. Widespread herbaceous perennial; abundant on rocky slopes in desertscrub and desert-grassland; 640-1430 m (2100-4700 feet).

Simmondsiaceae Jojoba Family

- *Simmondsia chinensis (Link) Schneid. Jojoba. Widespread shrub; very common on rocky slopes and along washes in desertscrub and desert-grassland; 670-1430 m (2200-4700 feet); January-June, August-November.

Solanaceae Potato, Nightshade Family

*Datura discolor Bernh. Desert thorn apple. Local annual; uncommon on sandy flats and along washes, jct. of Manville and Sandario roads, Sanctuary Cove, and Tumamoc Hill; 670-810 m (2200-2650 feet); flowers white with purplish throat, August-October.

Datura wrightii Regel. [D. meteloides DC.]. Sacred datura, moon flower. Local herbaceous perennial; uncommon on disturbed sandy roadside in desert scrub, jct. of Sandario and San Joaquin roads; 700 m (2300 feet); flowers pale ivory, August.

Lycium andersonii Gray. Narrowleaf wolfberry. Local shrub; rare on northeast rocky slopes and roadsides, Camino del Oeste just south of Speedway Blvd. and Rillito Peak; 640-790 m (2100-2600 feet); flowers white, August-October.

*Lycium andersonii Gray x L. fremontii Gray. Hybrid wolfberry. Local shrub; common on rocky slopes and margins of Safford Canyon; 745-1035 m (2450-3400 feet); flowers whitish with lavender tips, February; neither parent is common in the Tucson Mts. or in the area.

*Lycium berlandieri Dunal. var. longistylum (L.) Hitch. Berlandier wolfberry. Widespread shrub; very common on rocky slopes in desert scrub and desert-grassland; 640-1430 m (2100-4700 feet); January, flowers white or purple, April-May, July-November.

+Lycium exsertum Gray. Wolfberry. Local shrub; Rattlesnake Pass (L. Benson in 1941), west slope of Tumamoc Hill (P. S. Martin 895 in 1960); 760-815 m (2500-2670 feet); flowers white, greenish, or purple, March.

*Lycium fremontii Gray. Fremont wolfberry. Local shrub; uncommon on rocky slopes, Picture Rocks Pass and Tumamoc Hill; 640 m (2100 feet); flowers white to lavender/purple, March-April.

- +Lycium macrodon Gray. Peachthorn. Local shrub; Rattlesnake Pass (L. Benson 10617A in 1941); 760 m (2500 feet); flowers greenish white, February-May.
- *Margaranthus solanaceus Schlecht. Netted globeberry. Local annual; uncommon on rocky slopes, Sweetwater Trail; 1130-1160 m (3700-3800 feet); flowers white to purple, September.
- Nicotiana glauca Graham. Tree tobacco. Local exotic shrub; rare along washes, east of Starr Pass on Anklam Road and Tumamoc Hill; 745-790 m (2450-2600 feet); flowers greenish turning yellow, March-April.
- *Nicotiana trigonophylla Dunal. Desert tobacco. Widespread herbaceous perennial; common on rocky slopes, roadsides, and along washes and canyons; 640-1370 m (2100-4500 feet); flowers white or greenish white, August-May.
- *Petunia parviflora Juss. Wild petunia. Local annual; uncommon in moist gravel, King Canyon; 945 m (3100 feet); flowers pink, March-May.
- Physalis acutifolia (Miers) Sandw. [Physalis wrightii Gray]. Sharpleaf ground cherry. Local annual; rare on rocky slopes and roadsides, Greasewood and Twin Peaks roads and Tumamoc Hill; 670-745 m (2200-2450 feet); flowers whitish, (April) September-December.
- *Physalis crassifolia Benth. Thickleaf ground cherry. Scattered herbaceous perennial or annual; uncommon on rocky slopes and along washes and canyons in desertscrub and desert-grassland; 670-1430 m (2200-4700 feet); flowers yellow, April, August-November.
- Physalis lobata Torr. [Quincula lobata (Torr.) Raf.]. Purple ground cherry. Local annual; uncommon on flats, Tucson Estates and Tumamoc Hill; 745-780 m (2450-2550 feet); flowers purple, (March) August-September.

- *Solanum douglasii Dunal. Nightshade. Local herbaceous perennial; common on rocky slopes, northeast side of Safford Peak; 945-1005 m (3100-3300 feet); flowers white, April-May.
- *Solanum elaeagnifolium Cav. Silver horsenettle, trompillo. Scattered herbaceous perennial; uncommon on disturbed soils; 780-970 m (2550-3180 feet); flowers purple, August.

Sterculiaceae Cacao Family

- *Ayenia filiformis Wats. [A. compacta L., A. pusilla L. sensu K. & P.]. Scattered herbaceous perennial; common on rocky slopes in desertscrub and desert-grassland; 640-1430 m (2100-4700 feet); March-May, August-November.
- *Ayenia microphylla Gray. Widespread subshrub; common on rocky slopes in desertscrub and desert-grassland; 640-1430 m (2100-4700 feet); (April) July-October.
- *Hermannia pauciflora Wats. Hierba del soldado. Local herbaceous perennial; rare on rocky slopes and in rock crevices, Arrastra Canyon, Picture Rocks Pass, Sonoran Desert Station, and Twin Peaks; 730-915 m (2400-3150 feet); flowers yellow, February-May.

Tamaricaceae Tamarix Family

- Tamarix ramosissima Ledeb. [T. chinensis Loureiro, T. pentandra Pall. sensu K. & P.]. Tamarisk. Local exotic shrub; very common, Tumamoc Hill clay quarry and landfill; 640-745 m (2100-2450 feet); flowers pink, March-November.

Typhaceae Cattail Family

Typha domingensis Pers. Cattail. Local herbaceous perennial; very common, Tumamoc Hill clay quarry; 730 m (2400 feet); August.

Ulmaceae Elm Family

*Celtis pallida Torr. Desert hackberry. Widespread shrub; common on rocky slopes and along washes and canyons in desert scrub and desert-grassland; 640-1430 m (2100-4700 feet); April-May, July-October.

Umbelliferae Parsley Family

*Bowlesia incana Ruiz & Pavon. Widespread annual; abundant on rocky slopes and along washes and canyons, often under trees, shrubs, and boulders; 640-1325 m (2100-4350 feet); January-March.

+Coriandrum sativum L. Cilantro, coriander. Local exotic annual; Snyder Hill (A. E. Garwood 4439 in 1973); 810 m (2650 feet); April.

*Daucus pusillus Michx. Wild carrot. Widespread annual; common on rocky slopes and flats; 640-1325 m (2100-4350 feet); flowers white, February-April.

*Lomatium nevadense (Wats.) Coult. & Rose var. nevadense. Wild parsley. Local herbaceous perennial; very common on rocky slopes in desert scrub and desert-grassland, Radio Towers and Wasson peaks and Sweetwater Trail; 915-1430 m (3000-4700 feet); flowers white, February-April.

*Spermolepis echinata (Nutt.) Heller. Scale seed. Widespread annual; common on rocky slopes, gravelly flats, and along washes and canyons; 730-1220 m (2400-4000 feet); flowers white, March-May.

- *Yabea microcarpum (Hook. & Arn.) K.-Pol. [Caucalis microcarpa H. & A.]. Scattered annual; common on rocky slopes; 780-1310 m (2550-4300 feet); flowers white, March-April.

Urticaceae Nettle Family

- *Parietaria hespera B. D. Hinton. var. hespera. [P. floridana Nutt. sensu K. & P.]. Pellitory. Widespread annual; abundant on rocky slopes and along washes and canyons, often under trees, shrubs and boulders; 640-1310 m (2100-4300 feet); flowers cream, January-April.
- *Parietaria pennsylvanica Muhl. Hammerwort. Local annual; rare under trees, King Canyon; 915 m (3000 feet); January-March.

Verbenaceae Vervain Family

- *Aloysia wrightii (Gray) Heller. Oreganillo. Widespread shrub; common on rocky slopes and along washes in desert scrub and desert-grassland; 640-1430 m (2100-4700 feet); flowers white, February, June, August-December.
- Lantana camara L. Lantana. Local exotic shrub; uncommon on disturbed sites along Silverbell Road and Tumamoc Hill, escape from cultivation; 685-745 m (2250-2450 feet); flowers pink on outside of head, white with yellow center in middle of head, August-September.
- Tetradlea coulteri Gray. Local herbaceous perennial; uncommon on disturbed calcareous soils and along washes, Las Lomas, Oxbow Road, 8 miles west of Tucson, and Tumamoc Hill; 715-825 m (2350-2700 feet); leaves aromatic; flowers pinkish white, (April) August-October.

*Verbena gooddingii Briq. [Glandularia gooddingii (Briq.) Solbrig].

Goodding vervain. Scattered herbaceous annual or perennial; common on rocky slopes and along washes in desertscrub and desert-grassland; 790-1430 m (2600-4700 feet); flowers lavender, January-May, August-November.

*Verbena neomexicana (Gray) Small. Hillside vervain. Local herbaceous perennial; common on steep rocky slopes and in canyons in desertscrub and desert-grassland, King and Sweetwater canyons and Wasson Peak area; 945-1430 m (3100-4700 feet); flowers purple, March-May, August-November.

Violaceae Violet Family

*Hybanthus verticillatus (Ort.) Baill. Green violet. Local herbaceous perennial; rare on rocky slopes and in canyons, northeast of Gates Pass, Radio Towers Peak, and Sweetwater Trail; 990-1325 (3250-4350 feet); flowers purple, April-May, August.

Viscaceae Mistletoe Family

*Phoradendron californicum Nutt. Desert mistletoe. Widespread perennial parasite; common on trees and shrubs; 640-1310 m (2100-4300 feet); flowers yellow, January-March.

Zygophyllaceae Caltrop Family

*Kallstroemia californica (Wats.) Vail. Little summer poppy, California caltrop. Widespread annual; common on rocky slopes, gravelly flats, and along washes and canyons in desertscrub and desert-grassland; 640-1430 m (2100-4700 feet); flowers orange-yellow, August-November.

- *Kallstroemia grandiflora Torr. Arizona poppy, summer poppy, orange caltrop. Widespread annual; common on rocky slopes, gravelly flats, and along washes and canyons in desertscrub and desert-grassland; 640-1430 m (2100-4700 feet); flowers orange-yellow, August-November.
- *Kallstroemia parviflora Norton. Local annual; rare along King Canyon; 965 m (3160 feet); flowers orange-yellow, probably August-November.
- *Larrea divaricata Cav. ssp. tridentata (DC.) Felger & Lowe. [L. tridentata (DC.) Cov.]. Creosotebush, gobernadora. Widespread shrub; abundant on flats; 640-1430 m (2100-4700 feet); flowers yellow, March-May, August-December.
- *Tribulus terrestris L. Goathead, puncture vine. Local exotic annual; uncommon on disturbed areas and along washes; 715-915 m (2350-3000 feet); flowers yellow, August.

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