FLORA OF THE APPLETON-WHITTELL RESEARCH RANCH, NORTHEASTERN SANTA CRUZ COUNTY, ARIZONA

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ABSTRACT

The Appleton-Whittell Research Ranch, operated by the National Audubon Society, covers 3160 ha in northeastern Santa Cruz County. Elevations range from 1417 m to 1570 m. The known vascular flora comprises 81 families, 290 genera, 473 native species, and 38 exotic species. One species, *Lygodesmia ramosissima*, is new to the flora of Arizona. Floristic affinities, based on a comparison with 40 other local floras from the western United States, 32 local floras from Mexico, and 40 floras from the central United States, are strongest towards the southeast into Chihuahua and Coahuila.

INTRODUCTION

The Appleton-Whittell Research Ranch occupies 3160 ha southeast of Elgin in northeastern Santa Cruz County (31° 35' N, 110° 30' W). A cooperative partnership operated by the National Audubon Society, the Research Ranch includes private land as well as lands owned by the Coronado National Forest and the Bureau of Land Management (Bock and Bock 2000). The Research Ranch was established in 1967 when the Appleton family removed cattle from their property, the Elgin Hereford Ranch, with the goal of creating an environmental preserve (Bahre 1977, Bock and Bock 2000). The Appletons sold the property to the National Audubon Society in 1980. The current objectives of the Research Ranch are to maintain a wildlife sanctuary, host and conduct ecological research, and provide education about sustainable land management (Bock and Bock 1986b). Projects have included ecology of grassland birds and insects, vegetation dynamics, and exotic species. Here, we provide the first comprehensive checklist of the vascular plants of the Research Ranch.

The grasslands at the Research Ranch are described by Bock and Bock (2000) as "Madrean Mixed-Grass Prairie," implying a floristic relationship with the grasslands of northern Mexico. However, the area is mapped as "Plains and Great Basin Grasslands" by Brown and Lowe (1994), implying a closer relationship with grasslands of the central United States, Great Basin, and Colorado Plateau. Thus, a second objective of this paper is provide an evaluation of the floristic affinities of the plants occurring in the flora of the Research Ranch.

STUDY AREA

Elevation increases across the Research Ranch (Fig. 1) from north to south, ranging from 1417 m along the northern boundary where the O'Donnell Canyon drainage enters the Babocomari Land Grant, to 1541 m at Bald Hill in the northwestern corner and to 1570 m on a hilltop near the southern boundary on the west side of Lyle Canyon. Most of the area lies between 1430 and 1530 m. Three convergent watersheds drain most of the Research Ranch; from west to east they are Post Canyon, O'Donnell Canyon, and Turkey Creek. The only other major watershed is Lyle Canyon in the southeastern corner of the Research Ranch; the northwestern corner is in the Vaughn Canyon watershed.

Vegetation of the Research Ranch is primarily grassland in the northern part and along ridge crests and mesa tops, and Madrean evergreen oak woodlands in the higher elevations of the southern part and in canyon bottoms. The grasslands are dominated by sideoats grama (*Bouteloua curtipendula*), blue grama (*B. gracilis*), and plains lovegrass (*Eragrostis intermedia*), except on certain mesa tops where Boer's lovegrass (*Eragrostis curvula* var. *conferta*) was planted in the 1940s and 1950s (Bahre 1977). Riparian forests of ash (*Fraxinus velutina*), sycamore (*Platanus wrightii*), willows (*Salix gooddingii, S. taxifolia, S. laevigata,* and *S. exigua*), and cottonwood (*Populus fremontii*) occur in the major drainages. Permanent water provides important wetland habitats in Post Canyon, O'Donnell Canyon, and at Finley Tank. The lower part of the Turkey Creek drainage contains one of the best examples of sacaton (*Sporobolus wrightii*) flats remaining in southeastern Arizona (Bock and Bock 1986a).

Sellers et al. (1985) provide climatic data from four weather stations in eastern Santa Cruz County and northwestern Cochise County close to the Research Ranch and at comparable elevations: Elgin (1494 m, precipitation only), Canelo (1528 m), Fort Huachuca (1422 m), and San Rafael Ranch (1490 m). Monthly precipitation data from the Research Ranch from 1968-1997 are available on their website (www.audubon.org/local/sanctuary/appleton/). These stations have very similar climates (Fig. 2). The area has a "monsoonal" climate with a pronounced peak in monthly precipitation in July and August following a period of minimum rainfall from April through June. The winter rainy season (December-February) has about one-fourth to one-third of the rainfall received during the summer rainy season. Mean annual precipitation is somewhat higher at the Research Ranch Headquarters (433 mm), San Rafael Ranch (441 mm) and Canelo (453 mm)

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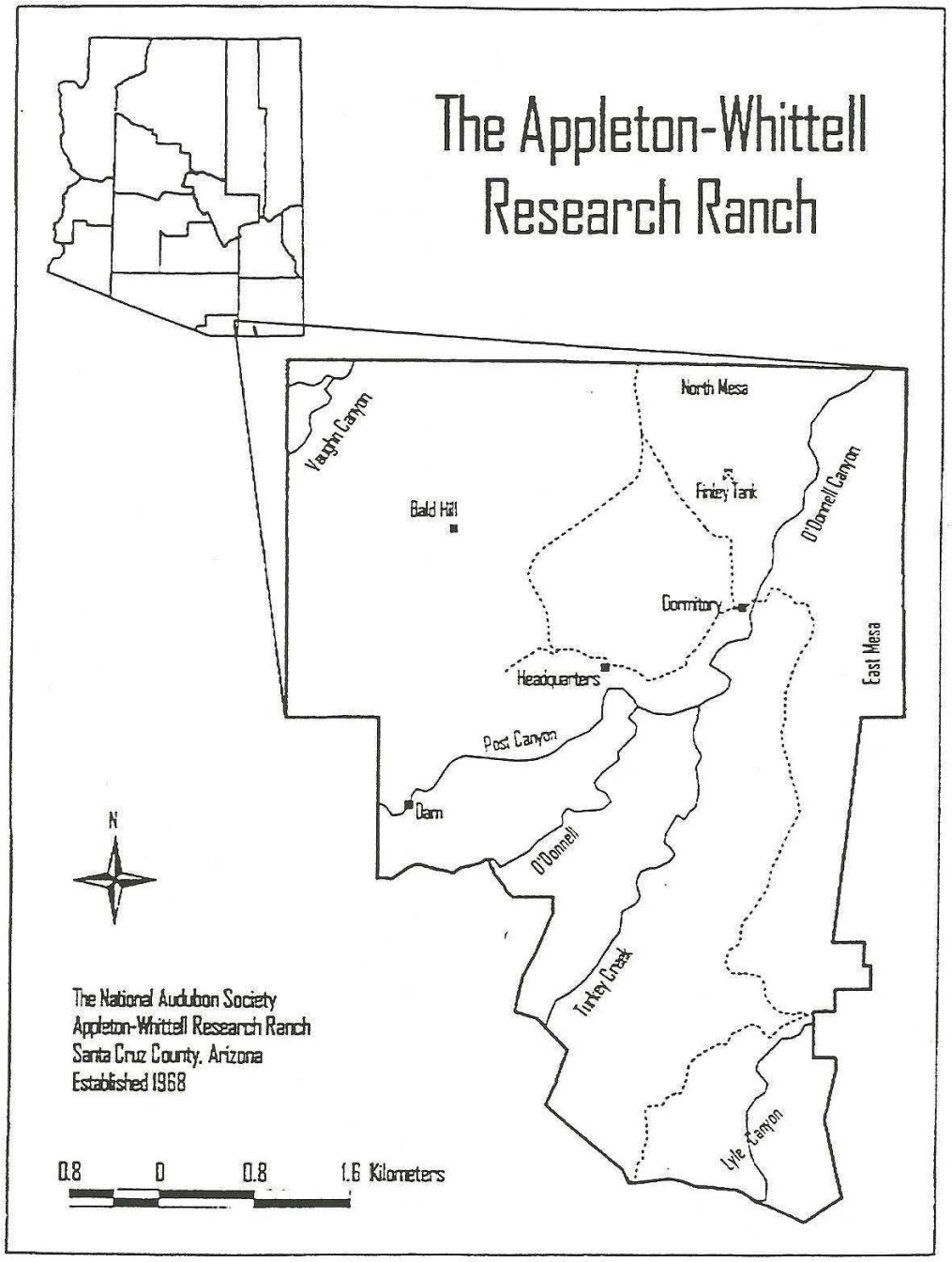

Figure 1. *Map of the Appleton-Whittell Research Ranch, with index map showing its location in northeastern Santa Cruz County, Arizona.*

than at Fort Huachuca (391 mm) and Elgin (381), reflecting a pattern of increasing summer precipitation from north to south across the Research Ranch. Mean monthly maximum temperatures are similar at all locations (Fig. 2); mean monthly minimum temperatures are about 5°C higher at Fort Huachuca than at Canelo, suggesting a gradient of decreasing temperature with increasing elevation across the Research Ranch.

Soils of the Research Ranch are described in the soil survey for Santa Cruz County (Richardson et al. 1979). Silt and clay loams of the Pima series

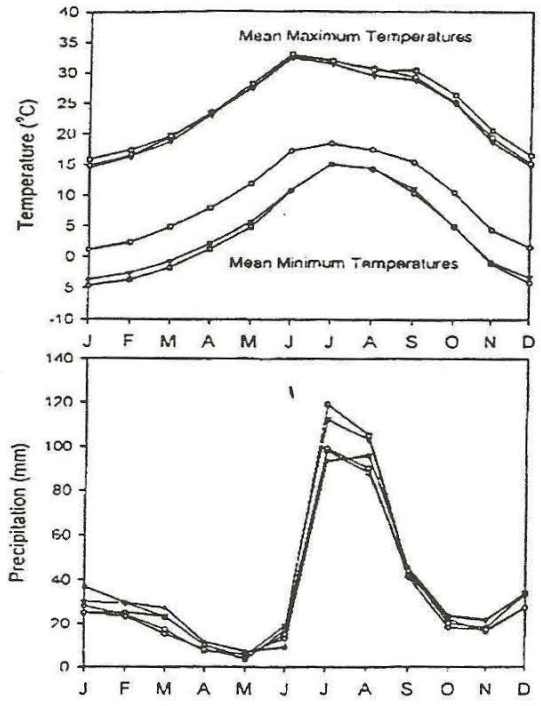

Figure 2. Climatic records from the Appleton-Whittell Research Ranch and nearby stations: Canelo Hills [▽], *Elgin, precipitation only* [◇], *Fort Huachuca* [○], *San Rafael Ranch* [□], *and the Research Ranch, precipitation only* [■].

occur along the floodplain of O'Donnell Canyon in the northeastern quarter of the Research Ranch; these soils support dense stands of sacaton. Canyon bottoms above the confluence of Post Canyon, O'Donnell Canyon, and Turkey Creek have sandy loams in the Grabe-Comoro complex; similar soils are also found in Lyle Canyon. Soils on slopes adjacent to the major drainages are mostly gravelly clay to sandy loams of the Bernardino-Hathaway and Hathaway associations. Mesa tops between drainages are mapped as White House gravelly loams. Soils on the higher hills and slopes on the southern part of the Research Ranch are shallow cobbly sandy loams of the Faraway-Rock outcrop complex.

METHODS

Plant collections were made from all habitats at the Research Ranch from September 1997 through October 1999. Voucher specimens have been deposited in a herbarium maintained at the Research Ranch, and at the University of Arizona (ARIZ). All specimens in the Research Ranch herbarium were examined and verified. Other than ourselves, major collectors have included Thomas Elias and his students and collaborators, who made several trips to the Research Ranch in the middle 1980s. Nomenclature in the checklist follows Kearney and Peebles (1960), except for recent revisions in the following taxa: pteridophytes and gymnosperms (Flora of North America Committee 1993); Asclepiadaceae (Sundell 1994), Convolvulaceae (Austin 1998), *Cylindropuntia* (Pinkava 1999), Gentianaceae (Mason 1998), Loasaceae (Christy 1998), Rubiaceae (Dempster and Terrell 1995), *Populus* (Eckenwalder 1992), *Salix* (Argus 1995), and Viscaceae (Hawksworth and Wiens1994). Where we use names reflecting recent taxonomic revisions in other taxa, the names found in Kearney and Peebles (1960) are provided in brackets following the names we have accepted.

All native species in the flora were classified into floristic elements based on an analysis of their occurrence in local floras from the western United States (McLaughlin 1992). Unpublished data bases of species distributions in 32 local floras from Mexico and 40 local floras from the central United States were used to characterize the distributions and range sizes of all species in flora of the Research Ranch in the western United States, Mexico, and the central United States. The extent of distribution of a species (range size) within a region can be estimated as its percentage incidence (number of floras in which the species is recorded) in a sample of local floras from that region. Many local floras for different parts of Mexico have been published in recent years, and although the coverage is still sparse in comparison to the United States, there are now enough to give a preliminary indication of how species found in the United States are distributed south of the international border. Similarities (Otsuka Index, Simpson 1980) between each of these floras and the flora of the Research Ranch were calculated and mapped to illustrate the geographic affinities of the flora. References for local floras used in this analysis are available from the senior author.

RESULTS AND DISCUSSION

The flora of the Research Ranch includes 81 families, 290 genera, 473 native species, and 38 exotic species. Exotics account for 7.4 % of the total flora. The largest families are the composites (Asteraceae), grasses (Poaceae), and legumes (Fabaceae), which together account for nearly half (45.7%) of the total flora (Table 1). Over half of the exotic species are grasses. The majority of the families in the flora are represented by three or fewer species (Table 2), a pattern which probably is typical for local floras. The largest genera are *Dalea* (12 spp.), *Bouteloua* (9 spp.), *Muhlenbergia* (8 spp.), *Asclepias* (7 spp.), *Chamaesyce* (7 spp.), and *Baccharis*, *Astragalus*, *Aristida*, and *Eragrostis*, each with 6 species.

A new species for the flora of Arizona, *Lygodesmia ramossima*, was found during this study. This species is sparsely distributed from west Texas to Durango (Correll and Johnston 1970). Several plants were seen only in grassland vegetation on markedly calcareous Bernardino-Hathaway soils in the northeastern portion of the Research Ranch.

Table 1. Largest families in the flora of the Appleton-Whittell Research Ranch.

Family	Genera	Native species	Exotic species	Total species
Asteraceae	54	91	4	94
Poaceae	40	65	19	84
Fabaceae	24	51	2	53
Euphorbiaceae	7	19	0	19
Solanaceae	5	12	0	12
Brassicaceae	9	8	3	11
Adiantaceae	5	9	0	9
Cactaceae	5	9	0	9
Convolvulaceae	4	9	0	9
Cyperaceae	4	9	0	9
Onagraceae	4	9	0	9
Amaranthaceae	4	8	1	9
Polygonaceae	3	7	2	9

A permanent spring at Finley Tank provides habitat for several species not found elsewhere on the Research Ranch, including *Lobelia cardinalis*, *Carex lanuginosa*, and *Sisyrinchium demissum*. An aggressive exotic blackberry, *Rubus discolor*, is firmly established at Finley Tank and is likely to displace the native taxa if not controlled or eliminated. Permanent water in O'Donnell Canyon also supports species not encountered elsewhere in the study area, including *Apocynum cannabinum*, *Centaurium calycosum*, *Ranunculus macranthus*, and *Parthenocissus quinquefolia*.

Table 2. Distribution of family sizes in the flora of the Appleton-Whittell Research Ranch.

Species per family	Number of families
1	31
2-3	20
4-8	17
≥ 9	13

Over half of the native species in the flora are herbaceous perennials (Table 3). Annuals constitute over one quarter of the native flora. At the Research Ranch, the majority of these are summer annuals rather than winter (spring) annuals. Woody species account for less than 15% of the flora, and succulents (Cactaceae, Agavaceae, Nolinaceae) account for less than 3%. Trees and shrubs in the flora of the western United States have wider distributions than annual or perennial herbs (McLaughlin 1986). In the flora of the Research Ranch, however, the average ranges of species in these different lifeforms do not differ greatly (Table 3). Trees and shrubs found at the Research Ranch occur in 23-25% of the floras of the western United States, 12-13% of the floras of Mexico, and 9% of the floras of the central United States. Compared to the woody plants, annual and perennial herbs are relatively less widely distributed in the western United States and more widely distributed in the central United States. The succulents are least widely distributed in Mexico and the central United States.

Floristic affinities of native species at the Research Ranch are presented in Table 4 and Figures 3 and 4. The designation of grasslands at the Research Ranch as "Plains and Great Basin Grasslands" (Brown and Lowe 1994) suggests that their floristic affinities should be highest to the

Table 3. Distribution of life forms in the flora of the Appleton-Whittell Research Ranch with their mean percentage incidence in samples of 40 local floras from the western U.S., 32 local floras from Mexico, and 40 local floras from the central United States.

Habit	Number of native species	Percent of total flora	Percent incidence in western U.S.	Percent incidence in Mexico	Percent incidence in central U.S.
Trees	21	4.4	25.1	13.2	9.4
Shrubs	49	10.4	22.6	12.2	9.3
Succulents	13	2.7	15.6	3.8	5.0
Herbaceous perennials	253	53.5	19.4	12.9	13.7
Annuals	137	29.0	18.5	14.8	14.0

Table 4. *Floristic elements in the flora of the Appleton-Whittell Research Ranch, with their mean percentage incidence in samples of 40 local floras from the western US, 32 local floras from Mexico, and 40 floras from the central United States.*

Floristic element	Number of native species	Percent of total flora	Percent incidence in western U.S.	Percent incidence in Mexico	Percent incidence in central U.S.
Madrean					
Widespread	167	35.3	23.1	15.2	19.3
Apachian	166	35.1	9.1	13.1	2.5
Chihuahuan	41	8.7	11.0	9.8	9.3
Sonoran	42	8.9	30.4	10.7	7.2
Californian	18	3.8	27.5	16.1	21.0
Cordilleran	19	4.0	42.5	10.4	33.4
Intermountain	20	4.2	44.5	9.1	40.0

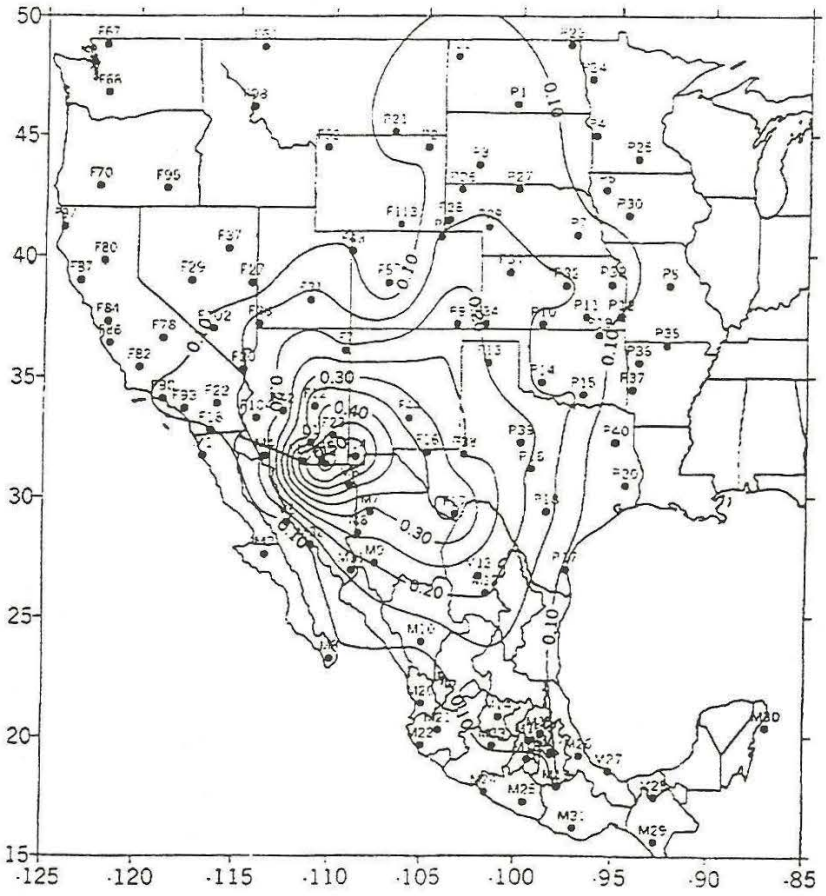

Figure 3. Map showing the similarities (Otsuka Index) of the flora of the Appleton-Whittell Research Ranch with other local floras, including 40 from the western United States, 32 from Mexico, and 40 from the central United States. Y axis gives the latitude, X axis gives longitude.

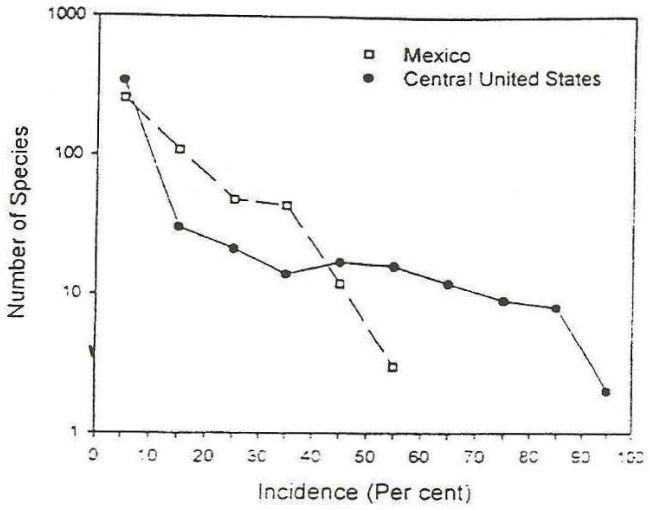

Figure 4. Frequency distributions of range sizes (incidence) of species in the flora of the Research Ranch extending into Mexico [□] and the Central United States [●].

north and east in the Colorado Plateau and Great Plains, but in fact nearly 80 % of the native species belong to floristic elements characteristic of the American Southwest (Table 4). The largest elements in the flora are the Widespread Madrean and Apachian elements. The former includes species found from western Texas through southern New Mexico and southern Arizona, whereas the latter are more narrowly distributed in southeastern Arizona and southwestern New Mexico.

The Chihuahuan element is small for a southeastern Arizona flora – just 9 % of the native species. This is related to the paucity of limestone on the Research Ranch, because species with Chihuahuan affinities are most commonly found in this region on limestone. In addition to the often calcareous Bernardino-Hathaway soils, there is a single, narrow outcropping of limestone on the west side of Turkey Creek in the southern part of the Research Ranch. This outcrop, dominated by cliffrose (*Purshia stansburiana*), has few characteristic Chihuahuan species.

The floristic categories developed by McLaughlin (1992) and used in Table 4 are based only on distributions north of the international border and west of the Great Plains. It is possible that the species that make up the Apachian element, although narrowly distributed in the southwestern United States, are more widespread in Mexico or in the Central United States, reaching the northern and western limits of their ranges in southeastern Arizona. "Widespread Madrean" species in the flora of the Research Ranch are as widely or more widely distributed in the Central United States (19% incidence) than in Mexico (15% incidence), but species of the Apachian element are comparatively widespread in Mexico (13% incidence) and comparatively rare in the Central United States (2.5% incidence), mostly found only in floras of the Edwards Plateau region of central Texas.

Species in the Research Ranch flora classified as Californian, Apachian, or Widespread Madrean penetrate somewhat further into Mexico than those classified as Chihuahuan, Sonoran, Cordilleran, or Intermountain, but the differences are not large. On the other hand, the Research Ranch species with Cordilleran and Intermountain distributions are widespread in the Central United States, while species with Apachian, Chihuahuan, and Sonoran distributions are uncommon in the prairies and plains.

The overall affinities of the Research Ranch flora are shown in Figure 3, which maps the Otsuka Index (*OI*) of similarity between the Research Ranch flora and the 40 selected floras for the western United States, the 32 selected floras from Mexico, and the 40 selected floras from the Central United States. Floras with a high similarity ($OI > 0.40$) are restricted to southeastern Arizona, southwestern New Mexico, and adjacent areas in northern Mexico–the "core" Apachian area. Similarity decreases with distance, but not uniformly in all directions. Similarity decreases most rapidly to the southwest and least rapidly to the southeast, despite the fact that species classified as Chihuahuan do not constitute a large proportion of the flora (Table 4). Similarities with floras from north-central Mexico (Chihuahua, Coahuila, Durango) are similar to those with the southwestern Great Plains and Edwards Plateau, and somewhat greater than those from the central and northern Great Plains.

The Research Ranch shares species with both the Great Plains and northern Mexico. Figure 4 provides frequency distributions for the shared species in these two areas, demonstrating that

similarities with floras from the Central United States are due primarily to a small number of widespread species (those with high incidence), many of which also occur in the Cordilleran and Intermountain regions of the western United States. However, the similarities of the Research Ranch with floras from northern Mexico are mostly due to a larger number of species with narrower ranges (lower incidence), found mostly in the Apachian floristic district of the southwestern United States. The sharing of species of narrower range suggests a closer floristic relationship, analogous to the sharing of more derived characters among taxa. The floristic affinities of the Research Ranch with the grassland and semi-desert regions on the east side of the Sierra Madre Occidental are somewhat stronger than those with the Great Plains (Fig. 3), consistent with Rzedowski's (1993) concept of a floristic "mega-Mexico" which includes the Apachian and Chihuahuan regions of the southwestern United States. Thus we agree more with Bock and Bock (2000) in characterizing these grasslands as "Madrean Mixed-grass Prairies" rather than as "Plains and Great Basin Grasslands" (Brown and Lowe 1994).

THE FLORA OF THE RESEARCH RANCH

Voucher citations represent collections made by the senior author and coworkers unless otherwise noted, and are mostly housed at the Research Ranch. Approximately 94 % of the flora is represented by voucher specimens. Annotations of species as "abundant," "common," "uncommon," or "rare," although necessarily subjective, are defined as follows: (1) abundant species are dominants of grasslands, oak woodlands, or riparian areas; (2) common species are subdominants in these habitats or dominants in less extensive habitats, such as springs or limestone outcrops; (3) uncommon species are less frequently encountered but still known from several localities, and (4) rare species are those found only a few times in particular habitats. Exotic species are indicated by an asterisk (*). "Washes" refers to broad sections of Post Canyon, Turkey Creek, and O'Donnell Canyon in the northern half of the Research Ranch that are dominated by sacaton, desert willow (*Chilopsis linearis*), rabbitbrush (*Chrysothamnus nauseosus*), ash and other deciduous, riparian trees. "Canyons" refers to narrower drainages and their tributaries, dominated by oaks and junipers, in the southern half of the Research Ranch.

PTERIDOPHYTES

Equisetaceae

Equisetum laevigatum A. Braun. *Elias 8441*. Rare along stretches of upper Turkey Creek.

Pteridaceae

Argyrochosma limitanea (Maxon) Windham [*Pellaea limitanea* (Maxon) Morton] *7862*. Rare, limestone outcrop adjacent to upper Turkey Creek.

Astrolepis cochisensis (Goodding) Benham & Windham [*Notholaena sinuata* (Lag.) Kaulf. var. *cochisensis* (Goodding) Weatherby]. *7864B*. Rare, limestone outcrops.

Astrolepis integerrima (Hooker) Benham & Windham [*Notholaena sinuata* (Lag.) Kaulf. var. *integerrima* Hooker]. *7864A*. Rare, limestone outcrops.

Astrolepis sinuata (Lag. *ex* Sw.) Benham & Windham ssp. *sinuata* [*Notholaena sinuata* (Lag.) Kaulf.]. *Geiger 12*. Rare, canyons.

Bommeria hispida (Mett. *ex* Kuhn) Underw. Rare, rock outcrops in Lyle Canyon.

Cheilanthes eatoni Baker. *7799*. Rare, rock outcrops in Lyle Canyon.

Cheilanthes fendleri Hooker. *7794*, *7798*. Uncommon, oak woodlands.

Cheilanthes lindheimeri Hooker. *7793*. Uncommon, oak woodlands.

Pellaea atropurpurea (L.) Link. *7880*. Rare, oak woodland in Lyle Canyon.

GYMNOSPERMS

Cupressaceae

Juniperus coahuilensis (Martinez) Gaussen *ex* R. P. Adams [*Juniperus monosperma* (Engelm.) Sarg., in part]. *8111*. Uncommon, grasslands and woodlands.

Juniperus deppeana Steud. var. *deppeana* [*J. deppeana* var. *pachyphlaea* (Torr.) Martinez] *J. Bock 82-6-6*. Common, woodlands and canyons.

Ephedraceae

Ephedra trifurca Torrey *ex* S. Watson. *Elias 8463*. Rare, calcareous grasslands.

Pinaceae

Pinus cembroides Zucc. *Elias 8411*. Common, woodlands and canyons.

ANGIOSPERMS – DICOTYLEDONS

Acanthaceae

Dyschoriste decumbens (A. Gray) Kuntze. *7271*. Common, grasslands and woodlands.

Amaranthaceae

**Amaranthus albus* L. *8030*. Rare, disturbed areas.

Amaranthus palmeri S. Watson. *7852*. Common, washes and disturbed areas.

Amaranthus powellii S. Watson. *7345*. Uncommon, mostly in woodlands.

Amaranthus torreyi (A. Gray) Benth. *8031*. Uncommon, grasslands.

Froelichia arizonica Thornber *ex* Standley. *Geiger 22*. Common, grasslands.

Gomphrena caespitosa Torrey. *Elias 8997*. Uncommon, grasslands.

Gomphrena nitida Rothrock. *7791*. Uncommon, grasslands and woodlands.
Gomphrena sonorae Torrey. *7765*. Common in grasslands, uncommon in woodlands.
Guilleminea densa (Humb. & Bonpl. *ex* Willd.) Moq. var. *densa* [*Brayulinea densa* Humb. & Bonpl. *ex* Willd.]. *7849*. Common, grasslands, disturbed sites.

Anacardiaceae

Rhus microphylla Engelm. *ex* A. Gray. *Elias 8943*. Rare, grasslands.
Rhus trilobata Nutt. var. *anisophylla* (Greene) Jepson. *Elias 8362*. Uncommon, woodlands.
Rhus virens Lindh. *ex* A. Gray var. *choriophylla* (Wooton & Standley) L. D. Benson [*R. choriophylla* Wooton & Standley]. *Elias 9313*. Uncommon, grasslands and woodlands.
Toxicodendron rydbergii (Small *ex* Rydb.) Greene [*Rhus radicans* L. var. *rydbergii* (Small *ex* Rydb.) Rehder]. *8801*. Uncommon, canyons.

Apiaceae

Eryngium heterophyllum Engelm. *7625*. Uncommon, grasslands, woodlands, and washes.
Spermolepis echinata (Nutt. *ex* DC.) Heller. *7465*. Uncommon, grasslands.

Apocynaceae

Apocynum cannabinum L. *7889*. Rare, along stream in upper O'Donnell Canyon.
Macrosiphonia brachysiphon (Torrey) A. Gray. Uncommon on steep, calcareous slopes adjacent to O'Donnell Canyon.

Asclepiadaceae

Asclepias asperula (Decaisne) Woods. ssp. *asperula*. *Elias 8376*. Common, grasslands.
Asclepias involucrata Engelm. *ex* Torrey. *7453*. Rare, grasslands and woodlands.
Asclepias nummularia Torrey. *Stromberg s.n., May 14, 1985*. Uncommon, grasslands and woodlands.
Asclepias nyctaginifolia A. Gray. *7607*. Uncommon, grasslands, woodlands, and washes.
Asclepias quinquedentata A. Gray. *7991*. Rare, oak woodland in Post Canyon.
Asclepias subverticillata (A. Gray) Vail. *7579*. Uncommon, grasslands, woodlands, and washes.
Asclepias uncialis Greene ssp. *uncialis*. Peterson *et al. s.n.* (ARIZ). Rare, grasslands.
Sarcostemma crispum Bentham [*Funastrum crispum* (Bentham) Schlechter]. *7557*. Rare, grasslands.

Asteraceae

Acourtia nana (A. Gray) Reveal & King [*Perezia nana* A. Gray]. *Anonymous, August 27, 1987*. Rare, below mesquites in grasslands.
Acourtia wrightii (A. Gray) Reveal & King [*Perezia wrightii* A. Gray]. *7359*. Rare, several plants in grassland adjacent to lower O'Donnell Canyon, flowering in both spring and fall.
Ambrosia confertiflora DC. [*Franseria confertiflora* (DC.) Rydb.] *7848*. Common, grasslands, washes, and disturbed sites.
Ambrosia psilostachya DC. *7867*. Common, washes and grasslands.
Artemisia campestris L. ssp. *pacifica* (Nutt.) Hall & Clements. [*A. pacifica* Nutt.] *7788*. Rare, along creek in Post Canyon.
Artemisia dracunculus L. [*A. dracunculoides* Pursh] *7881*. Uncommon, grasslands.
Artemisia ludoviciana Nutt. ssp. *albula* (Woot.) Keck. *7351*. Uncommon, woodlands.
Artemisia ludoviciana Nutt. ssp. *sulcata* (Rydb.) Keck. *7695*. Common, canyons.
Aster falcatus Lindl. var. *crassulus* (Rydb.) Cronq. [*Aster commutatus* (Torrey & A. Gray) A. Gray var. *crassulus* (Rydb.) Blake] *7365*. Rare, Finley Tank.
Aster subulatus Michx. var. *ligulatus* Shinners [*Aster exilis* Ell.] *7635*. Rare, along stream in Lyle Canyon.
Baccharis bigelovii A. Gray. *Elias 9081*. Uncommon, canyons.
Baccharis neglecta Britton. *8798*. Rare, in wash below Finley Tank.
Baccharis pteronioides DC. *Elias 8367*. Common, grasslands.
Baccharis salicifolia (Ruíz & Pavón) Pers. [*B. glutinosa* Pers.] *Raynor, August 8, 1970*. Common, washes.
Baccharis sarothroides A. Gray. *Van Deren, October 6, 1970*. Common, washes, grasslands.
Baccharis thesioides Kunth. *7789*. Rare, below oaks.
Bahia absinthifolia Bentham var. *dealbata* (A. Gray) A. Gray. *7325*. Uncommon, calcareous grasslands.
Bahia dissecta (A. Gray) Britton. *7711*. Uncommon, oak woodlands.
Berlandiera lyrata Benth. var. *lyrata*. *Elias 8466*. Uncommon, grasslands.
Bidens aurea (Aiton) Sherff. *7875*. Rare, along stream in Lyle Canyon.
Bidens bigelovii A. Gray. *7802*. Uncommon, oak woodlands in Lyle Canyon.
Bidens ferulifolia (Jacq.) DC. *7874*. Rare, along stream in Lyle Canyon.
Bidens leptocephala Sherff. *7320*. Abundant below oaks.
Brickellia betonicifolia A. Gray. *7801*. Uncommon, oak woodland in Lyle Canyon.
Brickellia californica (Torrey & A. Gray) A. Gray var. *californica*. *8804*. Uncommon, canyons.
Brickellia eupatorioides (L.) Shinners var. *chlorolepis* (Wooton & Standley) B. L. Turner [*Kuhnia rosmarinifolia* Vent var. *chlorolepis* (Wooton and Standley) Blake]. *7536*. Common, oak woodlands and grasslands.
Brickellia floribunda A. Gray. *8127*. Common late-fall bloomer in washes.
Brickellia venosa (Woot. & Standl.) B. L. Robins. *7855*. Uncommon, calcareous grasslands.

Carminatia tenuiflora DC. *7776*. Uncommon below oaks in woodlands and riparian areas.
Carphochaete bigelovii A. Gray. *7463*. Rare, found on rocks in Post Canyon.
Chaetopappa ericoides (Torrey) G. L. Nesom [*Aster arenosus* (Heller) Blake]. *Elias 8301*. Common in grasslands and woodlands.
Chrysothamnus nauseosus (Pallas *ex* Pursh) Britt. ssp. *latisquameus* (A. Gray) Hall & Clements. *Williams s.n, October 2, 1971*. Abundant in washes.
Cirsium arizonicum (A. Gray) Petrak. *7624*. Uncommon, grasslands.
Cirsium neomexicanum A. Gray. Uncommon, grasslands.
Cirsium ochrocentrum A. Gray. *7531*. Common, grasslands.
Conyza canadensis (L.) Cronq. [*Erigeron canadensis* L.]. *7833*. Common, washes, canyons, grasslands, disturbed sites.
Cosmos parviflorus (Jacq.) Pers. *Elias 9088*. Uncommon, oak woodlands.
Dyssodia papposa (Vent.) Hitchc. *8129*. Locally common, washes.
Erigeron arisolius G. L. Nesom [*Erigeron divergens* Torrey & A. Gray, in part]. *7614, 7810*. Common, mostly in grasslands.
Erigeron colomexicanus A. Nelson [*Erigeron nudiflorus* Buckl.]. *7446*. Uncommon, grasslands.
Erigeron flagellaris A. Gray. *7454*. Uncommon, oak woodlands.
Erigeron neomexicanus A. Gray. *7712*. Rare, oak woodlands.
Gaillardia pinnatifida Torrey. *7486*. Uncommon, oak woodlands, riparian areas.
Gnaphalium canescens DC. [*Gnaphalium wrightii* A. Gray]. *7299*. Common, grasslands.
Gnaphalium leucocephalum A. Gray. *Elias 9112*. Uncommon, mostly in washes.
**Gnaphalium luteoalbum* L. *7510*. Rare, found below cottonwoods above reservoir in Post Canyon.
Gnaphalium stramineum Kunth [*Gnaphalium chilense* Spreng.]. *7574B*. Rare, springs.
Guardiola platyphylla A. Gray. *Geiger 16*. Rare, Post Canyon.
Gutierrezia microcephala (DC.) A. Gray. *7761*. Uncommon, grasslands.
Helenium thurberi A. Gray. *7569*. Rare, along stream in Lyle Canyon.
Helianthus annuus L. *Elias 9110*. Abundant, larger washes, disturbed sites.
Helianthus petiolaris Nutt. ssp. *petiolaris*. *8067*. Uncommon, adjacent to stream in Lyle Canyon.
Heliomeris longifolia (Robins. & Greenm.) Cockerell var. *annua* (M. E. Jones) Yates [*Viguiera annua* (Jones) Blake]. *7353*. Common, mostly in oak woodlands.
Heliomeris multiflora Nutt. var. *multiflora* [*Viguiera multiflora* (Nutt.) Blake var. *multiflora*]. *7861*. Locally abundant in washes.
Heliopsis parvifolia A. Gray. *7617*. Uncommon, canyons and oak woodlands.
Heterosperma pinnatum Cav. *7314*. Common, oak woodlands.
Heterotheca subaxillaris (Lam.) Britt. & Rusby. *7288*. Uncommon, washes, grasslands, disturbed sites.
Hymenoclea monogyra Torrey & A. Gray *ex* A. Gray. *7884*. Rare, O'Donnell Canyon in northeast corner of the Research Ranch.
Hymenothrix wislizenii A. Gray. *Elias 9047*. Common, grasslands.
Isocoma tenuisecta Greene [*Aplopappus tenuisectus* (Greene) Blake]. *7324*. Common to abundant in grasslands.
**Lactuca serriola* L. *7874*. Uncommon, canyons.
Laennecia coulteri (A. Gray) G. L. Nesom [*Conyza coulteri* A. Gray]. *7758*. Uncommon, Finley Tank.
Laennecia sophiifolia (Kunth) G. L. Nesom [*Conyza sophiaefolia* Kunth]. *7702*. Uncommon, oak woodlands.
Lasianthaea podocephala (A. Gray) K. Becker [*Zexmenia podocephala* A. Gray]. *7318*. Uncommon, oak woodlands.
Lygodesmia ramosissima Greenm. *7340*. Rare, calcareous grasslands east of lower O'Donnell Canyon.
Machaeranthera gracilis (Nutt.) Shinners [*Aplopappus gracilis* (Nutt.) A. Gray]. *Elias 9109*. Common, grasslands, broad washes.
Machaeranthera pinnatifida (Hooker) Shinners ssp. *pinnatifida* var. *pinnatifida* [*Aplopappus spinulosus* (Pursh) DC. var. *gooddingii* (A. Nels.) Blake]. *8799*. Uncommon, grasslands.
Machaeranthera tagetina Greene [*Aster tagetinus* (Greene) Blake]. *7301*. Common, grasslands and riparian areas.
Machaeranathera tanacetifolia (Kunth) Nees [*Aster tanacetifolia* Kunth]. *7873*. Uncommon, grasslands.
Malacothrix fendleri A. Gray. *7489*. Uncommon spring annual, grasslands.
Melampodium sericeum Lag. [*Melampodium hispidum* Kunth]. *7274*. Uncommon, oak woodlands.
Pectis filipes Harvey & A. Gray. *7701*. Uncommon, woodlands and canyons.
Pectis imberbis A. Gray. *8047*. Rare, in a single tributary of upper O'Donnell Canyon.
Pectis longipes A. Gray. *7464*. Uncommon, grasslands.
Pectis prostrata Cav. *8037*. Rare, grasslands.
Porophyllum ruderale (Jacq.) Cass. ssp. *macrocephalum* (DC.) R. R. Johnson [*P. macrocephalum* DC.]. *8044*. Rare, canyons.
Sanvitalia abertii A. Gray. *7276*. Uncommon, woodlands and canyons.
Schkuhria anthemoidea (DC.) Coulter var. *wrightii* (A. Gray) Heiser [*S. wislizeni* A. Gray var. *wrightii* (A. Gray) Blake]. *7316*. Uncommon, oak woodlands.
Senecio flaccidus Less. var. *flaccidus* [*S. longilobus* Bentham]. *Elias 8340*. Uncommon, grasslands and washes.
Solidago velutina DC. [*S. sparsiflora* A. Gray]. *7787*. Rare, in Post Canyon south of Headquarters.

**Sonchus asper* (L.) Hill. *7891*. Uncommon, mostly in riparian areas.
Stephanomeria pauciflora (Torrey) A. Nelson. *7534*. Common, grasslands.
Stephanomeria thurberi A. Gray. *7457*. Uncommon, grasslands.
Thelesperma longipes A. Gray. *7709*. Rare, canyons.
Thelesperma megapotamicum (Spreng.) Kuntze. *Elias 8340*. Common, grasslands and oak woodlands.
Thymophylla acerosa (DC.) Strother [*Dyssodia acerosa* DC]. *Elias 8486*. Locally common on ridgetops in calcareous grasslands adjacent to lower O'Donnell Canyon.
**Tragopogon dubius* Scop. *7546*. Uncommon, oak woodlands.
Verbesina encelioides (Cav.) Bentham & Hooker f. *ex* A. Gray ssp. *exauriculata* (Robins. & Greenm.) J. R. Coleman. *7604*. Common, washes, seasonally wet depressions.
Verbesina rothrockii Robins. & Greenm. *Elias 12550*. Rare, oak woodlands.
Viguiera cordifolia A. Gray. *7785*. Rare, oak woodlands.
Viguiera dentata (Cav.) Spreng. var. *dentata*. *7792*. Common, oak woodlands, canyons.
Xanthium strumarium L. var. *canadense* (P. Hill) Torrey & A. Gray [*X. saccharatum* Wallr.]. *7812*. Locally abundant in washes, along streams in canyons.
Xanthocephalum gymnospermoides (A. Gray) Benth. & Hooker f. *Elias 8926*. Common in seasonally wet depressions.
Zinnia acerosa (DC.) A. Gray [*Z. pumila* A. Gray]. *Elias 8488*. Rare, limestone outcrop adjacent to Turkey Creek, calcareous grasslands.
Zinnia grandiflora Nutt. *7284*. Uncommon, grasslands.
Zinnia peruviana (L.) L. *7808*. Rare, adjacent to stream bottom in Lyle Canyon.

Bignoniaceae

Chilopsis linearis (Cav.) Sweet ssp. *arcuata* (Fosb.) Henrickson. *7571*. Common in lower O'Donnell Canyon.

Boraginaceae

Heliotropium fruticosum L. [*H. phyllostachyum* Torrey]. *8126*. Uncommon, grasslands.
Lithospermum incisum Lehm. *7328*. Common, grasslands.
Plagiobothrys arizonicus (A. Gray) Greene *ex* A. Gray. *Anonymous, April 29, 1973*. Uncommon spring annual, grasslands.

Brassicaceae

**Cardaria draba* (L.) Desv. ssp. *draba*. Rare, one population along road near junction of Turkey Creek and O'Donnell Canyon.
Descurainia pinnata (Walt.) Britton ssp. *halictorum* (Cockerell) Detling. *7459*. Common winter annual, grasslands, disturbed areas.
Draba cuneifolia Nutt. *ex* Torrey & A. Gray var. *cuneifolia*. *Elias 9324*. Rare, on rocks in Post Canyon above reservoir.
Lepidium lasiocarpum Nutt. var. *lasiocarpum*. Uncommon, mostly in disturbed areas.
Lepidium thurberi Wooton. *Geiger 15*. Uncommon, grasslands.
Lesquerella fendleri (A. Gray) S. Watson. *7452*. Rare, calcareous grasslands.
Pennellia micrantha (A. Gray) Nieuwl. [*Thelypodium micranthum* (A. Gray) S. Watson]. *7516*. Uncommon, woodlands.
Rorippa nasturtium-aquaticum (L.) Hayek. *Elias 8446*. Rare, upper portions of O'Donnell Canyon.
Schoenocrambe linearifolia (A. Gray) Rollins [*Sisymbrium linearifolium* (A. Gray) Payson]. *7346*. Uncommon, oak woodlands.
**Sisymbrium altissimum* L. *Anonymous, April 19, 1987*. Rare, disturbed sites.
**Sisymbrium irio* L. *7986*. Uncommon, disturbed sites.

Cactaceae

Cylindropuntia spinosior (Engelm.) Knuth [*Opuntia spinosior* (Engelm. & Bigel.) Toumey]. Common, grasslands and woodlands.
Echinocereus fendleri (Engelm.) F. Seitz var. *rectispinus* (Peebles) L. D. Benson. Uncommon, grasslands.
Echinocereus rigidissimus (Engelm.) Haage f. [*E. pectinatus* (Scheidw.) Engelm. var. *rigidissimus* (Engelm.) Engelm.]. Common, grasslands.
Escobaria vivipara (Nutt.) Buxb. var. *bisbeeana* (Orcutt) D. R. Hunt [*Mammillaria aggregata* Engelm., in part]. Common, grasslands.
Mammillaria heyderi Muehlenpfordt var. *macdougalii* (Rose) L. D. Benson [*M. macdougalii* Rose]. Rare, grasslands, rock outcrops.
Opuntia chlorotica Engelm. & J. M. Bigelow. Uncommon, oak woodlands.
Opuntia engelmannii Salm-Dyck ex Engelmann var. *engelmannii*. Uncommon, grasslands.
Opuntia macrocentra Engelm. var. *macrocentra*. Uncommon, grasslands.
Sclerocactus intertextus (Engelm.) N. P. Taylor var. *intertextus* [*Echinomastus intertextus* (Engelm.) Britton & Rose]. Uncommon, grasslands.

Campanulaceae

Lobelia cardinalis L. ssp. *cardinalis* [*L. cardinalis* L. ssp. *graminea* (Lam.) McVaugh]. *Geiger 30*. Rare, spring at Finley Tank.

Capparaceae

Polanisia dodecandra (L.) DC. ssp. *trachysperma* (Torrey & A. Gray) Iltis [*P. trachysperma* Torrey and A. Gray]. *Geiger 7*. Uncommon, washes.

Caprifoliaceae

Sambucus mexicana K. Presl *ex* DC. *7570*. Rare, Post Canyon.

Caryophyllaceae

Drymaria glandulosa K. Presl [*Drymaria fendleri* S. Watson]. *8188*. Rare, oak woodland in Post Canyon.

Drymaria molluginea (Lag.) Didr. [*Drymaria sperguloides* A. Gray]. *8050*. Uncommon, oak woodlands.

Silene antirrhina L. *7515*. Rare, oak woodlands.

Chenopodiaceae

Atriplex elegans (Moq.) D. Dietr. var. *fasciculata* (S. Watson) M. E. Jones [*A. fasciculata* S. Watson]. *7606*. Uncommon, disturbed sites.

Chenopodium berlandieri Moq. var. *sinuatum* (J. Murr) H. A. Wahl. *7854*. Uncommon, mostly in washes.

Chenopodium fremontii S. Watson var. *fremontii*. *7860*. Uncommon, grasslands and oak woodlands.

Chenopodium graveolens Willd. [*C. incisum* Poir. var. *neomexicanum* Aellen]. *8117*. Rare, oak woodland in Post Canyon.

Chenopodium neomexicanum Standley var. *palmeri* (Standley) T. W. Walters [*C. palmeri* Standley]. *Elias 12201*. Uncommon, grasslands.

**Salsola kali* L. *Williams s.n., October 2, 1971*. Common in disturbed areas, uncommon in washes.

Convolvulaceae

Convolvulus equitans Bentham [*C. incanus* Vahl]. *Elias 8401*. Common, grasslands.

Dichondra brachypoda Wooton & Standley. *8800*. Locally abundant under oaks, but rarely flowering.

Evolvulus arizonicus A. Gray. *7295*. Common, grasslands and woodlands.

Evolvulus nuttallianus J. A. Schultes [*E. pilosus* Nutt.]. *7544*. Common, grasslands and woodlands.

Evolvulus sericeus Swartz. *Elias 8420*. Common, grasslands and woodlands.

Ipomoea capillacea (Kunth) G. Don [*I. muricata* Cav.]. *8022*. Rare, oak woodlands.

Ipomoea costellata Torrey. *8054*. Common, grasslands and woodlands.

Ipomoea cristulata Hallier f. *Elias 9021*. [*I. coccinea* L.]. Locally common, twining up through shrubs in washes.

Ipomoea hederacea Jacq. [*I. hirsutula* Jacq. f., in part]. *Geiger 38*. Uncommon, climber in washes.

Cucurbitaceae

Apodanthera undulata A. Gray. *Geiger 31*. Uncommon, grasslands.

Cucurbita digitata A. Gray. Uncommon, grasslands.

Cucurbita foetidissima Kunth. Uncommon, grasslands.

Ericaceae

Arctostaphylos pungens Kunth. *Elias 9328*. Locally abundant in Post Canyon, uncommon elsewhere in oak woodlands.

Euphorbiaceae

Acalypha lindheimeri Muell. Arg. *7612*. Uncommon, washes and canyons.

Acalypha neomexicana Muell. Arg. *7949*. Common, oak woodlands.

Acalypha ostryifolia Riddell. *7783*. Uncommon, mostly in washes.

Chamaesyce albomarginata (Torrey & A. Gray) Small [*Euphorbia albomarginata* Torrey & A. Gray]. *Elias 8308*. Uncommon, mostly in disturbed areas, washes.

Chamaesyce dioica (Kunth) Millsp. [*Euphorbia indivisa* (Engelm.) Tidestrom]. *8796*. Locally abundant in washes.

Chamaesyce hirta (L.) Millsp. [*Euphorbia hirta* L.]. *7622*. Common, washes.

Chamaesyce hyssopifolia (L.) Small [*Euphorbia hyssopifolia* L.]. *7297*. Common, grasslands and washes.

Chamaesyce revoluta (Engelm.) Small [*Euphorbia revoluta* Engelm.]. *7310*. Rare, calcareous grasslands.

Chamaesyce serpyllifolia (Pers.) Small [*Euphorbia serpyllifolia* Pers.]. *7811*. Uncommon, mostly in washes.

Chamaesyce stictospora (Engelm.) Small [*Euphorbia stictospora* Engelm.]. *8036*. Uncommon, grasslands and washes.

Croton pottsii (Klotzsch) Muell. Arg. var. *pottsii* [*C. corymbulosus* Engelm.]. *Elias 8375*. Common, grasslands.

Euphorbia bilobata Engelm. *7355*. Rare, washes.

Euphorbia exstipulata Engelm. Rare, calcareous grasslands.

Poinsettia heterophylla (L.) Klotzsch & Garcke [*Euphorbia heterophylla* L.]. *Elias 8931*. Uncommon, oak woodlands and canyons.

Poinsettia dentata (Michx.) Klotzsch & Garcke [*Euphorbia dentata* Michx.]. Uncommon, grasslands and woodlands.

Poinsettia radians (Bentham) Klotzsch & Garcke [*Euphorbia radians* Bentham]. *Elias 8412*. Common, grasslands. Leafless, flowering stems appear in the spring; sterile vegetative stems are produced following the onset of summer rains.

Jatropha machrorhiza Bentham var. *septemfida* Engelm. *Elias 8951*. Uncommon, grasslands and woodlands.

Tragia laciniata (Torrey) Muell. Arg. Rare, Lyle Canyon.

Tragia ramosa Torrey [*T. stylaris* Muell. Arg.]. *7856*. Uncommon, grasslands.

Fabaceae

Acacia angustissima (P. Miller) Kuntze var. *suffrutescens* (Rose) Isely. *8062*. Uncommon, mostly in grassslands.

Amorpha fruticosa L. *7567*. Rare, Post Canyon.

Astragalus allochrous A. Gray. *Elias 8317*. Uncommon winter annual, mostly in grasslands.

Astragalus arizonicus A. Gray. *7447*. Uncommon, grasslands.

Astragalus mollissimus Torrey var. *bigelovii* (A. Gray) Barneby [*A. bigelovii* A. Gray]. *Elias 8395*. Common, grasslands and woodlands.

Astragalus nothoxys A. Gray. *7441*. Abundant in grasslands and woodlands following wet winters.

Astragalus nuttallianus DC. var. *nuttallianus*. *Liston 739-5*. Uncommon, grasslands.

Astragalus thurberi A. Gray. *Elias 8393*. Uncommon, grasslands.

Calliandra eriophylla Bentham var. *eriophylla*. Common, grasslands.

Calliandra humilis Bentham var. *reticulata* (A. Gray) L. D. Benson [*C. reticulata* A. Gray]. *7305*. Common, grasslands.

Chamaecrista nictitans (L.) Moench ssp. *nictitans* var. *leptadenia* (Greenm.) Gandhi & Hatch [*Cassia leptadenia* Greenm.]. *7282*. Common, grasslands and woodlands.

Cologania angustifolia Kunth [*C. longifolia* A. Gray]. *8116*. Rare, Post Canyon.

Coursetia caribaea (Jacq.) Lavin var. *sericea* (A. Gray) Lavin [*Cracca edwardsii* A. Gray]. *8049*. Rare, canyons.

Crotalaria pumila Ortega. *Armstead s.n., October 2,1971*. Uncommon, grasslands and woodlands.

Dalea albiflora A. Gray. *7348*. Uncommon, grasslands and woodlands.

Dalea brachystachys A. Gray [*D. lemmoni* Parry]. *8120*. Uncommon, grasslands.

Dalea candida Willd. var. *oligophylla* (Torrey) Shinners [*Petalostemon candidum* (Willd.) Michx. var. *oligophyllum* (Torrey) Hermann]. *7563*. Rare, oak woodlands.

Dalea exigua Barneby [*Petalostemon exilis* A. Gray]. *Elias 8945*. Rare, along stream in Lyle Canyon.

Dalea formosa Torrey. *7497*. Locally common in calcareous grasslands.

Dalea grayi (Vail) L. O. Williams. *8063*. Uncommon, grasslands.

Dalea jamesii (Torrey) Torrey & A. Gray. *7564*. Rare, grasslands.

Dalea lachnostachys A. Gray. *8038*. Uncommon, grasslands.

Dalea nana Torrey *ex* A. Gray var. *canescens* Kearney & Peebles. *7632*. Common, grasslands.

Dalea neomexicana (A. Gray) Cory var. *neomexicana*. *7500*. Rare, calcareous grasslands.

Dalea pogonathera A. Gray. *7535*. Uncommon, grasslands.

Dalea versicolor Zucc. ssp. *versicolor* var. *sessilis* (A. Gray) Barneby [*D. wislizenii* A. Gray]. *7350*. Rare, oak woodlands.

Desmanthus cooleyi (Eaton) Trel. *7293*. Common, grasslands.

Desmodium batocaulon A. Gray. *Geiger 37*. Uncommon, oak woodlands and canyons.

Desmodium cinerascens A. Gray. *7809*. Rare, on rock walls in Lyle Canyon.

Desmodium grahamii A. Gray. *8041*. Rare, oak woodlands and canyons.

Desmodium neomexicanum A. Gray. *7806*. Uncommon, oak woodlands.

Desmodium rosei Schubert. *7797*. Uncommon, oak woodlands.

Indigofera sphaerocarpa A. Gray. *8046*. Rare, oak woodlands.

Lotus greenei Ottley *ex* Kearney & Peebles. *Elias 8303*. Abundant in grasslands and woodlands after wet winters.

Lotus humistratus Greene. *7451*. Uncommon, grasslands, woodlands, and washes.

Lotus oroboides (Kunth) Ottley *ex* Kearney & Peebles. *7601*. Uncommon, woodlands.

Lupinus brevicaulis S. Watson. *7450*. Uncommon spring annual, grasslands and washes.

Lupinus concinnus Agardh. ssp. *concinnus*. *Martin, s.n., April 19, 1987*. Uncommon, grasslands and washes.

Macroptilium gibbosifolium (Ortega) A. Delgado [*Phaseolus heterophyllus* Willd.]. *7703*. Uncommon, grasslands and woodlands.

Marina calycosa (A. Gray) Barneby [*Dalea calycosa* A. Gray]. *7545*. Rare, washes.

**Melilotus albus* Medik. *7608*. Uncommon, Post Canyon.

**Melilotus officinalis* (L.) Lam. *Elias 8382*. Uncommon, washes.

Mimosa aculeaticarpa Ortega var. *biuncifera* (Bentham) Barneby [*Mimosa biuncifera* Bentham]. *Williams & Ogden s.n., October 2, 1971*. Locally abundant in grasslands, common in woodlands and canyons.

Mimosa dysocarpa Bentham. *Elias 9052*. Common in grasslands and woodlands.

Mimosa grahamii A. Gray. *7538*. Uncommon, oak woodlands.

Phaseolus acutifolius A. Gray var. *tenuifolius* A. Gray. *Geiger 32*. Uncommon, mostly in oak woodlands.

Phaseolus ritensis M. E. Jones. *7859*. Rare, grasslands.

Prosopis glandulosa Torrey var. *torreyana* (L. D. Benson) M. C. Johnst. [*P. juliflora* (Swartz) DC. var. *torreyana* L. D. Benson]. Rare, grasslands.

Prosopis velutina Wooton [*P. juliflora* (Swartz) DC. var. *velutina* (Wooton) Sarg.]. *Elias 8341*. Abundant in grasslands in northern part of the Research Ranch, common elsewhere in grasslands and woodlands.

Psoralidium tenuiflorum (Pursh) Rydb. [*Psoralea tenuiflora* Pursh]. *7532*. Uncommon, mostly in oak woodlands.

Rhynchosia senna Gillies *ex* Hooker var. *texana* (Torrey & A. Gray) M. C. Johnston [*R. texana*

Torrey & A. Gray]. *Geiger 14*. Common, grasslands and woodlands.
Senna bauhinioides (A. Gray) Irwin & Barneby [*Cassia bauhinioides* A. Gray]. *Geiger 2*. Uncommon, grasslands.
Tephrosia tenella A. Gray. *Geiger 50*. Rare, rock outcrops in Post Canyon.

Fagaceae

Quercus arizonica Sarg. *Bock 8277*. Common, oak woodlands.
Quercus emoryi Torrey. *Elias 8350*. Abundant, oak woodlands.
Quercus oblongifolia Torrey. *8805*. Uncommon, grassland on Bald Hill.
Quercus turbinella Greene. *7885*. Rare, one plant noted along drainage east of lower O'Donnell Canyon.

Fouquieriaceae

Fouquieria splendens Engelm. ssp. *splendens*. *Elias 8489*. Locally common, calcareous grassland.

Fumariaceae

Corydalis aurea Willd. ssp. *occidentalis* (Engelm. *ex* A. Gray) G. B. Ownbey. *Elias 9333*. Uncommon, grasslands and washes.

Garryaceae

Garrya wrightii Torrey. *Elias 9023*. Rare, woodlands and canyons.

Gentianaceae

Centaurium calycosum (Buckl.) Fern. var. *calycosum*. *7887*. Rare, in stream, upper O'Donnell Canyon.

Geraniaceae

**Erodium cicutarium* (L.) L'Hér. *ex* Ait. *Martin s.n., March 19, 1987*. Uncommon, mostly in disturbed sites.

Grossulariaceae

Ribes aureum Pursh var. *aureum*. *7461*. Rare, a few shrubs in Post Canyon above the reservoir.

Hydrophyllaceae

Phacelia arizonica A. Gray. *Liston 739-24*. Uncommon, grasslands and woodlands.
Phacelia bombycina Wooton & Standley [*Phacelia crenulata* Torrey, in part]. *7490*. Uncommon, grasslands and woodlands.
Phacelia coerulea E. L. Greene. *7485*. Uncommon, grasslands and woodlands.

Juglandaceae

Juglans major (Torrey) Heller. *Bock 8276*. Uncommon, washes and canyons.

Krameriaceae

Krameria erecta Willd. *ex* J. A. Schultes [*K. parviflora* Bentham]. *7492*. Locally common in calcareous grasslands.
Krameria lanceolata Torrey. *Elias 8388*. Uncommon, grasslands.

Lamiaceae

Hedeoma dentatum Torrey. *7638*. Uncommon, canyons.
Hedeoma drummondii Benth. *7609*. Rare, Post Canyon.
**Marrubium vulgare* L. *Geiger 18*. Uncommon, Post Canyon.
Monarda citriodora Cerv. *ex* Lag. ssp. *austromontana* (Epling) Scora [*M. austromontana* Epling]. *Geiger 21*. Common in washes and canyons, uncommon in grasslands and woodlands.
Salvia subincisa Bentham. *Geiger 25*. Common, grasslands and woodlands.
Scutellaria potosina T. S. Brandeg. ssp. *platyphylla* Epling. *Geiger 19*. Rare, along stream bottom in Post Canyon below reservoir.
Stachys coccinea Jacq. *Geiger 17*. Uncommon, canyons.
Trichostema arizonicum A. Gray. *Geiger 43*. Rare, on rock walls in Lyle Canyon.

Linaceae

Linum puberulum (Engelm.) Heller. *7494*. Uncommon, grasslands.

Loasaceae

Mentzelia albicaulis Hooker. *7573*. Common, washes and disturbed areas.
Mentzelia isolata Gentry [*M. asperula* Wooton & Standley]. *7772*. Uncommon, oak woodlands.
Mentzelia multiflora (Nutt.) A. Gray. *7550*. Uncommon, disturbed sites.

Lythraceae

Cuphea wrightii A. Gray. *7804*. Rare, oak woodlands in Lyle Canyon.
Lythrum californicum Torrey & A. Gray. *7558* Rare, found in Post Canyon and at Finley Tank.

Malpighiaceae

Aspicarpa hirtella L. C. Richard. *7796* Uncommon, oak woodlands.

Malvaceae

Anoda cristata (L.) Schltdl. *7708*. Uncommon canyons.
Rhynchosida physocalyx (A. Gray) Fryxell. *7555* Uncommon, grasslands.
Sida abutifolia P. Mill [*S. procumbens* Sw.]. *7338* Common, grasslands.

Sida neomexicana A. Gray. *7324*. Common, grasslands.
Sida spinosa L. *7322*. Common, grasslands.
Sphaeralcea angustifolia (Cav.) G. Don ssp. *cuspidata* (A. Gray) Kearney. *7572*. Uncommon, mostly in washes.

Molluginaceae

**Mollugo verticillata* L. *7281*. Abundant, grasslands and woodlands.

Nyctaginaceae

Allionia incarnata L. *Geiger 29*. Common, washes, grasslands, disturbed sites.
Boerhavia coccinea P. Mill. *7778*. Uncommon, woodlands, washes, grasslands.
Boerhavia coulteri (Hooker f.) S. Watson. *7851*. Uncommon, washes.
Boerhavia erecta L. *Geiger 26*. Common, mostly in washes.
Boerhavia purpurascens A. Gray. *7693*. Uncommon, canyons.
Mirabilis coccineus (Torrey) Benth. & Hooker f. [*Oxybaphus coccineus* Torrey]. *7537*. Uncommon, oak woodlands.
Mirabilis longiflora L. var. *wrightiana* (Gray) Kearney & Peebles. *Elias 9060*. Uncommon, oak woodlands.

Oleaceae

Fraxinus velutina Torrey. *7610*. Common, canyons.

Onagraceae

Calylophus hartwegii (Bentham) Raven ssp. *pubescens* (A. Gray) Towner & Raven [*Oenothera greggii* A. Gray]. *7498*. Locally common, calcareous ridgetops.
Epilobium canum (Greene) Raven ssp. *latifolium* (Hooker) Raven [*Zauschneria latifolia* (Hooker) Greene var. *arizonica* (Davidson) Hilend]. *7707*. Uncommon, canyons.
Epilobium ciliatum Raf. ssp. *ciliatum* [*E. californicum* Hausskn.]. *7947*. Rare, upper O'Donnell Canyon.
Gaura coccinea Nutt. *ex* Pursh. *7506*. Uncommon, grasslands.
Gaura hexandra Ortega ssp. *gracilis* (Wooton & Standley) Raven & Gregory [*G. gracilis* Wooton & Standley]. *Robinett s.n., October 2, 1971*. Uncommon, grasslands and woodlands.
Gaura parviflora Douglas *ex* Lehm. *Raynor s.n., October 2, 1971*. Common, washes.
Oenothera caespitosa Nutt. ssp. *marginata* (Nutt. *ex* Hooker & Arn.) Munz. *7488*. Uncommon, grasslands and woodlands.
Oenothera flava (A. Nelson) Garret ssp. *flava*. *Liston 739-20*. Uncommon, oak woodlands.
Oenothera rosea L'Hér. *ex* Ait. *7513*. Uncommon, along streams and at Finley Tank.

Oxalidaceae

Oxalis albicans Kunth ssp. *albicans*. *7780*. Uncommon, canyons.
Oxalis drummondii A. Gray [*O. amplifolia* (Trel.) Knuth]. *8040*. Rare, Post Canyon.

Papaveraceae

Argemone pleiacantha Greene ssp. *pleiacantha*. *7551*. Common, washes and disturbed areas.

Pedaliaceae

Proboscidea parviflora (Wooton) Wooton & Standley ssp. *parviflora*. *Elias 8946*. Locally common, grasslands.

Plantaginaceae

Plantago patagonica Jacq. *7575*. Uncommon, grasslands, woodlands, and washes.
**Plantago virginica* L. *Noel 17*. Uncommon, springs.

Platanaceae

Platanus wrightii S. Watson. *Elias 8359*. Common, washes and canyons.

Polemoniaceae

Eriastrum diffusum (A. Gray) Mason. *Martin s.n., May 2, 1987*. Uncommon, grasslands and washes.
Gilia flavocincta A. Nelson ssp. *australis* (A. D. Grant & V. Grant) A. D. Grant & V. Grant. *Bock 8267*. Uncommon, grasslands and washes.
Gilia mexicana A. D. Grant & V. Grant. *7456*. Common, grasslands and washes.
Ipomopsis macombii (Torrey *ex* A. Gray) V. Grant [*Gilia macombii* Torrey]. *7623*. Uncommon, canyons and oak woodlands.
Ipomopsis thurberi (Torrey *ex* A. Gray) V. Grant [*Gilia thurberi* Torrey]. *7637*. Rare, Lyle Canyon.

Polygalaceae

Monnina wrightii A. Gray. *8064*. Uncommon, woodlands and canyons.
Polygala alba Nutt. *7541*. Uncommon, grasslands.
Polygala barbeyana Chod. [*P. longa* Blake]. *7308*. Uncommon, grasslands.
Polygala hemipterocarpa A. Gray. *7539*. Rare, grasslands.
Polygala obscura Bentham. *7769*. Common, grasslands.

Polygonaceae

Eriogonum abertianum Torrey var. *abertianum*. *Geiger 27*. Locally common, grasslands.
Eriogonum polycladon Benth. *7870*. Common, roadsides, other disturbed sites.
Eriogonum wrightii Torr. *ex* Benth. var. *wrightii*. *7333*. Common, mostly in grasslands.
Polygonum amphibium L. var. *emersum* Michx. [*P. coccineum* Muhl.]. *7846*. Rare, in standing water, Post Canyon.
Polygonum pensylvanicum L. *7844*. Rare, seasonally wet depression near Post Canyon.
Polygonum punctatum Ell. var. *punctatum*. *7777*. Rare, Post Canyon.

**Rumex crispus* L. *7574*. Uncommon, wet ground around tanks.
Rumex salicifolius Weinm. var. *mexicanus* (Meisn.) C. L. Hitchc. [*R. triangulivalvis* (Danser) Rech. f.]. *8132*. Rare, depression below dormitory.

Portulacaceae

Portulaca oleracea L. [*P. retusa* Engelm.]. *7853*. Uncommon, washes.
Portulaca suffrutescens Engelm. *7292*. Common, grasslands.
Portulaca umbraticola Kunth ssp. *coronata* (Small) Matthews & Ketron [*P. coronata* Small]. *7294*. Common, grasslands.
Talinum aurantiacum Engelm. *Geiger 6*. Common, grasslands.
Talinum paniculatum (Jacq.) Gaertn. var. *paniculatum*. *Geiger 35*. Rare, oak woodlands.

Primulaceae

Androsace occidentalis Pursh. *7444*. Rare, oak woodlands.

Ranunculaceae

Anemone tuberosa Rydb. *Elias 9327*. Uncommon, grasslands.
Clematis drummondii Torrey & A. Gray. *Elias 8962*. Rare, oak woodlands.
Delphinium wootonii Rydb. [*D. virescens* Nutt. ssp. *wootonii* (Rydb.) Ewan]. *Anonymous, May 14, 1986*. Rare, grasslands near junction of Turkey and O'Donnell Canyon.
Myosurus cupulatus S. Watson. *7445*. Rare, oak woodlands.
Ranunculus macranthus Scheele. *7947*. Rare, wet ground, upper O'Donnell Canyon.

Rhamnaceae

Ceanothus greggii A. Gray ssp. *greggii*. *Elias 9329*. Rare, oak woodlands, Post Canyon.
Rhamnus californica Eschsch. ssp. *ursina* (Greene) Wolf. *Elias 8404*. Rare, O'Donnell Canyon.

Rosaceae

Cercocarpus montanus Raf. var. *paucidentatus* (S. Watson) F. L. Martin [*C. breviflorus* A. Gray]. *Bock 8267*. Uncommon, canyons.
Purshia stansburiana (Torrey) Henrickson [*Cowania mexicana* D. Don ssp. *stansburiana* (Torrey) Jepson]. *Elias 8319*. Uncommon, limestone outcrops, oak woodlands.
**Rubus discolor* Weihe & Nees [*Rubus procerus* P. J. Muell.]. *8797*. Abundant at Finley Tank, where displacing native vegetation.

Rubiaceae

Diodia teres Walter var. *angustata* A. Gray. *Geiger 47*. Uncommon, grasslands and woodlands.
Galium wrightii A. Gray. Rare, canyons.
Houstonia rubra Cav. *Martin & Stromberg, s.n., April 24, 1987*. Rare, oak woodlands.
Mitracarpus breviflorus A. Gray. *Geiger 48*. Rare, shallow soils on rock outcrops, Post Canyon.

Salicaceae

Populus fremontii S. Watson. *Bock 8271*. Uncommon, Finley Tank, washes and canyons.
Salix exigua Nutt. *7886, Elias 8452*. A single dense stand in upper Turkey Creek canyon.
Salix gooddingii Ball. *Elias 8451*. Common, canyons, Finley Tank.
Salix lasiolepis Benth. *7568*. Uncommon, along creek in Lyle Canyon.
Salix taxifolia Kunth. *Elias 9336*. Rare, washes and canyons.

Sapindaceae

Sapindus saponaria L. var. *drummondii* (Hooker & Arnott) L. D. Benson. *Elias 8457*. Uncommon, washes.

Scrophulariaceae

Brachystigma wrightii (A. Gray) Pennell. *Elias 8930*. Rare, oak woodlands.
Castilleja integra A. Gray var. *integra*. *7457*. Uncommon, canyons.
Mimulus guttatus DC. *Elias 8406*. Common along streams in canyons.
Penstemon barbatus (Cav.) Roth ssp. *barbatus*. *Elias 8453*. Uncommon, woodlands and canyons.
Penstemon dasyphyllus A. Gray. *7491*. Uncommon, grasslands and woodlands. Blooming in both the spring and fall at the Research Ranch.
Schistophragma intermedia (A. Gray) Pennell. *7273*. Uncommon, woodlands and canyons.
**Veronica anagallis-aquatica* L. *Elias 8448*. Uncommon, canyons.
Veronica peregrina L. ssp. *xalapensis* (Kunth) Pennell. *Elias 8469*. Uncommon, springs and canyons.

Solanaceae

Chamaesaracha coronopus (Dunal) A. Gray. *8121*. Uncommon, washes, disturbed areas.
Datura ferox L. [*D. quercifolia* Kunth]. *8026*. Rare, washes.
Datura wrightii Regel [*D. meteloides* DC]. *Elias 8428*. Uncommon, washes, disturbed areas.
Margaranthus solanaceus Schltdl. *7343*. Common, oak woodlands.
Physalis hederifolia A. Gray var. *fendleri* (A. Gray) Cronq. [*P. fendleri* A. Gray]. *7602*. Uncommon, grasslands and woodlands.
Physalis hederifolia A. Gray var. *hederifolia*. *8055*. Common, grasslands.
Physalis longifolia Nutt. *Fugate 37*, ARIZ. Rare, washes.
Physalis pubescens L. var. *pubescens*. *7865*. Uncommon, limestone outcrops, canyons.
Solanum deflexum Greenm. *8109*. Rare, oak woodlands in Post Canyon.

Solanum douglasii Dunal. *7633*. Rare, Lyle Canyon.
Solanum elaeagnifolium Cav. *Geiger 5*. Uncommon, grasslands and disturbed areas.
Solanum fendleri A. Gray var. *fendleri*. *8039*. Rare, canyons.
Solanum rostratum Dunal. *8133*. Rare, depressions, disturbed areas.

Ulmaceae

Celtis laevigata Willd. var. *reticulata* (Torrey) L. D. Benson [*C. reticulata* Torrey]. *8803*. Rare, Post Canyon.

Verbenaceae

Bouchea prismatica (L.) Kuntze. *7768*. Rare, Post Canyon.
Glandularia bipinnatifida (Nutt.) Nutt. var. *binnatifida*. *7587*. Uncommon, washes, grasslands, woodlands.
Phyla incisa Small. Reported by E. Geiger from disturbed areas around Headquarters.
Tetraclea coulteri A. Gray. *7280*. Uncommon, grasslands.
Verbena gracilis Desf. *7603*. Locally common in grasslands.
Verbena neomexicana (A. Gray) Small var. *xylopoda* Perry. *7508*. Uncommon, canyons.

Violaceae

Hybanthus verticillatus (Ortega) Baill. *7512*. Common, grasslands.

Viscaceae

Phoradendron villosum (Nutt.) Nutt. ssp. *coryae* (Trel.) Wiens [*P. coryae* Trel.]. *7866*. Rare, on *Quercus arizonica*.

Vitaceae

Parthenocissus quinquefolia (L.) Planch. [*P. inserta* (Kerner) K. Fritsch]. Rare, upper O'Donnell Canyon.
Vitis arizonica Engelm. *Elias 8429*. Uncommon, canyons.

Zygophyllaceae

Kallstroemia grandiflora Torrey *ex* A. Gray. *Geiger 33*. Uncommon, grasslands.
Kallstroemia parviflora J. B. S. Norton. *7312*. Uncommon, grasslands.

ANGIOSPERMS – MONOCOTYLEDONS

Agavaceae

Agave palmeri Engelm. Locally abundant on ridgetops.
Agave parryi Engelm. var. *huachucensis* (Baker) Little. Rare, a few colonies in grasslands in southeastern part of the Research Ranch.
Yucca elata (Englem.) Engelm. var. *elata*. Uncommon, grasslands.
Yucca schottii Engelm. Uncommon, canyons and woodlands.

Commelinaceae

Commelina dianthifolia Delile var. *dianthifolia*. *7296*. Common, grasslands and woodlands.
Tradescantia pinetorum Greene. *Geiger 46*. Uncommon, oak woodlands.

Cyperaceae

Carex lanuginosa Michx. *7502*. Rare, springs at Finley Tank.
Cyperus esculentus L. *7987*. Uncommon, mostly disturbed areas.
Cyperus odoratus L. *8131*. Uncommon, edges of tanks.
Cyperus pallidicolor (Kükenthal) G. Tucker [*C. flavus* (Vahl) Nees]. *7801*. Uncommon, oak woodlands.
Cyperus sphaerolepis Boeckl. [*C. rusbyi* Britton]. *8028*. Common, grasslands and woodlands.
Cyperus squarrosus L. [*C. aristatus* Rottb.] *7774*. Rare, Post Canyon.
Eleocharis palustris (L.) Roemer & J. A. Schultes [*E. macrostachya* Britton]. *7760*. Abundant, Finley Tank and other springs.
Scirpus acutus Muhl. *ex* Bigelow. *Elias 8409*. Common along edges of reservoir in Post Canyon, Finley Tank.
Scirpus maritimus L. *7363*. Uncommon, Finley Tank.

Iridaceae

Sisyrinchium demissum Greene. *7501*. Rare, springs at Finley Tank.

Juncaceae

Juncus interior Wieg. var. *arizonicus* (Wieg.) F. J. Herm. *7560*. Rare, springs at Finley Tank.
Juncus mexicanus Willd. *ex* J. A. Schultes & J. H. Schultes. *7577*. Uncommon, Post Canyon upstream of reservoir.
Juncus saximontanus A. Nelson. *7561*. Rare, Finley Tank.

Lemnaceae

Lemna minor L. *Elias 9116*. Rare, Post Canyon.

Liliaceae

Calochortus ambiguus (M. E. Jones) Ownbey. *7484*. Rare, grasslands.
Calochortus kennedyi Porter. *Liston 739-17*. Uncommon, grasslands.
Dichelostemma pulchellum (Salisb.) Heller var. *pauciflorum* (Torrey) Hoover. *7449*. Uncommon, grasslands.
Echeandia flavescens (J. A. Schultes & J. H. Schultes) Cruden [*Anthericum torreyi* Baker]. *Geiger 23*. Locally common, grasslands.
Milla biflora Cav. *7270*. Rare, oak woodlands.

Nolinaceae

Dasylirion wheeleri S. Watson. Locally abundant, grasslands.
Nolina microcarpa S. Watson. Common, grasslands and woodlands.

Poaceae

**Agrostis stolonifera* L. *7946*. Locally common, canyons.

Aristida adscensionis L. *7770*. Uncommon, grasslands.

Aristida divaricata Humb. & Bonpl. *ex* Willd. *Reichenbacher 1571*. Abundant, grasslands.

Aristida havardii Vasey [*A. barbata* Fourn.]. *Tomlinson 777*. Rare, grasslands.

Aristida orcuttiana Vasey. *Tomlinson 766*. Rare, grasslands.

Aristida purpurea Nutt. var. *longiseta* (Steud.) Vasey [*A. longiseta* Steud.]. *7540*. Locally abundant, grasslands.

Aristida purpurea Nutt. var. *nealleyi* (Vasey) Allred [*A. glauca* (Nees) Walp.]. *7307*. Uncommon, calcareous grasslands.

Aristida purpurea Nutt. var. *parishii* (A. S. Hitchc.) Allred [*A. parishii* A. S. Hitchc.]. *7762*. Uncommon, grasslands.

Aristida ternipes Cav. var. *hamulosa* (Henrickson) Trent [*A. hamulosa* Henr.]. *8053*. Common, grasslands, woodlands, and canyons.

Aristida ternipes Cav. var. *ternipes*. *Tomlinson 797*. Common, grasslands and woodlands.

Bothriochloa barbinodis (Lag.) Herter [*Andropogon barbinodis* Lag.]. *7329*. Abundant, grasslands and woodlands.

**Bothriochloa ischmaeum* (L.) Keng. Rare, a single patch found near north entrance to the Research Ranch by Robert Whitcomb.

Bouteloua aristidoides (Kunth) Griseb. var. *aristidoides*. *8066*. Uncommon, washes, grasslands.

Bouteloua chondrosioides (Kunth) Benth. *ex* S. Watson. *7290*. Abundant, grasslands.

Bouteloua curtipendula (Michx.) Torrey var. *curtipendula*. *7269*. Abundant, grasslands, woodlands, and canyons.

Bouteloua eludens Griffiths. *Geiger 40*. Uncommon, dry slopes in canyons.

Bouteloua eriopoda (Torrey) Torrey. *7285*. Locally common, calcareous grasslands.

Bouteloua gracilis (Willd. *ex* Kunth) Lag. *ex* Griffiths. *7279*. Abundant in grasslands, common in woodlands.

Bouteloua hirsuta Lag. var. *hirsuta*. *7311*. Common, grasslands and woodlands.

Bouteloua radicosa (Fourn.) Griffiths. *Geiger 42*. Uncommon, oak woodlands.

Bouteloua repens (Kunth) Scribn. & Merr. [*B. filiformis* (Fourn.) Griffiths]. *Geiger 39*. Uncommon, grasslands.

Brachiaria arizonica (Scribn. & Merr.) S. T. Blake [*Panicum arizonicum* Scribn. & Merr.]. *7989*. Common, grasslands.

Bromus anomalus Rupr. *ex* Fourn. *7805*. Uncommon, washes and canyons.

**Bromus catharticus* Vahl. *7511*. Uncommon, wet ground in canyons.

Cenchrus carolinianus Walter [*C. pauciflorus* Bentham]. *Elias 8357*. Uncommon, washes, disturbed areas.

Chloris virgata Swartz. *Tomlinson 792*. Common, washes, disturbed areas.

**Cynodon dactylon* (L.) Pers. *Raynor s.n., no date*. Abundant on check dams, uncommon elsewhere.

Digitaria californica (Bentham) Henrickson [*Trichachne californica* (Bentham) Chase]. *Tomlinson 785*. Locally common, grasslands.

Digitaria cognata (J. A. Schultes) Pilger [*Leptoloma cognata* (J. A. Schultes) Chase]. *8035*. Rare, grasslands, limestone outcrops.

**Echinochloa crus-galli* (L.) Beauv. *7775*. Uncommon, wet areas.

Elymus canadensis L. *7882*. Common along stream in upper O'Donnell Canyon, rare elsewhere.

Elymus elymoides (Raf.) Swezey [*Sitanion hystrix* (Nutt.) J. G. Smith]. *7487*. Uncommon, canyons.

Elymus trachycaulus (Link) Gould *ex* Shinners ssp. *trachycaulus* [*Agropyron trachycaulum* (Link) Malte]. *7559B*. Rare, spring at Finley Tank.

Elyonurus barbiculmis Hack. *7782*. Uncommon, oak woodlands.

Enneapogon desvauxii Desv. *ex* Beauv. *7858*. Uncommon, calcareous grasslands.

**Eragrostis cilianensis* (All.) Lut. *ex* Janchen. *7335*. Common, grasslands and disturbed sites.

**Eragrostis curvula* (Schrad.) Nees var. *conferta* Stapf. *7289*. Abundant, grasslands on North Mesa and East Mesa.

**Eragrostis curvula* (Schrad.) Nees var. *curvula*. Rare, reported from Lyle Canyon by Robert Whitcomb.

Eragrostis intermedia A. S. Hitchc. *7268*. Abundant, grasslands and woodlands.

**Eragrostis lehmanniana* Nees. *Tomlinson 795*. Locally abundant on North Mesa, common elsewhere on mesas and ridgetops.

Eragrostis pectinacea (Michx.) Nees *ex* Steud. var. *pectinacea*. *8058*. Uncommon, mostly in disturbed sites.

**Eragrostis superba* Peyr. Rare, reported by E. Geiger from East Mesa.

Eriochloa acuminata (J. Presl) Kunth var. *minor* (Vasey) R. B. Shaw [*E. gracilis* (Fourn.) Hitchc. var. *minor* (Vasey) Hitchc.]. *8042*. Common, grasslands.

Erioneuron pulchellum (Kunth) Tateoka [*Tridens pulchellus* (Kunth) A. S. Hitchc.]. *7341*. Locally common, calcareous grasslands.

**Festuca pratensis* Huds. [*F. elatior* L.]. *7509*. Abundant in Post Canyon immediately upstream of reservoir.

Hackelochloa granularis (L.) Kuntze. *8061*. Uncommon, grasslands.

Heteropogon contortus (L.) Beauv. *ex* Roemer & J. A. Schultes. *Elias 8969*. Locally common, grasslands.

Hilaria belangeri (Steud.) Nash var. *belangeri*. *7327*. Locally common, calcareous grasslands.

Hilaria mutica (Buckl.) Benth. *7763*. Uncommon, grasslands.

Hordeum arizonicum Covas. *7890*. Rare, canyons.

Hordeum jubatum L. ssp. *jubatum*. *Elias 8424*. Uncommon, canyons.

Leptochloa dubia (Kunth) Nees. *7334*. Common, grasslands and woodlands.
Lycurus setosus (Nutt.) C. G. Reeder. *7287*. Common, grasslands.
Muhlenbergia arenicola Buckl. *Tomlinson 832*. Locally common, Bald Hill.
Muhlenbergia arizonica Scribn. *7771*. Uncommon, canyons.
Muhlenbergia asperifolia (Nees & Meyen ex Trin.) Parodi. *8112*. Rare, one patch in grassland near north entrance to the Research Ranch.
Muhlenbergia emersleyi Vasey. *7342*. Uncommon, oak woodlands.
Muhlenbergia fragilis Swallen. *Geiger 49*. Uncommon, grasslands.
Muhlenbergia rigens (Benth.) A. S. Hitchc. *7876*. Abundant, canyon bottoms.
Muhlenbergia rigida (Kunth) Trin. *7360*. Rare, calcareous grasslands.
Muhlenbergia tenuifolia (Kunth) Trin. [*Muhlenbergia monticola* Buckl.]. *7636*. Rare, rock outcrops in Lyle Canyon.
**Panicum antidotale* Retz. *Williams & Ogden s.n., October 2, 1971*. Rare, grasslands.
Panicum bulbosum Kunth. *7629*. Common, grasslands and canyons.
Panicum hallii Vasey. *7598*. Uncommon, grasslands and woodlands.
Panicum hirticaule J. Presl. *8029*. Common, grasslands.
Panicum obtusum Kunth. *7339*. Locally abundant, grasslands, woodlands, and canyons.
**Paspalum dilatatum* Poiret. *7773*. Rare, wet ground in Post Canyon.
Paspalum distichum L. *7362*. Common at Finley Tank.
Paspalum setaceum Michx. *Tomlinson 753*. Rare, canyons.
**Phalaris canariensis* L. *7505*. Rare, disturbed sites.
Piptochaetium fimbriatum (Kunth) A. S. Hitchc. *Tomlinson 807*. Uncommon, oak woodlands in Lyle Canyon.
**Polypogon monspeliensis* (L.) Desf. *Elias 8356*. Uncommon, wet areas.
**Polypogon viridis* (Gouan) Breistr. [*Agrostis semiverticillata* (Forsk.) C. Chr.]. *7364*. Uncommon, Finley Tank.
Schizachyrium cirratum (Hack.) Wooton & Standley [*Andropogon cirratum* Hack.] *7315*. Common, oak woodlands.
Schizachyrium sanguineum (Retz.) Alston var. *hirtiflorum* (Nees) Hatch [*Andropogon hirtiflorus* (Nees) Kunth]. *7877*. Uncommon, woodlands and canyons.
Setaria grisebachii Fourn. *7879*. Common, woodlands and canyons.
Setaria leucopila (Scribn. & Merr.) K. Schum. *7764*. Uncommon, grasslands.
**Sorghum halepense* (L.) Pers. *Elias 8410*. Common, washes, disturbed sites.
Sphenopholis obtusata (Michx.) Scribn. *7503*. Rare, springs at Finley Tank.
Sporobolus contractus A. S. Hitchc. *Tomlinson 810*. Uncommon, grasslands.
Sporobolus cryptandrus (Torrey) A. Gray. *7869*. Common, woodlands and grasslands.
Sporobolus wrightii Munro ex Scribn. Abundant, washes.
Stipa neomexicana (Thunb.) Scribn. *7496*. Locally common, calcareous grasslands.
Trachypogon secundus (J. Presl) Scribn. *7781*. Uncommon, oak woodlands.
Tridens muticus (Torrey) Nash var. *muticus*. *Tomlinson 830*. Uncommon, canyons.
**Triticum aestivum* L. *7504*. Rare, disturbed sites.
Vulpia octoflora (Walt.) Rydb. [*Festuca octoflora* Walt.]. *7448*. Uncommon, grasslands.

Potamogetonaceae

Potamogeton foliosus Raf. var. *foliosus*. *7565*. Rare, standing water in Post Canyon.

Typhaceae

Typha domingensis Pers. *Geiger 8*. Rare, Post Canyon.
Typha latifolia L. *Geiger 9*. Rare, Post Canyon.

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