

Historical and Recent Flora of the Santa Rita Experimental Range

Abstract: The historical flora of the Santa Rita Experimental Range was composed from historical lists of plants collected by various investigators since 1903. Plant accessions were verified from lists of plant specimens housed at the Rocky Mountain Research Station herbarium in Flagstaff, AZ, and the Rocky Mountain National Herbarium in Laramie, WY. Recent additions (1980 to 1996) to the flora were from plant collections associated with wildlife and plant studies. This list represents the most comprehensive and current inventory of plants found on the Range.

Acknowledgments: A debt of gratitude is expressed to all scientists who contributed to this effort. A special appreciation goes to Dr. S. Clark Martin who dedicated most of his professional career (more than 55 years) and retirement to conducting and organizing research, transferring technology to ranchers, resource managers, and scientists, securing the integrity of historical data and photo records, and assisting graduate students with their research. Another special thanks to Robert Lee Mays who volunteer thousands of hours in assistance to the quail and plant studies on the Santa Rita Experimental Range. Mr. Mays collected, identified, and indexed many plant specimens for our herbariums. Additional thanks to Penny Medina, Scott Medina, and Joyce Medina who provided considerable volunteer time to assist in plant accessions and field data collection. Plant data from the Santa Rita Experimental Range Digital Database was also used to make the plant list inclusive. Funding for the digitization of these data was provided by USDA Forest Service, Rocky Mountain Research Station, and the University of Arizona.

Introduction

The Santa Rita Experimental Range (SRER), established in 1903, is the oldest experimental range in the United States. Much of our knowledge of Southwestern grassland ecosystems was derived from pioneering works on SRER (Medina 1996). The Santa Rita continues to be an important research facility, with continuance of long-term plant and wildlife studies. Plant collections from SRER include some of the oldest accessions in herbariums of the Southwest. However, there is no published listing of the historical flora of SRER.

Early ecologists and range examiners (for example, David Griffiths, John Thornber) working on SRER, made plant inventories throughout the Santa Rita Mountains, as well as compiled plant lists from individual range studies. John J. Thornber made several collections throughout the region (Thornber 1909). Griffiths (1901, 1904, 1910) spent considerable time on the SRER documenting range conditions and noting floristic conditions across seasons. Hence, the historical flora presented herein is a compilation of floristic data from many plant studies, by many investigators, over the last century. A preliminary list was initially compiled in 1906, and additions to the list were made periodically until the late 1940s. The master list was used as a guide in plant studies. This checklist was compiled in tribute to all the scientists, naturalists, and botanists who conducted research worked on SRER and in recognition of their contributions. Many of the works of these contributors are listed in Medina (1996). Additions to the historical checklist include plant collections from quail studies (Medina 1988) and new plants listed in the SRER Web site by the University of Arizona.

The Range

The Santa Rita Experimental Range consists of 53,159 acres about 35 miles south of Tucson in Pima County, Arizona. It lies at the foot of the northwestern edge of the Santa Rita Mountains. It is characterized by small areas of steep, stony foothills

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and a few isolated buttes, but the greater part consists of long, gently sloping alluvial fans. Upper fans slope rather steeply and are cut by canyons and arroyos. At lower elevations, the slope diminishes to about 100 ft per mile, and drainages become relatively shallow. Terraces, breaks, or low escarpments and numerous gullies characterize some parts of the lower range. Elevations range from 2,900 ft in the northwestern corner to about 5,200 ft in the southeastern part. Average annual rainfall increases with elevation, from 10 inches at 2,900 ft to almost 20 inches at 4,300 ft (Medina 1996).

The soils are representative of those developed under southwestern arid conditions. Most consist of, or developed from, recent alluvial deposits. Three soil orders (Aridisols, Entisols, and Mollisols) and 21 soil series have been described by Clemmons and Wheeler (1970). The soils present an interesting range of characteristics due directly or indirectly to differences in elevation and proximity to the Santa Rita Mountains. With greater elevation and proximity to the mountains, rainfall increases, temperatures decrease, soils are darker, soils have a higher content of organic matter, and soils are more deeply leached of soluble salts. Erosion is most pronounced in the lower elevations coincident with vegetation density.

Vegetation Changes

Major vegetation changes have occurred since the early 1900s. Velvet mesquite (*Prosopis juliflora* (Sw.) DC.) is the dominant overstory species on 20,000 to 30,000 acres where shrub-free grassland dominated 80 years ago. Mesquite and prickly pear cactus are major species above 4,000 ft, but other species including acacia (*Acacia greggii* Gray var. *greggii*, *Acacia angustissima* (P. Mill.) Kuntze var. *suffrutescens* (Rose) Isely), mimosa (*Mimosa aculeaticarpa* Ortega var. *biuncifera* (Benth.) Barneby, *Mimosa dysocarpa* Benth.), and falsemesquite (*Calliandra eriophylla* Benth.) comprise 65 percent of the cover in this zone compared to 21 percent below 3,000 ft. Mesquite, burroweed (*Isocoma tenuisecta* Greene), and cholla cactus (*Opuntia fulgida* Engelm., *Opuntia spinosior* (Engelm.) Toumey, and *Opuntia versicolor* Engelm. ex Coult.) attain highest densities between 3,200 and 3,600 ft elevation (Martin and Reynolds 1973). Lower elevations (less than 3,200 ft) are dominated by creosote bush (*Larrea tridentata* (Sessé & Moc. ex DC.) Coville). Lehmann's lovegrass (*Eragrostis lehmanniana* Nees), sown for experimental purposes, has expanded its distribution across thousands of acres, forming monocultures on some sites (Medina 1996). These changes in grassland types can have serious consequences on quail habitats and their foods by excluding preferred foods (Medina 1988, this proceedings).

Martin and Turner (1977) examined vegetational changes in the Sonoran Desert region and noted that numbers of some species undergo long-term (low frequency) fluctuations, while others fluctuate with higher frequencies. The activities of man are considered generally pervasive, but rodents and other wildlife may also induce and sustain changes. Pioneer wildlife work on SRER by Vorhies and Taylor (1933) illustrated that rodents and lagomorphs alone can keep range sites within a poor or fair condition. Other factors also contributed to vegetation change on SRER,

including experimentation with grazing systems (Marin 1978), fire (Martin 1983), herbicide and vegetation removal treatments, rodent and rabbit control, fertilizer applications, and water spreading (Martin 1975). Climate change is probably the most important natural factor that changed vegetation dynamics on SRER over the last century. Many studies throughout the research history of the range document the effects of rainfall and temperature on plant production, mortality, and reproduction (Martin 1975; Martin and Cable 1974).

Flora

The vascular flora of SRER contains 468 species, in 283 genera, and 80 families. Since 1984 at least 123 new additions to the flora have been indexed. The three largest families are Poaceae with 81 species, Asteraceae with 72 species, and Fabaceae with 61 species. These families account for 45 percent of the total flora. Important genera of the Poaceae family include *Bouteloua*, *Aristida*, and *Muhlenbergia*. Important genera of the Fabaceae family include *Acacia*, *Lotus*, and *Lupinus*. Several genera of the Asteraceae family contain species of unique and common value.

The author has examined all recent and historical collections forming the basis for this checklist. Voucher specimens are deposited at various herbariums, including the Rocky Mountain Herbarium and Forest Service National Herbarium in Laramie, WY, Rocky Mountain Research Station Herbarium in Flagstaff, AZ, Arizona State University Herbarium, and the University of Arizona Herbarium. Nomenclature follows USDA NRCS (2002). This checklist is intended to serve as documentation of historical and recent additions to the flora of SRER, and as a basis for future plant studies and reference.

The vascular list (table 1) is intended as documentation of the historical plants that occurred on SRER. It should serve as a basis for other comparative floristic studies of the region. While the list contains many species, many new species are yet to be indexed. The list is also a valuable guide to reference species of lesser economic importance but of ecological significance in regards to invasive plant ecology.

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Table 1—List of the historical and recent flora of the Santa Rita Experimental Range. Family names are in bold. The historical plant name (nonitalicized) follows the current accepted name (italicized) only when there was a name change.

Acanthaceae	<i>Ambrosia dumosa</i> (Gray) Payne ^a
<i>Anisacanthus thurberi</i> (Torr.) Gray	<i>Artemisia carruthii</i> Wood ex Carruth. ^a
<i>Carlowrightia arizonica</i> Gray	<i>Baccharis brachyphylla</i> Gray
<i>Tetramerium nervosum</i> Nees	<i>Baccharis emoryi</i> Gray
<i>Tetramerium hispidum</i> Nees.	<i>Baccharis pteronioides</i> DC.
<i>Yeatesia platystegia</i> (Torr.) Hilsenb. ^a	<i>Baccharis salicifolia</i> (Ruiz & Pavón) Pers. ^a
Agavaceae	<i>Baccharis sarothroides</i> Gray
<i>Agave palmeri</i> Engelm. ^a	<i>Baccharis thesioides</i> Kunth
<i>Yucca elata</i> (Engelm.) Engelm. ^a	<i>Baccharis wrightii</i> Gray
Aizoaceae	<i>Bahia absinthifolia</i> Benth. var. <i>dealbata</i> (Gray) Gray
<i>Trianthema portulacastrum</i> L. ^a	<i>Baileya multiradiata</i> Harvey & Gray ex Gray
Amaranthaceae	<i>Bidens bigelovii</i> Gray
<i>Amaranthus palmeri</i> S. Wats.	<i>Carphochaete bigelovii</i> Gray
<i>Gomphrena nitida</i> Rothrock	<i>Chaetopappa ericoides</i> (Torr.) Nesom ^a
<i>Gomphrena sonora</i> Torr.	<i>Cirsium arizonicum</i> (Gray) Petrak
<i>Guilleminea densa</i> (Humb. & Bonpl. ex Willd.) Moq. var. <i>Densa</i>	<i>Cirsium horridulum</i> Michx. ^a
<i>Tidestromia lanuginosa</i> (Nutt.) Standl.	<i>Cirsium neomexicanum</i> Gray ^a
Anacardiaceae	<i>Chloracantha spinosa</i> (Benth.) Nesom ^a
<i>Rhus trilobata</i> Nutt.	<i>Conyza canadensis</i> (L.) Cronq.
Apiaceae	<i>Ericameria laricifolia</i> (Gray) Shinnors
<i>Bowlesia incana</i> Ruiz & Pavón	<i>Haplopappus laricifolius</i> Gray
<i>Daucus carota</i> L. ^a	<i>Ericameria nauseosa</i> (Pallas ex Pursh) Nesom & Baird ^a
<i>Daucus pusillus</i> Michx.	<i>Ericameria suffruticosa</i> (Nutt.) Nesom
<i>Spermolepis echinata</i> (Nutt. ex DC.) Heller	<i>Haplopappus suffruticosus</i> (Nutt.) Gray
<i>Torilis nodosa</i> (L.) Gaertn. ^a	<i>Erigeron concinnus</i> (Hook. & Arn.) Torr. & Gray
<i>Yabea microcarpa</i> (Hook. & Arn.) K.-Pol.	<i>Erigeron divergens</i> Torr. & Gray
<i>Caucalis microcarpa</i> Hook. & Arn.	<i>Gutierrezia arizonica</i> (Gray) M.A. Lane
Apocynaceae	<i>Greenella arizonica</i> Gray
<i>Macrosiphonia brachysiphon</i> (Torr.) Gray ^a	<i>Gutierrezia sarothrae</i> (Pursh) Britt. & Rusby ^a
Araliaceae	<i>Guardiola platyphylla</i> Gray
<i>Aralia racemosa</i> L.	<i>Heliomeris longifolia</i> (Robins. & Greenm.) Cockerell var. <i>annua</i> (M.E. Jones) Yates
Aristolochiaceae	<i>Viguiera annua</i> (M.E. Jones) Blake
<i>Aristolochia watsonii</i> Woot. & Standl.	<i>Hymenoclea monogyra</i> Torr. & Gray ex Gray
Asclepiadaceae	<i>Hymenothrix wislizeni</i> Gray
<i>Asclepias asperula</i> (Dcne.) Woods. ssp. <i>capricornu</i> (Woods.) Woods.	<i>Isocoma tenuisecta</i> Greene ^a
<i>Asclepias brachystephana</i> Engelm. ex Torr.	<i>Haplopappus tenuisectus</i> (Greene) Blake
<i>Funastrum cynanchoides</i> (Dcne.) Schlechter ^a	<i>Lasthenia californica</i> DC. ex Lindl.
Asteraceae	<i>Lasthenia chrysostoma</i> (Fisch. & C.A. Mey.) Greene
<i>Agoseris heterophylla</i> (Nutt.) Greene	<i>Layia glandulosa</i> (Hook.) Hook. & Arn.
<i>Ambrosia ambrosioides</i> (Cav.) Payne ^b	<i>Lygodesmia grandiflora</i> (Nutt.) Torr. & Gray ^a
<i>Ambrosia artemisiifolia</i> L. ^a	<i>Machaeranthera canescens</i> (Pursh) Gray ssp. <i>canescens</i> var. <i>incana</i> (Lindl.) Gray
	<i>Machaeranthera tephrodes</i> (Gray) Greene
	<i>Machaeranthera gracilis</i> (Nutt.) Shinnors

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Table 1—(Con.)

<i>Machaeranthera pinnatifida</i> (Hook.) Shinners ssp. <i>pinnatifida</i> var. <i>pinnatifida</i>	<i>Pectocarya recurvata</i> I.M. Johnston ^a
Machaeranthera pinnatifida (Hook.) Shinners pinnatifida	<i>Plagiobothrys arizonicus</i> (Gray) Greene ex Gray ^a
pinnatifida Turner & Hartman	<i>Plagiobothrys pringlei</i> Greene
Haplopappus spinulosus (Pursh) DC.	Brassicaceae
<i>Machaeranthera tagetina</i> Greene	<i>Arabis perennans</i> S. Wats.
<i>Machaeranthera tanacetifolia</i> (Kunth) Nees	<i>Descurainia pinnata</i> (Walt.) Britt.
<i>Malacothrix glabrata</i> (Gray ex D.C. Eat.) Gray	Descurainia pinnata (Walt.) Britt. ssp. ochroleuca (Woot.)
Malacothrix californica (DC) glabrata Eaton	Detling
<i>Malacothrix fendleri</i> Gray	<i>Guillenia lasiophylla</i> (Hook. & Arn.) Greene
<i>Oonopsis foliosa</i> (Gray) Greene var. <i>foliosa</i> ^b	Thelypodium lasiophyllum (Hook. & Arn.) Greene
Haplopappus fremontii (Gray) Greene	<i>Lepidium lasiocarpum</i> Nutt.
<i>Parthenium incanum</i> Kunth	<i>Lepidium virginicum</i> L. var. <i>medium</i> (Greene) C.L. Hitchc.
<i>Pectis longipes</i> Gray	Lepidium medium Greene
<i>Pectis prostrata</i> Cav.	<i>Lepidium thurberi</i> Woot.
<i>Porophyllum gracile</i> Benth.	<i>Lesquerella gordonii</i> (Gray) S. Wats.
<i>Porophyllum ruderale</i> (Jacq.) Cass. ssp. <i>macrocephalum</i> (DC.) R.R. Johnson	<i>Streptanthus carinatus</i> C. Wright ex Gray ssp. <i>arizonicus</i> (S. Wats.)
<i>Pseudognaphalium macounii</i> (Greene) Kartesz, comb. nov. ined.	Krückeberg, Rodman & Worthington
Gnaphalium decurrens Ives, non L.	Streptanthus arizonica Wats.
<i>Psilactis asteroides</i> Gray	<i>Thelypodium integrifolium</i> (Nutt.) Endl. ex Walp.
Machaeranthera asteroides (Torr.) Greene	<i>Thysanocarpus curvipes</i> Hook.
<i>Psilostrophe cooperi</i> (Gray) Greene	Thysanocarpus curvipes Hook. Var. elegans (F. & M.) Robins
<i>Rafinesquia neomexicana</i> Gray	<i>Thysanocarpus laciniatus</i> Nutt.
<i>Sanvitalia abertii</i> Gray	Thysanocarpus laciniatus Nutt. var. crenatus (Nutt.) Brewer
<i>Senecio flaccidus</i> Less. var. <i>flaccidus</i> ^a	Cactaceae
Senecio filifolius Nutt., non Berg. ^b	<i>Carnegia gigantea</i> (Engelm.) Britt. & Rose ^a
Senecio longilobus Benth. ^b	<i>Coryphantha scheeri</i> (Muehlenpfordt) L. Benson ^a
<i>Senecio riddellii</i> Torr. & Gray	<i>Ferocactus wislizeni</i> (Engelm.) Britt. & Rose ^a
<i>Stephanomeria exigua</i> Nutt.	<i>Mammillaria grahamii</i> Engelm. var. grahamii ^a
<i>Stephanomeria spinosa</i> (Nutt.) S. Tomb ^a	Mammillaria microcarpa Engelm.
<i>Stylocline micropoides</i> Gray	<i>Opuntia acanthocarpa</i> Engelm. & Bigelow ^b
<i>Symphytotrichum divaricatum</i> (Nutt.) Nesom	<i>Opuntia arbuscula</i> Engelm. ^b
Aster subulatus Michx. var. ligulatus Shinners	<i>Opuntia engelmannii</i> Salm-Dyck ^a
<i>Tagetes lemmonii</i> Gray	<i>Opuntia fulgida</i> Engelm. ^a
<i>Tagetes micrantha</i> Cav.	<i>Opuntia imbricata</i> (Haw.) DC. ^a
<i>Thelesperma megapotamicum</i> (Spreng.) Kuntze	<i>Opuntia leptocaulis</i> DC. ^b
Thelesperma gracile (Torr.) Gray	<i>Opuntia santa-rita</i> (Griffiths & Hare) Rose ^a
<i>Tragopogon porrifolius</i> L. ^a	<i>Opuntia spinosior</i> (Engelm.) Toumey ^a
<i>Trixis californica</i> Kellogg	<i>Opuntia versicolor</i> Engelm. ex Coult. ^b
<i>Uropappus lindleyi</i> (DC.) Nutt.	Campanulaceae
Microseris linearifolia (Nutt.) Schultz-Bip.	<i>Triodanis perfoliata</i> (L.) Nieuwl.
<i>Verbesina encelioides</i> (Cav.) Benth. & Hook. f. ex Gray	<i>Triodanis perfoliata</i> (L.) Nieuwl. var. <i>biflora</i> (Ruiz & Pavón) Bradley
<i>Viguiera dentata</i> (Cav.) Spreng. var. <i>lanceifolia</i> Blake	Triodanis biflora (Ruiz & Pavón) Greene
<i>Xanthium strumarium</i> L. ^a	Capparaceae
<i>Zinnia acerosa</i> (DC.) Gray	<i>Polanisia dodecandra</i> (L.) DC. ^a
Zinnia acerosa (DC.) Gray	<i>Polanisia dodecandra</i> (L.) DC. ssp. <i>trachysperma</i> (Torr. & Gray) Iltis ^a
Zinnia pumila Gray	Caprifoliaceae
<i>Zinnia grandiflora</i> Nutt.	<i>Lonicera arizonica</i> Rehd. ^a
Bignoniaceae	Caryophyllaceae
<i>Chilopsis linearis</i> (Cav.) Sweet	<i>Cerastium brachypodium</i> (Engelm. ex Gray) B.L. Robins.
Bixaceae	Cerastium brachypodium (Engelm.) Ribins
<i>Amoreuxia palmatifida</i> Moc. & Sessé ex DC.	<i>Cerastium glomeratum</i> Thuill. ^a
Amoreuxia palmatifida M. & S.	<i>Cerastium nutans</i> Raf. var.
Boraginaceae	<i>obtectum</i> Kearney & Peebles
<i>Amsinckia douglasiana</i> A. DC. ^a	<i>Silene antirrhina</i> L.
<i>Amsinckia menziesii</i> (Lehm.) A. Nels. & J.F. Macbr. var. <i>intermedia</i>	<i>Silene laciniata</i> Cav. ssp. <i>greggii</i> (Gray) C.L. Hitchc. & Maguire
(Fisch & C.A. Mey.) Ganders	Celastraceae
Amsinckia intermedia F. & M.	<i>Mortonia scabrella</i> Gray
<i>Cryptantha angustifolia</i> (Torr.) Greene	Chenopodiaceae
<i>Cryptantha barbigera</i> (Gray) Greene	<i>Atriplex canescens</i> (Pursh) Nutt.
<i>Cryptantha crassisejala</i> (Torr. & Gray) Greene	<i>Atriplex wrightii</i> S. Wats.
<i>Cryptantha nevadensis</i> A. Nels. & Kennedy ^a	<i>Chenopodium album</i> L. ^a
<i>Pectocarya heterocarpa</i> (I.M. Johnston) I.M. Johnston	

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Table 1—(Con.)

<i>Chenopodium fremontii</i> S. Wats.	<i>Acacia constricta</i> Benth.
<i>Cycloloma atriplicifolium</i> (Spreng.) Coult. ^a	<i>Acacia filiculoides</i> (Cav.) Trelease
<i>Kochia scoparia</i> (L.) Schrad. ^a	<i>Acacia greggii</i> Gray var. <i>greggii</i>
<i>Monolepis nuttalliana</i> (J.A. Schultes) Greene	<i>Acacia greggii</i> Gray var. <i>arizonica</i> Isely
<i>Salsola kali</i> L. ^a	<i>Amorpha californica</i> Nutt.
<i>Salsola tragus</i> L. ^a	<i>Astragalus allochrous</i> Gray var. <i>playanus</i> Isely
Commelinaceae	<i>Astragalus wootonii</i> Sheldon
<i>Commelina dianthifolia</i> Delile	<i>Astragalus arizonicus</i> Gray
<i>Tradescantia occidentalis</i> (Britt.) Smyth	<i>Astragalus nothoxys</i> Gray
Convolvulaceae	<i>Astragalus nuttallianus</i> DC.
<i>Evolvulus arizonicus</i> Gray	<i>Astragalus tephrodes</i> Gray ^a
<i>Evolvulus nuttallianus</i> J.A. Schultes	<i>Caesalpinia gilliesii</i> (Hook.) Wallich ex D. Dietr.
<i>Evolvulus pilosus</i> Nutt.	<i>Caesalpinia gilliesii</i> Wall.
<i>Ipomoea capillacea</i> (Kunth) G. Don	<i>Calliandra eriophylla</i> Benth.
<i>Ipomoea muricata</i> Cav.	<i>Calliandra humilis</i> Benth.
<i>Ipomoea coccinea</i> L.	<i>Chamaecrista nictitans</i> (L.) Moench ssp. <i>nictitans</i> var. <i>leptadenia</i>
<i>Ipomoea eriocarpa</i> R. Br. ^a	(Greenm.) Gandhi & Hatch
<i>Ipomoea plummerae</i> Gray ^a	<i>Cassia leptadenia</i> Greenm.
<i>Ipomoea triloba</i> L.	<i>Crotalaria pumila</i> Ortega
<i>Ipomoea turbinata</i> Lag. ^a	<i>Dalea aurea</i> Nutt. ex Pursh ^a
Cucurbitaceae	<i>Dalea formosa</i> Torr.
<i>Citrullus lanatus</i> (Thunb.) Matsumura & Nakai var. <i>lanatus</i>	<i>Dalea grayi</i> (Vail) L.O. Williams
<i>Citrullus vulgaris</i> Schrad.	<i>Dalea pogonathera</i> Gray
<i>Cucurbita digitata</i> Gray	<i>Dalea wrightii</i> Gray
<i>Cucurbita foetidissima</i> Kunth ^a	<i>Desmanthus cooleyi</i> (Eat.) Trel.
<i>Cyclanthera dissecta</i> (Torr. & Gray) Arn.	<i>Desmanthus jamesii</i> Torr. & Gray
<i>Marah gilensis</i> Greene	<i>Desmanthus virgatus</i> (L.) Willd. ^a
Cupressaceae	<i>Desmodium neomexicanum</i> Gray
<i>Juniperus deppeana</i> Steud.	<i>Desmodium psilocarpum</i> Gray
<i>Juniperus deppeana</i> Steud. <i>pachyphlaea</i>	<i>Eysenhardtia polystachya</i> (Ortega) Sarg.
Cuscutaceae	<i>Galactia wrightii</i> Gray
<i>Cuscuta cephalanthi</i> Engelm.	<i>Hoffmannseggia glauca</i> (Ortega) Eifert
Cyperaceae	<i>Lathyrus lanszwertii</i> Kellogg var. <i>leucanthus</i> (Rydb.) Dorn
<i>Cyperus squarrosus</i> L.	<i>Lathyrus arizonicus</i> Britt.
<i>Cyperus aristatus</i> Rottb.	<i>Lathyrus graminifolius</i> (S. Wats.) White
<i>Cyperus hermaphroditus</i> (Jacq.) Standl.	<i>Lotus greenei</i> Ottley ex Kearney & Peebles
Ephedraceae	<i>Lotus greenei</i> (Woot. & Standl.) Oettle
<i>Ephedra trifurca</i> Torr. ex S. Wats.	<i>Lotus humistratus</i> Greene
Ericaceae	<i>Lotus rigidus</i> (Benth.) Greene ^a
<i>Arbutus arizonica</i> (Gray) Sarg.	<i>Lotus salsuginosus</i> Greene ^a
<i>Arctostaphylos pungens</i> Kunth	<i>Lotus strigosus</i> (Nutt.) Greene var. <i>tomentellus</i> (Greene) Isely ^a
Euphorbiaceae	<i>Lotus unifoliolatus</i> (Hook.) Benth. var. <i>unifoliolatus</i> ^a
<i>Acalypha neomexicana</i> Muell.-Arg.	<i>Lotus wrightii</i> (Gray) Greene ^a
<i>Argythamnia neomexicana</i> Muell.-Arg. ^a	<i>Lupinus arizonicus</i> (S. Wats.) S. Wats. ^a
<i>Ditaxis neomexicana</i> (Muell.-Arg.) Heller	<i>Lupinus concinnus</i> J.G. Agardh
<i>Chamaesyce albomarginata</i> (Torr. & Gray) Small	<i>Lupinus neomexicanus</i> Greene
<i>Euphorbia albomarginata</i> Torr. & Gray	<i>Lupinus palmeri</i> S. Wats.
<i>Chamaesyce florida</i> (Engelm.) Millsp.	<i>Lupinus sparsiflorus</i> Benth.
<i>Euphorbia florida</i> Engelm.	<i>Melilotus indica</i> (L.) All.
<i>Chamaesyce maculata</i> (L.) Small ^a	<i>Mimosa aculeaticarpa</i> Ortega var. <i>biuncifera</i> (Benth.) Barneby
<i>Chamaesyce melanadenia</i> (Torr.) Millsp. ^a	<i>Mimosa biuncifera</i> (Benth.) Britt. & Rose
<i>Chamaesyce nutans</i> (Lag.) Small ^a	<i>Mimosa dysocarpa</i> Benth.
<i>Chamaesyce prostrata</i> (Ait.) Small ^a	<i>Olneya tesota</i> Gray ^a
<i>Chamaesyce serrula</i> (Engelm.) Woot. & Standl.	<i>Parkinsonia florida</i> (Benth. ex Gray) S. Wats. ^b
<i>Euphorbia serrula</i> Engelm.	<i>Parkinsonia microphylla</i> Torr. ^a
<i>Croton glandulosus</i> L. ^a	<i>Phaseolus acutifolius</i> Gray var. <i>tenuifolius</i> Gray
<i>Croton pottsii</i> (Klotzsch) Muell.-Arg. var. <i>pottsii</i>	<i>Phaseolus angustissimus</i> Gray
<i>Croton corymbulosus</i> Engelm.	<i>Phaseolus maculatus</i> Scheele
<i>Euphorbia marginata</i> Pursh ^a	<i>Phaseolus metcalfei</i> Woot. & Standl.
Fabaceae	<i>Phaseolus ritensis</i> M.E. Jones ^a
<i>Acacia angustissima</i> (P. Mill.) Kuntze var. <i>suffrutescens</i> (Rose) Isely	<i>Prosopis juliflora</i> (Sw.) DC. ^a
	<i>Prosopis velutina</i> Woot.
	<i>Senna covesii</i> (Gray) Irwin & Barneby
	<i>Cassia covesii</i> Gray
	<i>Cassia leptadenia</i> Greenm.

(Con.)

Table 1—(Con.)

<i>Senna hirsuta</i> (L.) Irwin & Barneby var. <i>glaberrima</i> (M.E. Jones) Irwin & Barneby Cassia leptocarpa Benth. var. glaberrima M.E. Jones <i>Tephrosia leiocarpa</i> Gray <i>Tephrosia thurberi</i> (Rydb.) C.E. Wood <i>Vicia hassei</i> S. Wats. ^a <i>Vicia leucophaea</i> Greene <i>Vicia ludoviciana</i> Nutt. ssp. <i>Ludoviciana</i> <i>Vicia exigua</i> Nutt.	Loasaceae <i>Mentzelia</i> <i>rusbyi</i> Woot. <i>Mentzelia texana</i> Urban & Gilg
Fagaceae <i>Quercus emoryi</i> Torr. <i>Quercus hypoleucoides</i> A. Camus <i>Quercus oblongifolia</i> Torr. <i>Quercus pauciloba</i> Rydb. (pro sp.) [<i>gambelii</i> x <i>turbinella</i>] <i>Quercus undulata</i> Torr. <i>Quercus rugosa</i> N.E. <i>Quercus turbinella</i> Greene	Malvaceae <i>Abutilon berlandieri</i> Gray ex S. Wats. ^a <i>Anoda cristata</i> (L.) Schlecht. Anoda lavaterioides Medik. <i>Gossypium thurberi</i> Todaro <i>Hibiscus coulteri</i> Harvey ex Gray Hibiscus coulteri Harv. <i>Sida abutifolia</i> P. Mill. Sida filicaulis Torr. & Gray Sida procumbens Sw. <i>Sida spinosa</i> L. ^a <i>Sphaeralcea emoryi</i> Torr. ex Gray Sphaeralcea emoryi Torr. <i>Sphaeralcea fendleri</i> Gray
Fouquieriaceae <i>Fouquieria splendens</i> Engelm. ^a	Molluginaceae <i>Mollugo verticillata</i> L.
Fumariaceae <i>Corydalis aurea</i> Willd.	Moraceae <i>Morus microphylla</i> Buckl.
Geraniaceae <i>Erodium botrys</i> (Cav.) Bertol. ^a <i>Erodium cicutarium</i> (L.) L'HER. ex Ait. Erodium cicutarium (L.) L'Her. <i>Erodium texanum</i> Gray	Nyctaginaceae <i>Abronia villosa</i> S. Wats. <i>Acleisanthes longiflora</i> Gray ^a <i>Allionia incarnata</i> L. <i>Boerhavia coulteri</i> (Hook. f.) S. Wats. <i>Boerhavia erecta</i> L. <i>Boerhavia intermedia</i> M.E. Jones ^a <i>Boerhavia purpurascens</i> Gray <i>Boerhavia spicata</i> Choisy ^a Boerhavia torreyana (S. Wats.) Standl. <i>Mirabilis coccinea</i> (Torr.) Benth. & Hook. f. Oxybaphus coccineus Torr. <i>Mirabilis linearis</i> (Pursh) Heimerl Oxybaphus linearis (Pursh) B.L. Robins. <i>Mirabilis longiflora</i> L. var. <i>wrightiana</i> (Gray ex Britt. & Kearney) Kearney & Peebles Mirabilis longiflora L. var. wrightiana (Gray) Kearney & Peebles
Hydrophyllaceae <i>Phacelia alba</i> Rydb. <i>Phacelia arizonica</i> Gray <i>Phacelia crenulata</i> Torr. ex S. Wats. <i>Phacelia distans</i> Benth. Phacelia distans Benth. Var. australis Brand. <i>Pholistoma auritum</i> (Lindl.) Lilja var. <i>arizonicum</i> (M.E. Jones) Constance	Oleaceae <i>Menodora scabra</i> Gray Menodora scabra Gray var. ramosissima Steyerem.
Juglandaceae <i>Juglans major</i> (Torr.) Heller	Onagraceae <i>Camissonia chamaenerioides</i> (Gray) Raven Oenothera chamaenerioides Gray <i>Camissonia scapoidea</i> (Nutt. ex Torr. & Gray) Raven ssp. <i>Scapoidea</i> <i>Epilobium canum</i> (Greene) Raven ssp. <i>latifolium</i> (Hook.) Raven Zauschneria californica K. Presl ssp. latifolia (Hook.) Keck <i>Oenothera primiveris</i> Gray
Krameriaceae <i>Krameria erecta</i> Willd. ex J.A. Schultes Krameria parvifolia Benth. var. glandulosa (Rose & Painter) J.F. Macbr.	Oxalidaceae <i>Oxalis albicans</i> Kunth <i>Oxalis drummondii</i> Gray Oxalis amplifolia (Trel.) Kunth.
Lamiaceae <i>Agastache wrightii</i> (Greenm.) Woot. & Standl. <i>Hedeoma dentata</i> Torr. <i>Hedeoma drummondii</i> Benth. ^a <i>Marrubium vulgare</i> L. <i>Salvia columbariae</i> Benth. <i>Salvia subincisa</i> Benth. <i>Stachys coccinea</i> Ortega <i>Trichostema arizonicum</i> Gray	Papaveraceae <i>Argemone hispida</i> Gray Argemone platyceras Link & Otto var. hispida (Gray) Prain <i>Argemone pleiacantha</i> Greene ^a <i>Argemone polyanthemus</i> (Fedde) G.B. Ownbey Argemone intermedia auct. non Sweet <i>Eschscholzia californica</i> Cham. ssp. <i>mexicana</i> (Greene) C. Clark Eschscholtzia mexicana Greene
Liliaceae <i>Allium cernuum</i> Roth var. <i>neomexicanum</i> (Rydb.) J.F. Macbr. <i>Allium kunthii</i> G. Don Allium scaposum (Benth.) <i>Calochortus gunnisonii</i> S. Wats. <i>Dasylyrion wheeleri</i> S. Wats. ^a <i>Dichelostemma capitatum</i> (Benth.) Wood ssp. <i>pauciflorum</i> (Torr.) G. Keator Dichelostemma pulchellum (Salisb.) Heller var. pauciflorum (Torr.) Hoover <i>Linum puberulum</i> (Engelm.) Heller <i>Milla biflora</i> Cav.	

(Con.)

Table 1—(Con.)

Pedaliaceae*Proboscidea parviflora* (Woot.) Woot. & Standl.**Phytolaccaceae***Rivina humilis* L.*Rivina portulacoides* Nutt.**Plantaginaceae***Plantago ovata* Forsk.^a*Plantago insularis* Eastw.*Plantago patagonica* Jacq.*Plantago purshii* R.&S.*Plantago purshii* R.&S. *picta* (Morris) Pilger*Plantago tweedyi* Gray*Plantago virginica* L.**Poaceae***Achnatherum hymenoides* (Roemer & J.A. Schultes) Barkworth^a*Aegopogon tenellus* (DC.) Trin.*Alopecurus carolinianus* Walt.*Bothriochloa saccharoides* (Sw.) Rydb.*Andropogon saccharoides* Sw.*Aristida adscensionis* L.*Aristida californica* Thurb. ex S. Wats.*Aristida californica* Thurb. ex S. Wats. var. *glabrata* Vasey^a*Aristida glabrata* (Vasey) A.S. Hitchc.*Aristida divaricata* Humb. & Bonpl. ex Willd.*Aristida purpurea* Nutt.*Aristida purpurea* Nutt. var. *fendleriana* (Steud.) Vasey*Aristida fendleriana* Steud.*Aristida ternipes* Cav.*Aristida hamulosa* Henr.*Bothriochloa barbinodis* (Lag.) Herter^a*Andropogon barbinodis* Lag.*Bouteloua aristidoides* (Kunth) Griseb.*Bouteloua barbata* Lag.*Bouteloua chondrosioides* (Kunth) Benth. ex S. Wats.*Bouteloua chondrosioides* (H.B.K.) Benth*Bouteloua**curtipendula* (Michx.) Torr.*Bouteloua eludens* Griffiths*Bouteloua eriopoda* (Torr.) Torr.*Bouteloua gracilis* (Willd. ex Kunth) Lag. ex Griffiths*Bouteloua hirsuta* Lag.*Bouteloua parryi* (Fourn.) Griffiths*Bouteloua radicata* (Fourn.) Griffiths*Bouteloua repens* (Kunth) Scribn. & Merr.*Bouteloua rothrockii* Vasey*Bromus catharticus* Vahl*Bromus willdenowii* Kunth*Bromus porteri* (Coul.) Nash*Cenchrus spinifex* Cav.*Cenchrus insertus* M.A. Curtis*Chloris virgata* Sw.*Cottea pappophoroides* Kunth^a*Dasyochloa pulchella* (Kunth) Willd. ex Rydb.*Tridens pulchellus* (Kunth) A.S. Hitchc.*Digitaria californica* (Benth.) Henr.*Trichachne californica* (Benth.) Chase*Digitaria ciliaris* (Retz.) Koel.^a*Digitaria cognata* (J.A. Schultes) Pilger var. *cognata*^b*Leptoloma cognatum* (J.A. Schultes) Chase*Digitaria sanguinalis* (L.) Scop.^a*Echinochloa acuminata* (J. Presl) Kunth var. *acuminata*^a*Eriochloa gracilis* (Fourn.) A.S. Hitchc.*Echinochloa crus-galli* (L.) Beauv.^a*Elionurus barbiculmis* Hack.*Elymus elymoides* (Raf.) Swezey*Sitanion hystrix* (Nutt.) J.G. Sm.*Enneapogon desvauxii* Desv. ex Beauv.^a*Eragrostis cilianensis* (All.) Vign. ex Janchen*Eragrostis cilianensis* (All.) Mohser*Eragrostis curvula* (Schr.) Nees^a*Eragrostis chloromelas* Steud.*Eragrostis curvula* (Schr.) Nees var. *conferta* Stapf*Eragrostis intermedia* A.S. Hitchc.^a*Eragrostis lehmanniana* Nees^a*Eragrostis superba* Peyr.^a*Heteropogon contortus* (L.) Beauv. ex Roemer & J.A. Schultes^a*Hilaria belangeri* (Steud.) Nash*Koeleria macrantha* (Ledeb.) J.A. Schultes*Koeleria pyramidata* auct. p.p. non (Lam.) Beauv.*Leptochloa dubia* (Kunth) Nees*Lycurus phleoides* Kunth*Muhlenbergia arizonica* Scribn.*Muhlenbergia emersleyi* Vasey^a*Muhlenbergia polycaulis* Scribn.*Muhlenbergia porteri* Scribn. Ex*Muhlenbergia repens* (J. Presl) A.S. Hitchc.*Muhlenbergia rigida* (Kunth) Trin.*Muhlenbergia tenuifolia* (Kunth) Trin.*Muhlenbergia monticola* Buckl.*Panicum bulbosum* Kunth*Panicum plenum* Hitchc. & Chase*Panicum capillare* L.^a*Panicum hallii* Vasey var. *hallii*^a*Panicum hirticaule* J. Presl*Panicum obtusum* Kunth*Pappophorum vaginatum* Buckl.*Piptochaetium fimbriatum* (Kunth) A.S. Hitchc.*Poa bigelovii* Vasey & Scribn.*Poa fendleriana* (Steud.) Vasey*Polypogon viridis* (Gouan) Breistr.*Agrostis semiverticillata* (Forsk.) C. Chr.*Schizachyrium cirratum* (Hack.) Woot. & Standl.*Schizachyrium scoparium* (Michx.) Nash^b*Setaria grisebachii* Fourn.*Setaria viridis* (L.) Beauv.^a*Setaria vulpiseta* (Lam.) Roemer & J.A. Schultes*Setaria macrostachya* H.B.K.*Sorghum halepense* (L.) Pers.^a*Sporobolus airoides* (Torr.) Torr.*Sporobolus airoides* Torr.*Sporobolus contractus* A.S. Hitchc.*Sporobolus cryptandrus* (Torr.) Gray^a*Sporobolus wrightii* Munro ex Scribn.*Trachypogon spicatus* (L.) Kuntze*Trachypogon secundus* (J. Presl) Scribn.*Tragus berteronianus* J.A. Schultes*Tridens muticus* (Torr.) Nash*Urochloa arizonica* (Scribn. & Merr.) O. Morrone & F. Zuloaga*Panicum arizonicum* Scribn. & Merr.*Vulpia octoflora* (Walt.) Rydb. var. *hirtella* (Piper) Henr.*Festuca octoflora* Walt. ssp. *hirtella* Piper**Polemoniaceae***Gilia filiformis* Parry ex Gray*Gilia filiformis* Parry*Gilia leptomeria* Gray*Gilia rigidula* Benth.^a*Gilia sinuata* Dougl. ex Benth.*Gilia sinuata* Dougl.

(Con.)

Table 1—(Con.)

Ipomopsis longiflora (Torr.) V. Grant
Linanthus aureus (Nutt.) Greene

Polygalaceae

Eriogonum abertianum Torr.
Eriogonum thurberi Torr.
Eriogonum wrightii Torr. Ex
Polygala alba Nutt.
Rumex hymenosepalus Torr.

Portulacaceae

Calandrinia ciliata (Ruiz & Pavón) DC.^a
Cistanthe monandra (Nutt.) Hershkovitz
 Calyptidium monandrum Nutt.
Portulaca oleracea L.^a
Portulaca pilosa L.
Portulaca umbraticola Kunth
Talinum aurantiacum Engelm.
Talinum paniculatum (Jacq.) Gaertn.

Primulaceae

Androsace occidentalis Pursh

Pteridaceae

Astrolepis sinuata (Lag. ex Sw.) Benham & Windham ssp. *Sinuata*
 Notholaena sinuata (Lag. ex Sw.) Kaulfuss

Ranunculaceae

Anemone tuberosa Rydb.
Aquilegia chrysantha Gray
Clematis ligusticifolia Nutt.
Delphinium scaposum Greene

Rhamnaceae

Frangula californica (Eschsch.) Gray ssp. *ursina* (Greene) Kartesz
 & Gandhi
 Rhamnus californica Eschsch. ssp. *ursina* (Greene) C.B. Wolf
Zizyphus obtusifolia (Hook. ex Torr. & Gray) Gray
 Zizyphus obtusifolia (Hook. ex Torr. & Gray) var. *canescens*
 (Gray) M.C. Johnst.

Rosaceae

Cercocarpus montanus Raf. var. *glaber* (S. Wats.) F.L. Martin
 Cercocarpus betuloides Nutt.
Potentilla wheeleri S. Wats.
 Potentilla viscidula Rydb.
Prunus serotina Ehrh. var. *virgens* (Woot. & Standl.) McVaugh
Purshia stansburiana (Torr.) Henrickson
 Cowania mexicana D. Don var. *stansburiana* (Torr.) Jepson

Rubiaceae

Bouvardia ternifolia (Cav.) Schlecht.
 Bouvardia glaberrima Engelm.
Diodia teres Walt. var. *angustata* Gray
Galium aparine L.
Galium microphyllum Gray
Houstonia rubra Cav.
 Hedyotis rubra (Cav.) Gray
Mitracarpus breviflorus Gray

Sapindaceae

Sapindus saponaria L. var. *drummondii* (Hook. & Arn.) L. Benson

Saxifragaceae

Heuchera sanguinea Engelm.

Scrophulariaceae

Castilleja exserta (Heller) Chuang & Heckard ssp. *exserta*
 Orthocarpus purpurascens Benth. var. *palmeri* Gray
Castilleja integra Gray
Castilleja patriotica Fern.
Mimulus guttatus DC.
Nuttallanthus texanus (Scheele) D.A. Sutton
 Linaria texana Scheele
Penstemon barbatus (Cav.) Roth
Penstemon linarioides Gray
Penstemon pseudospectabilis M.E. Jones^a

Solanaceae

Chamaesaracha coniodes (Moric. ex Dunal) Britt.^a
Datura wrightii Regel
 Datura meteloides DC
Lycium torreyi Gray
Margaranthus solanaceus Schlecht.
Nicotiana obtusifolia Mertens & Galeotti var. *Obtusifolia*
 Nicotiana trigonophylla Dunal
Physalis crassifolia Benth.
Physalis hederifolia Gray var. *fendleri* (Gray) Cronq.^a
Solanum adscendens Sendtner
 Solanum deflexum Greenm.
Solanum douglasii Dunal
Solanum elaeagnifolium Cav.
Solanum heterodoxum Dunal var. *setigeroides* M.D. Whalen^a

Sterculiaceae

Ayenia insulicola Cristobal^a

Ulmaceae

Celtis laevigata Willd.
 Celtis reticulata Torr.
Celtis pallida Torr.

Urticaceae

Parietaria hespera Hinton

Verbenaceae

Aloysia wrightii Heller ex Abrams
 Aloysia wrightii (Grey) Heller
Glandularia wrightii (Gray) Umber
 Verbena wrightii Gray
Glandularia bipinnatifida (Nutt.) Nutt. var. *bipinnatifida*
 Verbena ambrosiifolia Rydb. ex Small
Tetradlea coulteri Gray
Verbena neomexicana (Gray) Small
Verbena stricta Vent.^a

Violaceae

Viola nephrophylla Greene

Viscaceae

Phoradendron californicum Nutt.^a

Vitaceae

Vitis arizonica Engelm.

Zygophyllaceae

Kallstroemia grandiflora Torr. ex Gray
 Kallstroemia grandiflora Torr.
Larrea tridentata (Sessé & Moc. ex DC.) Coville
 Larrea tridentata (DC) Coville
Tribulus terrestris L.

^aRecent additions (1984 to 1996) by A. Medina and R. Mays.

^bAdditions from the University of Arizona Web list.