

MOHAVE COUNTY FLORA

- 1 Plants reproducing by spores, these released from sporangia **Fern and Fern Allies**
- 1 Plants reproducing by seeds, these released from flowers or woody cones (berry-like in Juniper)
 - 2 Seeds released from woody cones, no real flowers present **Cone-bearing Plants**
 - 2 Seeds released from flowers, these having calyx , petals, stamens and pistles, one or the other may be missing but not all at once
 - 3 Plants obviously parasitic, lacking chlorophyll, or if chlorophyll present, than plants attached to trees or shrubs
 - 4 Plants never attached to the ground (Page) **Viscaceae**
 - 4 Plants attached to the ground (Page) **Orobanchaceae**
 - 3 Plants not obviously parasitic
 - 5 Plants fleshy, with leaves replaced by spines or small, barbed, deciduous bristles **Cactaceae**
 - 5 Plants woody or herbaceous, usually with well developed leaves, at least in season
 - 6 Plants bearing thorns , spines, stinging hairs, or branchlets spinescent at tips **Group 1**
 - 6 Plants lacking the above
 - 7 Sap milky **Group 2**
 - 7 Sap clear or some other color
 - 8 Plants woody, vines, subshrubs, shrubs or trees
 - 9 Plants woody vines with tendrils **Vitaceae**
 - 9 Plants not woody vines
 - 10 Leaves 2, fused at base appearing 2-lobed (*Larrea*) **Zygophyllaceae**
 - 10 Leaves not as above
 - 11 Leaves pinnate, pinnately lobed or palmately lobed **Group 3**
 - 11 Leaves not as above, sometimes scale-like **Group 4**
 - 8 Plants herbaceous, sometimes $\pm$ woody-like at their very base
 - 12 Calyx and petals lacking or not recognizable as such; pseudoperianth (bracts or a perianth-like involucre) present or lacking, some of these bracts are called scales (calyx present in some in the form of bristles) or glumes (perianth present in the form of lodicules (grass or grass-like plants)
 - 13 Fruit an achene; the nodes are not easily found; stems usually having pith; anthers base-fixed **Cyperaceae**
 - 13 Fruit a caryopsis; the nodes are usually easily found; stem mostly round and hollow; anthers versatile **Poaceae**
 - 12 Calyx and or petals or both present (not grass-like plants)
 - 14 Flowers composed of banner, wing and 2 petals fused forming the keel, if flowers not composed as such, than the stamens are the most conspicuous feature **Fabaceae**
 - 14 Flowers with petals not as above or stamens not the conspicuous feature
 - 15 Flowers composed of an involucre; fruit inferior; calyx lacking or present as pappus; petals connate, outer rows often with an expanded ligule (ray flower) these never perfect; anthers fused **Asteraceae**
 - 15 Flowers may be composed of one or the other of the above, but no combination of the above
 - 16 Perianth bearing a single whorl, either calyx or petals present, sometimes both are present but one or the other are very inconspicuous; plants are included here that lose their calyx at flowering time **Group 5**
 - 16 Perianth with a double whorl, calyx and petals present; calyx and petals dissimilar or similar
 - 17 Petals, calyx irregular or calyx spurred and petaloid **Group 6**
 - 17 Petals and calyx regular; calyx not both spurred and petaloid
 - 18 Petals 3, calyx 3 and are $\pm$ same color (Monocots) **Group 7**
 - 18 Petals other than 3 and calyx other than 3 and are different in color (Diocots)
 - 19 Flowers bearing a hypanthium **Group 8**
 - 19 Flowers lacking a hypanthium
 - 20 Petals fused for some distance **Group 9**
 - 20 Petals free **Group 10**

Group 1. PLANTS SPINESCENT ON SOME PART, BEARING THORNS, SPINES, OR STINGING HAIRS

- 1 Fruit bearing spines
 - 2 Flowers perfect **Zygophyllaceae**
 - 2 Flowers imperfect; staminate elevated above the pistillate (*Ambrosia*) **Asteraceae**
- 1 Fruit lacking spines
 - 3 Leaves very long ending in a long straight spine-like tip **Agavaceae**
 - 3 Leaves otherwise
 - 4 Plants shrubs to small trees

- 5 Leaves bearing short spines on the teeth
 - 6 Leaves pinnate **Berberidaceae**
 - 6 Leaves simple
 - 7 Leaves concave, teeth fine **Rhamnaceae**
 - 7 Leaves often wavy margined, teeth coarse **Fagaceae**
- 5 Leaves lacking spines
 - 8 Branchlets or stems bearing thorns, these often at the nodes
 - 9 Leaflets 10 or more **Fabaceae**
 - 9 Leaflets less than 10 **Rosaceae**
 - 8 Branchlets or twigs spinescent at their tip, (not true thorns)
 - 10 Leaves small and scale-like, soon deciduous, tree always looking naked **Celastraceae**
 - 10 Leaves larger, more persistent, shrubs not always looking naked
 - 11 Leaves in fascicles either at the base of the spines and nodes or at the end of the short twigs
 - 12 Leaves narrowly lanceolate **Rosaceae**
 - 12 Leaves broader, not lanceolate
 - 13 Leaves at the base of the spines or nodes **Solanaceae**
 - 13 Leaves at the end of the twigs **Rhamnaceae**
 - 11 Leaves not in fascicles
 - 14 Leaves short-hairy on the lower surface, yellow pine belt **Rhamnaceae**
 - 14 Leaves glabrous, below yellow pine belt
 - 15 Calyx inflated like a bladder **Laminaceae**
 - 15 Calyx lacking or minute **Oleaceae**
- 3 Plants herbs
 - 16 Herbage having stinging hairs **Euphorbiaceae**
 - 16 Herbage lacking stinging hairs
 - 17 Herbage stellate or scaley stellate (hairs fused in center) **Solanaceae**
 - 17 Herbage glabrous or with other kinds of hair
 - 18 Flower with well developed white petals **Papaveeraceae**
 - 18 Flowers lacking obvious petals **Asteraceae**

Group 2. PLANTS HAVING MILKY SAP

- 1 Flowers composed of many strap-shaped corollas **Asteraceae**
- 1 Flowers not as above
 - 2 Petals lacking (appendages that are attached to the gland $\pm$ petal-like) **Euphorbiaceae**
 - 2 Petals present
 - 3 Corolla tubular **Apocynaceae**
 - 3 Corolla not tubular **Asclepiadaceae**

Group 3. PLANTS WOODY ABOVE BASE; LEAVES PINNATE OR LOBED, PALMATELY LOBED

- 1 Leaves palmately lobed **Aceraceae**
- 1 Leaves pinnate or pinnately lobed
 - 2 Leaves trifoliate
 - 3 Leaves having shallow lobes **Anacardiaceae**
 - 3 Leaves lacking shallow lobes, serrulate to irregularly serrate-dentate
 - 4 Leaves bright green and $\pm$ glossy above, below with prominent whitish veins, attenuate to acuminate at tips **Rutaceae**
 - 4 Leaves not as above **Aceraceae**
 - 2 Leaves with over 3 leaflets or pinnately lobed
 - 5 Leaves pinnate
 - 6 Inflorescence a flat topped panicle of cymes **Caprifoliaceae**
 - 6 Inflorescence otherwise
 - 7 Leaves odd pinnate (rachis ending with a single leaf)
 - 8 Leaves lacking gland dots; flowers lacking petals; fruit a nut or samara
 - 9 Leaves fairly strong scented; fruit a nut **Juglandaceae**
 - 9 Leaves not strong scented; fruit a samara **Oleaceae**
 - 8 Leaves having gland dots; flowers having petals, entire; fruit a pod **Fabaceae**
 - 7 Leaves even pinnate (rachis ending with a pair of leaves) **Sapindaceae**

- 5 Leaves pinnately lobed **Rosaceae**

Group 4. PLANTS SUBSHRUBS, SHRUBS, OR TREES; LEAF MARGINS NOT LOBED

- 1 Inflorescence a catkin (only the staminate one in **Fagaceae**)
 - 2 Plants with both staminate and pistillate catkins, but plants staminate entirely or pistillate entirely
 - 3 Leaves thick and leathery, opposite, evergreen (Page) **Garryaceae**
 - 3 Leaves thinner, alternate, falling off at the end of the season (Page) **Salicaceae**
 - 2 Plants with staminate catkins only, pistillate flowers not in catkins, both staminate and pistillate flowers on the same plant (Page) **Fagaceae**
- 1 Inflorescence not a catkin
 - 4 Leaves scale-like **Tamaricaceae**
 - 4 Leaves larger, not scale-like
 - 5 Stems and branches with reddish smooth bark **Ericaceae**
 - 5 Stems and branches not as above
 - 6 Branches and upper surface of the leaves sticky glutinous **Hydrophyllaceae**
 - 6 Branches and upper surface of the leaves not sticky glutinous
 - 7 Petals erose-ciliate; filaments of the stamens petaloid extending as 2 linear to subulate lobes beyond the anthers **Hydrangeaceae**
 - 7 Petals and filaments not as above
 - 8 Plants with pistillate flowers lacking sepals or petals, enclosed by the bracts; fruit 4-winged **Chenopodiaceae**
 - 8 Plants not as above
 - 9 Branchlets 4-angled
 - 10 Leaves 2.5-5 cm long, herbage not aromatic **Oleaceae**
 - 10 Leaves 0.5-1.5 cm long, herbage aromatic **Verbenaceae**
 - 9 Branchlets not obviously 4-angled
 - 11 Leaf blade 3-8 cm long and 3-8 cm wide, widely ovate to widely elliptic $\pm$ leathery, folded along midrib **Anacardiaceae**
 - 11 Leaf blade not combining the above characters
 - 12 Leaves asymmetrical at base, reticulate-veined on the upper surface, rough **Ulmaceae**
 - 12 Leaves not as above
 - 13 Inflorescence umbellate; sepals petaloide, petals lacking **Polygonaceae**
 - 13 Inflorescence not in all respects as above
 - 14 Leaves 10-26 cm long, linear or lance-linear **Bignoniaceae**
 - 14 Leaves less than 10 cm long
 - 15 Style plumose, elongating **Rosaceae**
 - 15 Styles not as above
 - 16 Petals lacking; plants becoming a well developed tree (except suckers) **Ulmaceae**
 - 16 Petals present; shrubs
 - 17 Petals fused for some distance
 - 18 Ovary superior **Solanaceae**
 - 18 Ovary inferior
 - 19 Calyx reduced to bristles or awns; flower yellow **Asteraceae**
 - 19 Calyx not as above; flowers whitish to pale pink **Caprifoliaceae**
 - 17 Petals separate, inserted on a hypanthium
 - 20 Hypanthium tubular, elongate, petaloide **Grossulariaceae**
 - 20 Hypanthium not as above
 - 21 Stamens + 10 **Rosaceae**
 - 21 Stamens fewer than 5 **Rhamnaceae**

Group 5. PERIANTH IN A SINGLE WHORL

- 1 Calyx obviously petaloide
- 2 Calyx pale pink, red, magenta **Nyctaginaceae**
- 2 Calyx white, yellow, pale reddish
 - 3 Tepals appearing as lobes on the hypanthium, each bearing a tuft of hairs behind and $\pm$ adherent to the stamen **Santalaceae**

- 3 Tepals not as above
 - 4 Flowers subtended by a connate involucre **Polygonaceae**
 - 4 Flowers not subtended by a connate involucre
 - 5 Inflorescence umbellate **Apiaceae**
 - 5 Inflorescence not umbellate **Ranunculaceae**
- 1 Calyx not obviously petaloid
 - 6 Leaves pinnatifid
 - 7 Petals yellow; calyx lost at flowering time leaving a scar; plants monocious..... **Papaveraceae**
 - 7 Petals lacking; calyx greenish; plants dioecious **Ranunculaceae**
 - 6 Leaves simple
 - 8 Leaves whorled **Rubiaceae**
 - 8 Leaves not whorled
 - 9 Stipules present (*Rumex*) **Polygonaceae**
 - 9 Stipules lacking
 - 10 Plants mealy pubescent on some part or throughout **Chenopodiaceae**
 - 10 Plants otherwise **Amaranthaceae**

Group 6. FLOWERS IRREGULAR or CALYX SPURRED AND PETALOID

- 1 Calyx petaloid, spurred **Ranunculaceae**
- 1 Calyx greenish not petaloid, not spurred
 - 2 Petals free **Violaceae**
 - 2 Petals forming a tube
 - 3 The style arising between the lobes of the ovary or almost from apex; fruit nutlets
 - 4 Flowers strongly irregular **Lamiaceae**
 - 4 Flowers slightly irregular **Verbenaceae**
 - 3 The style $\pm$ arising from the top of the ovary; fruit a capsule
 - 5 Stigma $\pm$ capitate to obviously so or remotely divided into 2 lobes; capsule less than 2 cm long **Scrophulariaceae**
 - 5 Stigma divided into 2 obvious lobes; capsule over 2 cm long **Martyniaceae**

Group 7. CALYX 3 AND PETALS 3, OFTEN SIMILAR IN COLOR (MONOCOTS)

- 1 Ovary inferior **Iridaceae**
- 1 Ovary superior or rarely slightly inferior
 - 2 Perianth not petaloid **Juncaceae**
 - 2 Perianth petaloid
 - 3 Inflorescence a umbel, subtended with spathe-like bracts **Alliaceae**
 - 3 Inflorescence not a umbel or subtended with spathe-like bracts
 - 4 Petals orange or yellow **Calochortaceae**
 - 4 Petals white **Convallariaceae**

Group 8. FLOWERS BEARING A HYPANTHIUM

- 1 Pistils numerous (one per each fruit), fruit many on a common receptacle **Rosaceae**
- 1 Pistils 1, lacking a common receptacle
 - 2 Petals not real obvious, linear to filiform, easily mistaken for filaments **Saxifragaceae**
 - 2 Petals more obvious often quite showy
 - 3 Herbage bearing glochidiate hairs **Loasaceae**
 - 3 Herbage glabrous or with other kinds of hairs
 - 4 Sepals small teeth on the apex of the floral tube; ovary superior **Lythraceae**
 - 4 Sepals quite well developed; ovary inferior **Onagraceae**

Group 9. PETALS FUSED FOR SOME DISTANCE FORMING A COROLLA TUBE (DIOCOTS)

- 1 Plants scapose, lacking cauline leaves; corolla scarious **Plantaginaceae**
- 1 Plants with cauline leaves or a whorl of bracts
 - 2 Leaves sagittate; corolla lobes not obvious **Convolvulaceae**

- 2 Leaves otherwise; corolla lobes usually obvious
- 3 Ovary inferior; corolla often with a short spur..... **Valerianaceae**
- 3 Ovary superior; corolla lacking a short spur
- 4 Stamens 2..... **Oleaceae**
- 4 Stamens 4 or 5
- 5 Corolla lobes 4..... **Gentianaceae**
- 5 Corolla lobes 5
- 6 Plants with a basal rosette, stems naked with a whorl of bracts subtending umbellate flowers; corolla not any longer than the calyx..... **Primulaceae**
- 6 Plants not composed of the above combination
- 7 Stamens 4; leaves pinnatifid **Verbenaceae**
- 7 Stamens 5, or if 4 than a staminode present; leaves simple or pinnatifid
- 8 Flowers red; stamens 4 + a staminode **Scrophulariaceae**
- 8 Flowers not red; stamens 4
- 9 Style 3-cleft..... **Polemoniaceae**
- 9 Style 2-cleft or simple; flowers not in heads
- 10 Ovary not lobed, style inserted on top; fruit a capsule or a berry
- 11 Style 1, unbranched.....(Page) **Solanaceae**
- 11 Styles 2 or if 1 than it is branched.....(Page) **Hydrophyllaceae**
- 10 Ovary 1-4 lobed, style fastened between the lobes, fruit falling away leaving style (nutlets) ... (Page) **Boraginaceae**

Group 10. PETALS SEPARATE, STAMENS OVER TWICE AS MANY AS THE PETALS (DIOCOTS)

- 1 Sepals 2..... **Portulacaceae**
- 1 Sepals more than 2..... (Page) **Malvaceae**

Group 11. PETALS SEPARATE, STAMENS NOT MORE THAN TWICE AS MANY AS THE PETALS (DIOCOTS)

- 1 Style 2-8-cleft
- 2 Flowers yellow..... **Linaceae**
- 2 Flowers whitish..... **Caryophyllaceae**
- 1 Style not or only slightly cleft at the apex
- 3 Sepals 4, fruit a silique or silicle; sometimes indehiscent and 1-celled or separating across into 1-seeded joints (Page) **Brassicaceae**
- 3 Sepals mostly 5
- 4 Flowers other than yellow..... (Page) **Geraniaceae**
- 4 Flowers orange or yellow..... **Zygophyllaceae**

FERNS AND FERN ALLIES

- 1 Stems hollow and having a sheath at the nodes, not developing anything that looks like leaves **Equisetaceae**
- 1 Stems solid and sheath-less at the nodes
- 2 Plants prostrate forming mats; leaves overlapping on the stems..... **Selaginellaceae**
- 2 Plants erect; usually forming clumps; pinnae not overlapping on the stems
- 3 Sori marginal, covered by the reflexed margin, if decurrent on the veins, than lower surface having waxy scales that appear golden powdery..... **Sinopteridaceae**
- 3 Sori separate from the margin, not having waxy scales
- 4 Sori lacking a covering even when young (no indusia); 1-pinnate with sessile pinnae (Woodsiaceae included here because indusia are sometimes hard to see or soon disappearing) **Woodsiaceae**
- 4 Sori with a covering (has indusia), easily overlooked in Woodsiaceae
- 5 Indusium umbrella-shaped or reniform; plants large **Dryopteridaceae**
- 5 Indusium cup-like **Woodsiaceae**

AZOLLACEAE Mosquito Fern Family

AZOLLA

***Azolla filiculoides* Lam.**

LARGE MOSQUITO FERN. Sluggish water. Big Sandy River 12 0263 600E 38 38 564N Clifton 39840.

DRYOPTERIDACEAE Wood Fern Family**DRYOPTERIS** Wood Fern***Dryopteris filix-mas* (L.) Schott**

MALE FERN. In rich soil among rocks, crevices and along streams, above 6500 ft.

EQUISETACEAE Horsetail Family**EQUISETUM** Horsetail, Scouring-Rush

- 1 Sterile stems green, having many branches; fertile stems dirty white, lacking branches, withering early..... ***E. arvense***
 1 Stems not of 2 kinds, all green, branchless or rarely with a few branches ***E. laevigatum***

***Equisetum arvense* L.**

FIELD or COMMON HORSETAIL. Alluvial situations, along rivers, streams and open meadows, below 8000 ft.

***Equisetum laevigatum* A. Braun**

SMOOTH SCOURING-RUSH. Along flowing streams, about 2215 ft. Sometimes these plants have a few sterile branches.

Mar-Apr. Six Mile Crossing 12 0284 168E 38 26 800N Clifton 39466. [*E. kansanum* Schaffn., *E. funstonii* A.A. Eat.].

MARSILEACEAE Water-Clover Family**MARSILEA** Water-Clover***Marsilea vestita* Hook. & Grev.**

HAIRY WATER-CLOVER or PEPPERWORT. Edges of ponds, ditches and rivers. Six Mile Crossing 12 0284 432E 38 26 971N Clifton 28259.

SELAGINELLACEAE Spike-Moss Family**SELAGINELLA** Mossfern; Spike-Moss

- 1 Apical seta less than .075 mm long white, bearing short cilia ***S. leucobryoides***
 1 Apical seta 1-2 mm long, greenish, lacking or having only a very few short cilia..... ***S. underwoodii***

***Selaginella leucobryoides* Maxon**

MOHAVE SPIKE-MOSS. Clay Springs Road 12 0241 354E 39 57 309N Clifton 39381.

***Selaginella underwoodii* Hieron.**

UNDERWOOD'S SPIKE-MOSS. Crevices and rocky ledges in limestone, above 4900 ft.

SINOPTERIDACEAE Maiden-Hair Family

[Pteridaceae]

- 1 Fronds with some part bearing hairs or scales
 3 Upper surface of the laminae lacking stellate scales ***Cheilanthes***
 3 Upper surface of the laminae bearing stellate scales ***Astroblepis***
 1 Fronds with no part bearing hairs or scales
 2 Lamina thin, broadly fan shaped..... ***Adiantum***
 2 Lamina thicker, shaped otherwise
 3 Margins of laminae recurved hiding the sori ***Pellaea***
 3 Margins of laminae not hiding the sori ***Argyrochosma***

ADIANTUM

***Adiantum capillus-veneris* L.**

SOUTHERN MAIDENHAIR. Colorado River 11 0704 359E 39 86 544N Clifton 39210.

ARGYROCHOSMA***Argyrosma jonesii* (Maxon) M. Windham**

JONES' FALSE CLOAK FERN. Grapevine Canyon 12 0233 746E 39 75 700N, Clay Springs Road 12 0241 354E 39 57 309N Clifton 39377.

ASTROLEPIS***Astrolepis cochisensis* D. Benham & M. Windham**

COCHISE SCALY CLOAK FERN. Kaiser Spring Wash 12 0272 294E 38 29 368N Clifton 39834.

CHEILANTHES Lip Fern

Note: The plants that include *C. covillei*, *L. fendleri*, and *L. wootonii* have not read the book so that they know how to behave. The characters used to separate each of them often are lacking on one or the other. It also seems no one author can agree as to which plants fit which species. Some of the plants have long narrow scale protruding from below making the top of the frond look like it has some scales, this should make these plants *C. lindheimeri*, but they lack some of the other characters and they are out range. Some of these plants would qualify for one of the above 3 except the scales on the stipe lack long hairs or long teeth at their base. So plants are placed in each of the above 3 based on what they look like rather than based on the characters given in keys.

- 1 Lower surface of fronds having linear-lanceolate to lanceolate scales
- 2 The scales at the base of the stipe almost entirely dark brown with a very narrow light brown margin; long, narrow scales protruding to the top of the frond (This doesn't completely fit the plants in California)..... ***C. covillei***
- 2 The scales at the base of the stipe tan or with a narrow dark center; narrow scales not protruding to upper surface
- 3 The scale of the fronds lacking long, curly hairs at their base, bottom surface with the ends exposed..... ***C. fendleri***
- 3 The scales of the fronds with margins bearing long curly hairs, bottom surface completely covered ***C. wootonii***
- 1 Lower surface of frond bearing curly hairs, no scales
- 4 Upper surface with thick intertwining curly hairs; the petiole and leaf axis often with some of the hairs glandular ***C. parryi***
- 4 Upper surface with the hairs sparse, not intertwining; the petiole and leaf axis lacking any glandular hairs ***C. feei***

***Cheilanthes covillei* Maxon**

COVILLE'S LIP FERN. Steep rocky slopes or cliffs, 2000-5000 ft. Alamo Road 12 0230 158E 38 45 594N Clifton 38803, North Fork Knight Creek 12 0277 379E 38 90 789N Clifton 39881.

***Cheilanthes feei* Moore**

SLENDER LIP FERN. Widely scattered, 2000- 7000 ft.; crevices in rock faces, often on limestone. Clay Springs Road 12 0241 354E 39 57 309E Clifton 39378, Grapevine Canyon 12 0233 685E 39 75 633N Clifton 41340.

***Cheilanthes fendleri* Hook.**

FENDLER'S LIP FERN. Below rocks, along margins of shrubs, 4000-6500 ft. Antelope Wash 12 0238 241E 38 84 500N Clifton 39395, Wheeler Wash 12 0238 867E 38 86 324N Clifton 40926.

***Cheilanthes parryi* (D.C. Eat.) Domin**

PARRY'S CLOAK FERN. Crevices in rock, bluff, and cliffs. below 5000 ft. Oatman Road 11 0743 106E 38 80 133N Clifton 38752, *Notholaena* p. D.C. Eat.]

***Cheilanthes wootonii* Maxon**

WOOTON'S LIP FERN. Rock-crevices, among boulders, and ledges, throughout.

PELLAEA Cliff-Brake

- 1 Rays simple pinnate; pinnules fairly broad, not as recurved..... ***P. truncata***
- 1 Rays with most of the lower bipinnate; pinnules appear narrow because the margins are strongly recurved ***P. mucronata***

***Pellaea mucronata* (D.C. Eat.) D.C. Eat.**

BIRD'S-FOOT FERN. This taxon grows close to the next and there often looks like there are crosses. Cook Canyon 11 0765 309E 38 98 666N Clifton 39235.

***Pellaea truncata* Goodding**

SPINY CLIFF-BRAKE. Dry rocky or gravelly slopes Sawmill Canyon 12 0230 711E 38 94 161N Clifton 38623, Oatman Road 11 0743 165E 38 80 133N Clifton 38753, Sawmill Canyon 11 0768 485E 38 95 102N Clifton 38780.

WOODSIACEAE Cliff Fern Family

[Dryopteridaceae]

- 1 Indusium hood-like, attached at base, its free tip arched over the sorus and commonly thrown back as the sorus expands *Cystopteris*
- 1 Indusium attached under the sorus, plate-like with radiating, inconspicuous segments *Woodsia*

CYSTOPTERIS Bladder Ferns

Cystopteris fragilis (L.) Bernh

BRITTLE FERN. Moist rocky places that are somewhat shaded, above 5000ft. Hualapai Mountain County Park 12 0235 565E 38 87 050N Clifton 41392.

WOODSIA Cliff Fern

Woodsia oregana D.C. Eat.

WESTERN CLIFF FERN. Dry rocky areas or cliffs, above 5500 ft. Wheeler Wash 12 0238 867E 38 86 324N Clifton 40925, Hualapai Mountain County Park 12 0236 100E 38 87 050N Clifton 41378, Mt. Trumbull 12 0308 817E 40 29 918N.

CONE-BEARING PLANTS

- 1 Stems continuous, lacking joints; branches covered by bark, not photo synthetic *Pinaceae*
- 2 Leaves needle-like *Cupressaceae*
- 2 Leaves of overlapping scales, or if needle-like than overlapping *Ephedraceae*
- 1 Stems jointed, branches green, photo synthetic *Ephedraceae*

CUPRESSACEAE Cypress Family

JUNIPERUS Juniper

- 1 Branchlets most often flattened; leaves entire..... *J. scopulorum*
- 1 Branchlets not flattened; leaves minutely denticulate
- 2 Scale-like leaves lacking an obvious gland on the upper surface..... *J. osteosperma*
- 2 Scale-like leaves generally with a well developed gland on the upper surface toward their base
- 3 Scale-like leaves generally in 3's, the upper young scales may be in 2's..... *J. californica*
- 3 Scale-like leaves generally in 2's..... *J. monosperma*

Juniperus californicus Carr.

CALIFORNIA JUNIPER. The end branchlet on some of our plants have the scales in 2's and 3's, but on the older part of the branch they are in 3's. Oatman Road 11 0741 956E 38 80 152N Clifton 38890

Juniperus monosperma (Engelm.) Sarg.

ONE-SEEDED JUNIPER. Poachie Range 12 0271 934E 38 16 474N Clifton 39010, Knight Creek 12 0276 558E 38 89 296N Clifton 39905.

Juniperus osteosperma (Torr.) Little

UTAH JUNIPER. Mountain slopes and flats, below 7000 ft. Mt Trumbull Loop 12 0324 500E 40 41 400N Clifton 41715.

Juniperus scopulorum Sarg.

ROCKY MOUNTAIN JUNIPER. Widely scattered, above 4000 ft.; most often in riparian or close by.

EPHEDRACEAE Ephedra Family

EPHEDRA

- 1 Leaf-scales generally 3
 - 2 Tip of twig thorn-like; leaf sheath fibrous, persistent *E. trifurca*
 - 2 Tip of twig not thorn-like; leaf sheath not persistent
 - 3 Pollen cones 5-7 mm long, seed cones 10-12 mm long; seeds not exerted *E. torreyana*
 - 3 Pollen cones and seed cones about the same length; seed exposed for some distance above cone *E. funerea*
- 1 Leaf-scales generally 2
 - 6 Leaves deciduous except their base; seeds generally 2
 - 7 Twigs divergent, pale green, bluish in the grooves, giving the plants a blue-gray color, lacking papillae on the ridges; some of cones on stalks up to 6 mm long *E. nevadensis*
 - 7 Twigs tending to be parallel like the straws of a broom, green, with sparse rough papillae on the ridges; none of the cones on stalks as long as 6 mm *E. viridis*
 - 6 Leaves persistent; seeds generally 1
 - 8 Seed smooth *E. aspera*
 - 8 Seed furrowed *E. fasciculata*

Ephedra aspera S. Wats.

ROUGH EPHEDRA. Old Trails Road 11 0767 962E 38 95 613N Clifton 38649, Alamo Road 12 0257 063E 37 98 762N Clifton 38875. [*E. nevadensis* S. Wats. var. *a.* L. Benson]

Ephedra fasciculata A. Nels.

ARIZONA EPHEDRA. There are two name varieties based on the length and shape of the cone but that doesn't appear to be enough different to warrant a distinction. Aubrey Hills 11 0756 950E 38 10 077N Clifton 39267.

Ephedra funerea Cov. & C. Morton

DEATH VALLEY EPHEDRA.

Ephedra nevadensis S. Wats.

NEVADA EPHEDRA. Grapevine Spring Wash 11 0765 292N 38 99 449N Clifton 38936, White Cliffs 11 0768 927E 38 99 233N Clifton 39258.

Ephedra torreyana S. Wats.

TORREY'S EPHEDRA. Detrital Valley 11 0727 240E 39 78 669N Clifton 39690.

Ephedra trifurca Torr.

LONG-LEAVED EPHEDRA. Blankenship Valley 738 724E 38 30 443N Clifton 43365

Ephedra viridis Cov.

MORMON TEA. Slopes in pinyon-juniper, 4000-7000 ft. Big Wash Road 11 0754 851E 39 27 961N Clifton 39670. [*E. nevadensis* var. *v.* (Cov.) M.E. Jones].

PINACEAE Pine Family

- 1 Needles in bundles *Pinus*
- 1 Needles single
 - 2 Cones erect, not found laying on the ground whole *Abies*
 - 2 Cones pendulous, found laying on the ground whole *Pseudotsuga*

ABIES Fir

Abies concolor (Gord. & Glend.) Lindl. var. *concolor*

WHITE FIR. Mountain slopes and ridges, above 6500 ft. Hayden Peak 12 0235 129E 38 86 240N Clifton 40726.

PINUS Pine

- 1 Needles 1 or 2, short
 - 2 Needles 1 *P. monophylla*
 - 2 Needles 2 *P. edulis*
- 1 Needles 3, long *P. ponderosa*

Pinus edulis Engelm.

TWO-NEEDLE PINYON. Mt Trumbull Loop 12 0324 500E 40 41 400N Clifton 41716.

Pinus monophylla Torr. & Frém.

SINGLE-LEAF PINYON. Mountain slopes and flats, below 6500 ft. Packsaddle Campground 11 0756 950E 39 26 719N Clifton 42181.

Pinus ponderosa Dougl. var. ***scopulorum*** Engelm.

WESTERN YELLOW PINE. Slopes and ridges, above 6000 ft..

PSEUDOTSUGA***Pseudotsuga menziesii*** (Mirb.) Franco var. ***glauca*** (Mayr) SudworthDOUGLAS FIR. Slopes, ridges and canyons, above 6500 ft. [*P. taxifolia* (Poir.) Britt.]**FLOWERING PLANTS****DICOTS**

Shrub species Cerbat Canyon 11 0762 552E 39 10 932N Clifton 39327

ACERACEAE Maple Family**ACER** Maple

- 1 Leaves trifoliate ***A. negundo*** var. ***interius***
 1 Leaves simple ***A. grandidentatum***

Acer grandidentatum Nutt.

BIT-TOOTH MAPLE. Found in the conifer belt in canyons and mesic slopes, below 7000 ft. Apr. Hualapai Mountain County Park 12 0235 936E 38 87 017N Clifton 41381.

Acer negundo L. var. ***interius*** (Britt.) Sarg.

BOX ELDER. Found in drainages and along mountain roads, below 8000 ft. May-June. Wheeler Wash 12 0237 778E 38 85 538N Clifton 40692.

AIZOACEAE Carpet-weed Family

- 1 Plants perennial; calyx lobes hooded or beaked, outer surface papillate; leaf pairs similar ***Sesuvium***
 1 Plants annual; calyx not hooded or beaked, outer surface not papillate; leaf pairs dimorphic ***Trianthema***

SESUVIUM***Sesuvium verrucosum*** Raf.

SEA-PURSLANE. Highway 95 11 0719 614E 38 62 129N Clifton 39955.

TRIANTHEMA***Trianthema portulacastrum*** L.

DESERT HORSE-PURSLANE. West Spring St. 11 0767 404E 38 98 151N Clifton 41326.

AMARANTHACEAE Amaranth Family

- 1 Herbage white with branched hairs ***Tidestromia***
 1 Herbage not as above ***Amaranthus***

AMARANTHUS Amaranth

Note: This group of plants is in great need of a complete overhaul as there are not any Floras that agrees with each other. Some plants fit the keys while a good share don't. The keys are not very good as they miss most of the key characters that are

real obvious. Either that or a lot of these plants have never been collected.

- 1 Flower glomerules turgid, falling as a unit; utricle indehiscent; styles 2; inflorescence axillary *A. turgidus*
- 1 Flower glomerules not turgid, not falling as a unit; utricle circumscissile; inflorescence terminal or axillary; styles 2 or 3
 - 2 _ flowers lacking
 - 3 Inflorescence axis and bracts short glandular hairy (sometimes sparsely so)..... *A. watsonii*
 - 3 Inflorescence axis glabrous villous *A. palmeri*
 - 2 _ flowers the dominate part of the inflorescence
 - 4 Inflorescence ending in terminal spikes, these short or long
 - 5 Sepals of the _ flowers fimbriate *A. fimbriatus*
 - 5 Sepals of the _ flowers entire to slightly toothed
 - 6 Inflorescence axis short glandular hairy (sometimes sparsely so)..... *A. watsonii*
 - 6 Inflorescence axis glabrous, villous or slightly villous-glandular
 - 7 Styles very obviously hairy..... *A. palmeri*
 - 7 Styles not hairy or only shortly so
 - 7 Pistillate sepals with an obvious claw, tip quit a bit wider
 - 8 Sepals of pistillate flowers becoming recurved and readily disarticulate from the bracts *A. retroflexus*
 - 8 Sepals otherwise
 - 9 Flower cluster scattered to the base of plant *A. torreyi*
 - 9 Flower clusters well above base ($\pm$ half the height of plant)
 - 10 Tepals of the pistillate flowers acute, most often shorter than the fruit..... *A. hybridus*
 - 10 Tepals of the pistillate flowers emarginate or retuse (rarely outer one pungent) most often longer than the fruit..... *A. wrightii*
 - 4 Flowers only in axillary bunches *A. blitoides*

***Amaranthus albus* L.**

TUMBLEWEED. Fort Rock Exit 12 0284 600E 38 96 492N Clifton 40754.

***Amaranthus blitoides* S. Wats.**

MAT AMARANTH. Sandy valley floors, other sandy areas, waste places. July-Oct. Hualapai Mountain Road 12 0230 765E 38 94 437 Clifton 38586. [*A. graecizans* auct. non L., may be misapplied depending if it is different than the one from Europe].

***Amaranthus fimbriatus* (Torr.) Benth.**

FRINGED AMARANTH. Gravelly slopes, sandy places, below 5000 ft. Aug.-Nov. Hualapai Mountain Road 12 0230 765E 38 94 437E Clifton 38584

***Amaranthus hybridus* L.**

HYBRID AMARANTH. Waste places along roads, below 8000 ft. June-Aug.

***Amaranthus palmeri* S. Wats.**

PALMER'S AMARANTH. Highway 95 11 0719 614E 38 62 129N Clifton 39958, N. Burbank St. 11 0770 498E 39 01 605N Clifton 26232.

***Amaranthus pringlei* S. Wats.**

PRINGLE'S AMARANTH.

***Amaranthus retroflexus* L.**

RED-ROOT AMARANTH. Truxton 12 0268 229E 39 29 750N Clifton 41374.

***Amaranthus torreyi* (A. Gray) Benth.**

TORREY'S AMARANTH. Hualapai Mountain Road 12 0230 765E 38 94 437N Clifton 38583, Blake Ranch Road 12 0245 741E 38 95 872N Clifton 10358, Willow Creek Ranch 12 0277 084E 38 96 090N Clifton 8232, Old 66 12 0285 250E 39 36 800N Clifton 41370.

***Amaranthus turgidus* G. Clifton sp. nov.**

SWOLLEN AMARANTH. Old Highway 66 12 0285 250E 39 36 800N Clifton 41365, Willow Ranch 12 0278 062E 38 96 327 Clifton 41417 Type locality.

***Amaranthus watsonii* Standl.**

WATSON'S AMARANTH. Old Trails Road 11 0767 872E 38 95 827N Clifton 38635, Big Sandy River 12 0263 381E 38 38 776N Clifton 15781.

***Amaranthus wrightii* S. Wats**

WRIGHT'S AMARANTH. Hualapai Mountain County Park 12 0235 660E 38 87 100N Clifton 41389.

TIDESTROMIA

- 1 Plants annual; sepals 1.8-2.6 mm long; filaments 0.6-1.6 mm long *T. lanuginosa*
 1 Plants perennial; sepals 1.3-1.7 mm long; filaments 0.5 or less long *T. oblongifolia*

Tidestromia lanuginosa (Nutt.) Standl.

WOOLLY HONEYSWEET. Washes, sandy slopes and flats, below 5500 ft. June-early Dec. Old Trails Road 11 0767 921E 38 95 761N Clifton 38641, Highway 93 12 0257 027E 38 83 062N Clifton 41309.

Tidestromia oblongifolia (S. Wats.) Standl.

ARIZONA HONEYSWEET. Highway 95 11 0730 433E 38 46 957N Clifton 38680.

ANACARDIACEAE Sumac Family

- 1 Fruit white, with a greenish or yellowish cast, smooth; petals glabrous on the inner surface; sepals not ciliate ... *Toxicodendron*
 1 Fruit reddish, hairy; petals hairy on the inner surface, if not hairy than sepals ciliate *Rhus*

RHUS Sumac

- 1 Leaves with more than 3 leaflets *R. glabra*
 1 Leaves simple or with 3 leaflets
 2 Leaf blade thick and leathery, entire *R. ovata*
 2 Leaf blade not thick or leathery, margin crenate or slightly lobed *R. aromatica*

Rhus aromatica Ait.

- 1 Leaves simple or if 3-foliate than middle leaflet abruptly contracted to base var. *simplicifolia*
 1 Leaves 3-foliate, middle leaflets long-tapered to base var. *trilobata*

var. *simplicifolia* (E. Greene) Cronq.

SINGLE-LEAF SKUNKBUSH. Beaver Dam Mountains. 12 0248 766E 40 96 415N Clifton 41669.

var. *trilobata* (T. & G.) S. Wats.

SKUNKBUSH. Canyons and washes, below 7500 ft. Mid March-June. Grapevine Spring 11 0764 673E 38 99 873N Clifton 39220, Mt. Trumbull 12 0308 869E 40 30 200N. [*R. trilobata* var. *malacophylla* (E. Greene) Munz, *R. trilobata*].

Rhus glabra L.

SMOOTH SUMAC

Rhus ovata S. Wats.

SUGAR BUSH. Rocky slopes, below 5000 ft. March-April. Six Mile Crossing Road 12 0279 188E 38 32 464N Clifton 39490.

TOXICODENDRON

Toxicodendron rydbergii (Small) E. Greene

WESTERN POISON-IVY.

APIACEAE Carrot or Parsley Family [Umbelliferae]

- 1 Plants growing in permanently wet or moist places
 2 Leaves divided
 3 Leaflets sessile *Berula*
 3 leaflets petiolate *Apium*
 2 Leaves simple and peltate *Hydrocotyle*
 1 Plants in dry places if in a moist to wet place than leaflets thread like
 4 Herbage bearing stellate hairs *Bowlesia*
 4 Herbage glabrous or hairs not stellate
 5 Ovary and fruit having bristles that are hooked, or barbed
 6 Herbage glabrous *Spermolepis*
 6 Herbage variously hispid

- 7 Fruit with hooked bristles *Yabea*
- 7 Fruit having barbed bristles *Daucus*
- 5 Ovary and fruit glabrous to hairy, if the hairs appear to be slightly spiny than lacking a thick base
- 8 Plants annual leaflets thread-like *Ciclospermum*
- 8 Plants biennial or perennial, if appearing annual than leaflets not thread-like
- 9 Plants biennial; stems purple-spotted, hollow, tall, weedy; fruit ribbed only *Conium*
- 9 Plants perennial; stems not as above, not weedy; fruit winged on the ribs or at least on the margin
- 10 Herbage finely puberulent or hirtellous throughout..... *Lomatium*
- 10 Herbage essentially glabrous, except under the involucre in one..... *Cymopterus*

APIUM

Apium graveolens L var. *dulce* (P. Mill.) DC.

CELERY. Growing in ± permanently moist places, about 3120 ft. Mar. Cook Canyon 11 0766 577E 38 96 020N Clifton 38970.

BERULA

Berula erecta (Huds.) Cov.

CUTLEAF WATER PARSNIP. Infrequent, below 6500 ft.; wet places. June-Sept.

BOWLESIA

Bowlesia incana López & Pavón

HOARY BOWLESIA. Moist sandy places of creek deposits, among shrubs, 1000-3500 ft. Jan.-May. Burro Creek 12 0274 873E 38 24 010N, Alamo Road 12 0248 781E 38 13 246N Clifton 38867.

CONIUM

Conium maculatum L.

POISON-HEMLOCK. Waste places; introduced from Europe. April-July: Pine Lake 12 0238 573E 38 86 457N Clifton 40940.

CYCLOSPERMUM

Cyclospermum leptophyllum (Pers.) Britt. & Wilson

MARSH-PARSLEY. Knight Creek Spring 12 0275 984E 38 89 527N Clifton 39911, 41411.

CYMOPTERUS

- 1 Involucre lacking
- 2 Herbage glabrous or minutely granular-scabrous; inflorescence open..... *C. purpureus*
- 2 Herbage with a prominent hairy area at the junction of the peduncle and the inflorescence rays; inflorescence ± compact..... *C. lemmonii*
- 1 Involucre quite prominent
- 3 The involucre bearing several to many nerves; pedicels virtually obsolete, even in fruit *C. multinervatus*
- 3 The involucre bearing one dominant mid-vein, sometimes with several lesser veins; pedicels evident *C. purpurescens*

Cymopterus lemmonii (Coult. & Rose) Dorn.

CALIFORNIA SPRING-PARSLEY. Locally frequent, throughout; dry brushy or open rocky slopes. May-July: Hayden Peak 12 0235 000E 38 86 408N Clifton 40727. [*Pseudocymopterus montanus* (A. Gray) Coult. & Rose].

Cymopterus multinervatus (Coult & Rose) Tidestr.

STRIATE SPRING-PARSLEY. Sawmill Canyon 12 0230 418E 38 94 595N Clifton 38977.

Cymopterus purpurascens (A. Gray) M.E. Jones

WIDE-WINGED SPRING-PARSLEY. Frequent, below 7500 ft.; openings in mixed desert shrub, pinyon-juniper. March-April.

Cymopterus purpureus S. Wats.

COLORADO PLATEAU SPRING-PARSLEY. Red clay or sandy soil. April-June .Mt. Trumbull Loop Road 12 0271 809E 40 77 515N Clifton 42277

DAUCUS

Daucus pusillus Michx.

RATTLESNAKE-WEED. Fairly frequent, usually below 3000 ft. on the west side; open slopes, especially after fires and disturbance. April-June. Late Feb-Apr. Cook Canyon 11 0766 911E 38 96 919N Clifton 38967.

HYDROCOTYLE

Hydrocotyle verticillata Thunb.

WHORLED MARSH-PENNYROYLE. Big Sandy River 12 0263 600E 38 38 564N Clifton 39842.

LOMATIUM

- 1 Herbage hirtellous or puberulent; flowers white or yellow
- 2 Flowers yellow; ultimate leaf segments short and narrow; scape in fruit declining ***L. foeniculaceum***
- 2 Flowers white; ultimate leaf segments long and broader; scape not declining ***L. nevadensis***
- 1 Herbage glabrous or scabrous; flowers white
- 3 Pedicels generally longer than the fruit; leaves narrow in outline, lower pair of leaflets generally remote from the next, becoming progressively more crowded; bractlets 4-10 mm long ***L. parryi***
- 3 Pedicels generally shorter than the fruit; leaves broad in outline, leaflets all about the same distance apart; bractlets 1-4 mm long ***L. scabrum***

Lomatium foeniculaceum (Nutt.) Coult. & Rose var. ***macdougalii*** (Coult. & Rose) Cronq.

MACDOUGAL'S DESERT-PARSLEY. East Branch Tuckayou Wash 12 0280 889E 39 03 148N Clifton 39867.

Lomatium nevadense (S. Wats.) Coult. & Rose var. ***parishii*** (Coult. & Rose) Jeps.

NEVADA LOMATIUM. Grapevine Spring Wash 11 0765 292N 38 99 449N Clifton 38935, Clack Canyon 11 0766 565E 38 99 556N Clifton 39410, Cerbat Mountains 11 0758 771E 39 22 659N Clifton 39662. [*Cogswellia decipiens* M. E. Jones, type Hualapai Mountain].

Lomatium parryi (S. Wats.) J. F. Macbr.

LONG-STALKED LOMATIUM. [*Cogswellia cottami* M. E. Jones type from Beaver Dam Mountains].

Lomatium scabrum

- a Plants averaging on the small side with the leaves mostly bipinnate and averaging few ultimate segments (50-220); fruit 3-8 mm long; generally above 5200 ft. var. ***scabrum***
- a Plants averaging on the larger side with the leaves mostly tripinnate and averaging more ultimate segments (150-400+); fruit 6-9 mm long; generally below 5200 ft. var. ***tripinnatum***

var. ***scabrum*** (Coult. & Rose) Mathias

CLIFF LOMATIUM. Beaver Dam Mountains 12 0248 782E 40 96 646N Clifton 42228

var. ***tripinnatum*** Goodrich

TRIPINNATE CLIFF LOMATIUM.

SPERMOLEPIS

Spermolepis echinata (Nutt.) A. Heller

BRISTLY-FRUIT SCALESEED. Fine gravel in openings in brush, 4500-4800 ft. Mid Apr-May. Timber Wash 12 0243 263E 38 82 484N Clifton 39804.

YABEA

Yabea microcarpa (H. & A.) Koso-Polj.

FALSE HEDGE-PARSLEY. Hualapai Mountains 11 0770 007E 38 93 191N Clifton 39027, Clack Canyon 11 0766 813E 38 99 433N Clifton 39406, Timber Wash 12 0243 263E 38 82 484N.

APOCYNACEAE Dogbane Family

- 1 Corolla 2.5-5 mm long ***Apocynum***

- 1 Corolla much longer.....
- 2 Corolla whitish, blue or greenish; stamens attached near top of tube.....*Amsonia*
- 2 Corolla reddish-purple; stamens attached near base of tube *Cycladenia*

CYCLADENIA

Cycladenia jonesii Eastw.

JONES' RED-FLOWERED DOGBANE This taxon look enough different to be left as a species. Woodbury and Potter Canyons. [*C. Humilis* Benth. var. *jonesii* (Eastw.) Welsh & Atwood].

AMSONIA

- 1 Calyx very small, lobes 1-3 mm long; corolla hairy on the outer surface at juncture of lobes with tube.....*A. Jonesii*
- 1 Calyx larger, lobes 3.5-7 mm long; corolla not hairy on the outer surface
- 2 Corolla tube uniformly hairy on the inner surface; anthers ± sessile, connective not very obvious.....*A. brevifolia*
- 2 Corolla tube only hairy on the obvious connectives; filaments obvious.....*A. palmeri*

Amsonia jonesii Woodson

JONES' BLUESTAR.

Amsonia palmeri A. Gray

PALMER'S BLUESTAR. Mid Mar- Jun. Cook Canyon 11 0764 608E 38 99 080N Clifton 39231, Six Mile Crossing 12 0284 194E 38 26 763N Clifton 39468.

Amsonia tomentosa Torr. & Frém.

INDIFFERENT BLUESTAR. Sandy washes, below . Mid Mar- Jun. Alamo Road 12 0246 390E 38 27 225N Clifton 39162. [*A. brevifolia* A. Gray].

APOCYNUM Dogbane

Apocynum cannabinum L.

COMMON DOGBANE, INDIAN HEMP. Warm Springs 746 272E 38 64 564N.

ASCLEPIADACEAE Milkweed Family

- 1 Plants climbing or twining
- 2 Sepals often reflexed; petals hood-like; corona lacking..... *Cynanchum*
- 2 Sepals spreading; petal not forming hoods; corona present
- 3 Appendages on the staminal-column are 5, separate fleshy-inflated or thickened*Funastrum*
- 3 Appendages on the staminal-column thin and flat, not separate *Matelea*
- 1 Plants not climbing or twining..... *Asclepias*

ASCLEPIAS Milkweed

- 1 Plants rush-like, the filiform leaves soon deciduous.....*A. subulata*
- 1 Plants not rush-like, the leaves persistent
- 2 Flowers orange-red, varying to pale orange or yellow, very showy *A. tuberosa* var. *interior*
- 2 Flowers not as above
- 3 Plants decumbent to prostrate, not of the Mohave
- 4 The leaves 8-22 mm wide, margins crenate, crisped.....*A. involucrata*
- 4 The leaves 30-60 mm wide, margins not as above..... *A. cryptoceras*
- 3 Plants ascending to erect, if decumbent than of the Mohave
- 5 Leaves whorled, 3-4 per nod, upper most often opposite*A. subverticillata*
- 5 Leaves opposite or alternate
- 6 Leaves 1-4 mm wide*A. rusbyi*
- 6 Leaves over 7 mm wide
- 7 Calyx segments spreading with the tips erect; leaves not opposite, some may be approximate.....*A. asperula*

- 7 Calyx segments deflexed
- 7 Leaf margins finely papillate-toothed *A. erosa*
- 7 Leaf margins entire
- 8 Umbels lateral as well as terminal; stems simple *A. latifolia*
- 8 Umbels all lateral; stems several from an under ground rhizome *A. nyctaginifolia*

Asclepias asperula (Decne.) Woods.

ANTELOPE-HORNS, ROUGH or SPIDER MILKWEED. Above 4,200 ft.; gravelly or rocky soil or on exposed talus. May-Jul (Aug.). Knight Creek 12 0276 832E 38 89 451N Clifton 39892, Flag Mine 12 0237 211E 38 85 100N Clifton 40708

Asclepias cryptoceras S. Wats.

HUMBOLDT MOUNTAIN MILKWEED. Limited to Pipe Springs area.

Asclepias erosa Torr.

DESERT MILKWEED. Gem Acres Road 11 0760 097E 38 53 558N Clifton 39760.

Asclepias involucrata Engelm.

DWARF MILKWEED.

Asclepias latifolia (Torr.) Raf.

BROADLEAF MILKWEED. roadsides, canyon bottoms, washes. April-Aug. (Oct.) Bulrush Canyon 12 0348 622E 40 71 965N Clifton 41170.

Asclepias nyctaginifolia A. Gray

MOJAVE MILKWEED. White Cliff Wagon Trail Park 11 0768 056E 38 99 256N Clifton 39784.

Asclepias rusbyi (Vail) Woods.

RUSBY,S MILKWEED. above 5,000 ft.; rocky soil. June-July

Asclepias subulata Decne

RUSH MILKWEED. Gem Acres Road 11 0759 889E 38 54 027N Clifton 38676.

Asclepias subverticillata (A. Gray) Vail

HORSETAIL or WHORLED MILKWEED. Moist places along roadside ditches and streams. Late May-Aug. Fort Rock Exit 12 0284 685E 38 96 409N Clifton 40753, Twomile Wash 12 0351 874N 40 78 606N Clifton 41166.

Asclepias tuberosa L. var. ***interior*** (Woods.) Shinn.

BUTTERFLYWEED, ORANGE MILKWEED. Above 5000 ft.; moist sandy or sometimes gravelly soils in woodlands. Late May-Aug. (Sept.).

CYNANCHUM

Cynanchum utahensis (Engelm.) Woodson

UTAH SWALLOW-WORT. Beaver Dam 237 474E 40 88 380N Clifton 42207

FUNASTRUM

- 1 Leaf margins crisped..... *F. crispum*
- 1 Leaf margins not crisped
- 2 Corolla ± purplish; plants sparsely hairy; leaves most often hastate..... *F. cynanchoides* var. ***hartwegii***
- 2 Corolla greenish-white to very light cream in age; plants quite hairy; leaves generally not hastate *F. hirtellum*

Funastrum crispum (Benth.) Schlechter

WAVEY-LEAVED TWINEVINE. Above 4000 ft.; among shrubs in canyons. April-July

Funastrum cynanchoides (Decne.) Schlechter var. ***hartwegii*** (Vail) G. Clifton Comb. nov.

VARIABLE TWINEVINE. Old Trails Road 11 0767 795E 38 95 932N Clifton 38636, Kaiser Spring Wash 12 0272 294E 38 29 368N Clifton 39835.

Funastrum hirtellum (A. Gray) Schlechter

SMOOTH TWINEVINE. Type from Fort Mohave. Late Jan-Apr. Jumbo Wash 11 0711 822E 39 70 366N Clifton 38790, Highway 95 11 0767 558E 37 99 332N Clifton 38982.

MATELEA

- 1 Corolla reddish-black to dark purple, lobes almost free to base, spreading..... *M. parvifolia*
- 1 Corolla greenish or brownish, lobes free about one half, erect..... *M. producta*

Matelea parvifolia (Torr.) Woodson

SPEARLEAF. Mohave Mountains 11 0747 958E 38 34 574N Clifton 39201.

Matelea producta (Torr.) Woodson

TAXES MILKVINE. Open rocky places, about 4200 ft. se. of Vulcan's Throne, Toroweap. Apr-Jun; Aug-Sep. Pine Lake 12 0238 730E 38 86 258N Clifton 41295.

ASTERACEAE Sunflower Family [Compositae]

- 1 Plants rank or fetid smelling, having translucent, elongate oil glands on the leaves and involucre
- 2 Plants perennial
- 3 Rays evident
 - 4 Heads generally over 1 cm tall..... *Adenophyllum*
 - 4 Heads generally less than 1 cm tall..... *Thymophylla*
- 3 Rays lacking..... *Porophyllum*
- 2 Plants annual
 - 5 Leaves simple..... *Pectis*
 - 5 Leaves pinnatifid..... *Dyssodia*
- 1 Plants not as above
- 6 Plants with many-flowered staminate involucre and a single flowered pistillate involucre that is of hardened concrescent bracts that may be winged, may bear spines, may bear hooked prickles, or lacking wings, spines or hooked prickles
- 7 Pistillate involucre bearing hooked prickles..... *Xanthium*
- 7 Pistillate involucre lacking hooked prickles..... *Ambrosia*
- 6 Plants not as above
- 8 Plants with stickers or prickles on leaves on their margins or surface, or stems (not including leaves that are sharply dentate or serrate)
- 9 Heads with all ligulate corollas; sap milky
 - 10 Plants perennial bearing tufts of pale or brownish wool at base; leaves small..... *Pleiacanthus*
 - 10 Plants annual, lacking the wool at base; leaves well developed
 - 11 Cauline leaves with basal clasping lobes curled; fruit not beaked..... *Sonchus*
 - 11 Cauline leaves with basal clasping lobes not curled; fruit with a long beak..... *Lactuca*
- 9 Heads having disk flowers; sap not milky
- 12 Phyllaries lacking spines at their tip
- 13 Plants forming broom-like clumps, almost leafless..... *Chloracantha*
- 13 Plants woody shrubs, not broom-like
 - 14 Branches spinescent at tip..... *Amphipappus*
 - 14 Branches not spinescent, spines in axiles..... *Tetradymia*
- 12 Phyllaries spine-tipped
 - 15 Phyllaries with a spine at tip; heads large..... *Cirsium*
 - 15 Phyllaries fringed with spines as well at one at the tip; heads small..... *Centaurea*
- 8 Plants lacking stickers, leaves may be sharply serrate or dentate
- 16 Heads with all ligulate corollas; sap milky
- 17 Leaves essentially all basal
- 18 Plants essentially stemless..... *Glyptopleura*
- 18 Plants with well developed stems
 - 19 Leaves very broad, generally purplish at least below, glaucous, margins irregularly dentate or denticulate..... *Atrichoseris*
 - 19 Leaves not combining the above characters
 - 20 Inflorescence thinly stellate, more than 1 flowered..... *Hieracium*
 - 20 Inflorescence lacking stellate hairs; flowers single
 - 21 Phyllaries papery-transparent on the margins; pappus of plumose, capillary bristles..... *Anisocoma*
 - 21 Phyllaries otherwise; pappus not plumose
 - 22 Awn from between a bilobed scale..... *Uropappus*
 - 22 Awns strictly capillary
 - 23 Achenes muricate near the summit of the body..... *Taraxacum*
 - 23 Achenes ribbed, but not muricate..... *Agoseris*
 - 17 Leaves sometimes basal but also cauline
 - 24 Upper stems and phyllaries bearing tack-shaped glands..... *Calycoseris*
 - 24 Upper stems and phyllaries not bearing tack-shaped glands

- 25 Achene with a well developed beak
 - 26 Flowers yellow
 - 27 Phyllaries longer than the ray flowers; leaves grass-like..... *Tragopogon*
 - 27 Phyllaries shorter than ray flowers; leaves lobed *Lactuca*
 - 26 Flowers white..... *Rafinesquia*
- 25 Achene lacking a beak
 - 28 Rays yellow, if appearing white the phyllaries with broad hyaline-scarious margins
 - 29 Phyllaries lacking any black hairs *Malacothrix*
 - 29 Phyllaries bearing some black hairs *Crepis*
 - 28 Rays white, phyllaries not broad
 - 30 Pappus plumose at least in part *Stephanomeria*
 - 30 Pappus finely scaberulous *Prenanthes*
- 16 Heads with ligulate corollas marginal, or lacking; sap clear
 - 31 Ray corollas present, sometimes very short and inconspicuous (heads falsely subradiate in several genera)
 - 32 Ray corollas other colors than yellow
 - 33 Ray achenes narrowly callose margined this adnate at base to the pales of the 2 opposed disk flowers and the subtending phyllary, at length tearing away from the achene below but remaining attached at apex *Parthenium*
 - 33 Ray achenes not as above
 - 34 Ray corolla bilabiate; leaves sharply dentate *Acourtia*
 - 34 Ray corolla regular; leaves various
 - 35 Ray achenes enclosed by the subtending phyllaries
 - 36 Leaves entire; plant perennial *Melampodium*
 - 36 Leaves with the lower pinnatifid or merely toothed; plants annual..... *Layia*
 - 35 Ray achenes free
 - 37 Receptacle chaffy, each flower subtended by a scale
 - 38 Plants tall with pinnatifid leaves *Achillea*
 - 38 Plants low with entire to toothed leaves..... *Eclipta*
 - 37 Receptacle naked
 - 39 Pappus of scales, or awns, or distinctly flattened , chaffy bristles, a short crown, or some combination of these, or lacking
 - 40 Phyllaries $\pm$ in a single series
 - 41 Herbage arachnoid-woolly *Eriophyllum*
 - 41 Herbage copiously spreading-hirsute *Monoptilon*
 - 40 Phyllaries in more than a single series
 - 42 Disk-corollas 4-toothed; achenes hairs not glochidiate..... *Perityle*
 - 42 Disk-corollas 5-toothed; achenes with glochidiate hairs..... *Townsendia*
 - 39 Pappus of capillary bristles
 - 43 Rays scarcely, if at all surpassing the disk *Conyza*
 - 43 Rays surpassing the disk by some distance
 - 44 Plants coarse, freely branching, broom-like, most often leaves much reduced; colonial from long rhizomes..... *Chloracantha*
 - 44 Plants obviously otherwise
 - 45 Plants low with numerous small, narrow leaves, often upper acicular; inflorescence generally flat-topped; phyllaries frayed or irregularly lacerate-ciliate toward the summit..... *Chaetopappa*
 - 45 Plants not combining the above characters
 - 46 Phyllaries in numerous elevations, most often the outer quite a bit shorter than the upper; style tips lanceolate or subulate, acute to acuminate
 - 47 Plants taprooted; leaves most often with some teeth on the margins
 - 48 Plants not woody at the base *Machaeranthera*
 - 48 Plants woody for some distance above the base..... *Xylorhiza*
 - 47 Plants fibrous-rooted with long or short rhizomes *Aster*
 - 46 Phyllaries in few elevations, the outer not much shorter than the inner; style tips deltoid, obtuse or rounded *Erigeron*
 - 32 Rays corollas yellow or orange
 - 49 Rays 2-lipped, the outer lip 3 toothed, the inner 2-cleft, recurved or coiled *Trixis*
 - 49 Rays not 2-lipped
 - 50 Receptacle having chaff scales or bristles
 - 51 Ray corollas persistent, drying white-green, lacking a tube *Sanvitalia*

- 51 Ray corollas not combining the above characters
- 52 Fruit of ray flowers not like the fruit of the disk flowers *Heterosperma*
- 52 Fruit all alike, if ray and disk flowers are fertile
- 53 The outer row of phyllaries not like the inner row
- 54 Plants annual; outer row of the phyllaries spreading..... *Coreopsis*
- 54 Plants perennial; outer row of the phyllaries not spreading *Thelesperma*
- 53 The outer not markedly different from the others
- 55 Receptacle bristly only *Gaillardia*
- 55 Receptacle chaffy
- 56 Stems essentially naked
- 57 Leaves simple..... *Enceliopsis*
- 57 Leaves pinnatifid..... *Balsamorhiza*
- 56 Stems with well developed cauline leaves
- 58 Leaves laciniately deeply cleft into mostly 3 or 5 rather crowded, irregularly toothed or lacerate segments..... *Rudbeckia*
- 58 Leaves not deeply cleft
- 59 Plants 0.5-2 dm tall; leaves 1-3 mm wide; rays becoming papery, persistent *Zinnia*
- 59 Plants over 2 dm tall; leaves over 3 mm wide; rays not persistent
- 60 Plants with the ray flowers pistillate; achene broadly winged; lower surface of leaves densely strigose with translucent hair bases *Verbesina*
- 60 Plants not combining the above characters
- 61 Cauline leaves all alternate or appearing so
- 62 Plants shrubs or perennial herbs
- 63 Plants shrubs *Encelia*
- 63 Plants herbs *Wyethia*
- 62 Plants annual *Geraea*
- 61 Cauline leaves with at least the lower opposite
- 64 Pappus lacking *Viguiera*
- 64 Pappus present, but readily deciduous on some
- 65 Achenes bearing long, straight, ascending-appressed white hairs *Helianthella*
- 65 Achenes not as above *Helianthus*
- 48 Receptacle naked
- 67 Pappus wholly or partly of capillary bristles
- 68 Principal involucre bracts in 1 series or appearing so
- 69 Principal involucre bracts 8 or more, bracteoles present *Senecio*
- 69 Principal involucre bracts generally about 5, bracteoles lacking *Syntrichopappus*
- 68 Principal involucre bracts in 2+ series
- 70 Margin of the leaves spinulosus-toothed..... *Machaeranthera*
- 70 Margin of the leaves may be toothed, but not spinulosus
- 71 Plants herbs, may be a little woody at the very base
- 72 Plants annual or biennial
- 73 Marginal corollas perfect, falsely radiate; plants small *Lessingia*
- 73 Marginal corollas pistillate, radiate; plants quite robust *Heterotheca*
- 72 Plants perennial
- 74 Flowers (3) 4-6 (8) per head; leaves firm, grass-like..... *Petradoria*
- 74 Flowers generally more than 8; leaves not firm, not grass-like
- 75 Plants fibrous-rooted from rhizomes or short caudex; heads fairly small *Solidago*
- 75 Plants tap-rooted; heads larger *Chrysopsis*
- 71 Plants shrubs *Ericameria*
- 67 Pappus other than capillary bristles or lacking
- 76 Plants not over 1 dm tall and with an extensive underground root system *Picradeniopsis*
- 76 Plants not as above
- 77 Herbage with some gland tipped hairs *Bahia*
- 77 Herbage lacking gland tipped hairs
- 78 Plants annual, seldom over 1 dm tall *Eriophyllum*
- 78 Plants biannual or perennial, most often over 1 dm tall
- 79 Pappus present
- 80 Pappus of awns *Grindelia*

- 80 Pappus of various types of scales
 - 81 Leaves with some of them lobed or it lacking lobes than strictly basal..... *Hymenoxys*
 - 81 Leaves entire
 - 82 Leaves up to 3 mm wide..... *Gutierrezia*
 - 82 Leaves well over 3 mm wide..... *Psilostrophe*
 - 79 Pappus lacking..... *Baileya*
- 31 Rays lacking
- 83 Receptacle chaffy throughout or naked in center
 - 84 Plants a shrub..... *Encelia*
 - 84 Plants herbs
 - 85 Phyllaries lacking, chaff-scales act like phyllaries; herbage woolly
 - 86 Pappus of disk flowers $\pm$ exserted; disk flowers bisexual *Filago*
 - 86 Pappus of disk flowers included; disk flowers staminate *Stylocline*
 - 85 Phyllaries present; herbage not woolly
 - 87 Plants perennial; heads in the axils of the leaves; leaves sessile *Iva*
 - 87 Plants annual; heads on naked branchlets; leaves petiolate..... *Dicoria*
- 83 Receptacle naked, may have a single row of scales at the margin or a few scattered scales
- 88 Pappus lacking or of a crown less than 1 mm long or of scales less than 1.5 mm long
 - 89 Flowers yellow
 - 90 Plants of dry places
 - 91 Plants fairly tall perennials..... *Hymenopappus*
 - 91 Plants small annuals..... *Eriophyllum*
 - 90 Plants of wet places..... *Cotula*
 - 89 Flowers not yellow..... *Artemisia*
- 88 Pappus present
 - 92 Pappus of scales, awns with a broadened base, or firm awns
 - 93 Disk-corollas 4-toothed..... *Perityle*
 - 93 Disk-corollas 5-toothed
 - 94 Plants shrubs
 - 95 Flowers yellow *Acamptopappus*
 - 95 Flowers white or pink *Pleurocoronis*
 - 94 Plants herbs
 - 96 Pappus of scales that are not awn-tipped
 - 97 Scales lacking a center nerve *Chaenactis*
 - 97 Scales having a center nerve *Palafoxia*
 - 96 Pappus with awn-tipped scales or firm awns
 - 98 Pappus of several firm awns; involucre gummy..... *Grindelia*
 - 98 Pappus of awn-tipped scales
 - 99 Leaves with the main one pinnately or ternately dissected into narrow lobes..... *Hymenothrix*
 - 99 Leaves incised *Trichoptilium*
 - 92 Pappus of capillary bristles, these sometimes plumose
 - 100 Flowers yellow
 - 101 Plants a taprooted perennial with small, fleshy, linear or scale-like leaves..... *Leucosyris*
 - 101 Plants not combining the above characters
 - 102 Plants low herbs..... *Psathyrotes*
 - 102 Plants shrubs or subshrubs
 - 103 Pappus of plumose bristles..... *Bebbia*
 - 103 Pappus not plumose
 - 104 Involucral bracts in a single row
 - 105 Leaves glandular-punctate..... *Peucephyllum*
 - 105 Leaves not glandular-punctate *Tetradymia*
 - 104 Involucral bracts in more than 1 row
 - 106 Phyllaries bicolored, greenish-tipped and yellow-white below *Isocoma*
 - 106 Phyllaries not bicolored *Chrysothamnus*
 - 100 Flowers other than yellow
 - 107 Plants woolly herbs
 - 108 Plants forming mats *Antennaria*
 - 108 Plants not forming mats *Gnaphalium*

- 107 Plants not woolly, mostly subshrubs to shrubs
 109 Perfect flowers lacking
 110 Plants with pistillate corollas on one plant and staminate on another (dioecious) *Baccharis*
 110 Plants with an outer row of pistillate corollas and inner functionally staminate corollas *Pluchea*
 109 Perfect flowers present
 111 Phyllaries with distinct parallel veins *Brickellia*
 111 Phyllaries lacking distinct veins *Eupatorium*

ACAMPTOPAPPUS

Acamptopappus sphaerocephalus (A. Gray) A. Gray

- a Stems and leaves rough-puberulent var. *hirtellus*
 a Stems and leaves glabrous or leaves ciliate var. *sphaerocephalus*

var. *hirtellus* S.F. Blake
 HAIRY GOLDENHEAD.

var. *sphaerocephalus*

GOLDENHEAD. Found on rocky, sandy, or clay type soils on slopes or flats, 1000-4500 ft. (Jan) April-May. Alamo Road 12 0241 952E 38 32 750N Clifton 38721.

ACHILLEA Yarrow

Achillea millefolium L. *lanulosa* (Nutt.) Piper
 MOUNTAIN YARROW.

ACOURTIA

- 1 Plants quite tall; inflorescence of numerous heads; plants wide spread *A. wrightii*
 1 Plants quite short; inflorescence of a single head; plants limited *A. nana*

Acourtia nana (A. Gray (Reveal and R. King

DWARF DESERT-PEONY. Open, low desert-scrub, about 4320 ft. July. Truxton 12 0268 384E 39 29 654N Clifton 41245.

Acourtia wrightii (A. Gray) Reveal & R. King

BROWNFOOT. Dry open places, among shrubs. March-July (Dec.). D-W Ranch Road 12 0234 314E 38 92 574N Clifton 38560.

ADENOPHYLLUM

- 1 Leaves pinnatifid; phyllaries 8-12 mm long *A. porophylloides*
 1 Leaves simple; phyllaries 15-18 mm long *A. cooperi*

Adenophyllum cooperi (A. Gray) Strother

COOPER'S STINK-SHRUB. [*Dyssodia c.* A. Gray]. Hualapai Mountain Road 12 0229 591E 38 95 204N Clifton 38576,
 Temple Bar Road 11 0722 568E 39 68 954N Clifton 39681.

Adenophyllum porophylloides (A. Gray) Strother

SAN FELIPE STINK-SHRUB. Cane Spring Wash 12 0259 967E 38 66 431N, Poachie Range 12 0270 013E 38 17 846N
 Clifton 39013. [*Dyssodia p.* A. Gray]

AGOSERIS

- 1 Plants annual *A. heterophylla*
 1 Plants perennial *A. glauca* var. *laciniata*

Agoseris glauca (Pursh) Raf. var. *laciniata* (D.C. Eat.) Smiley

SHORT BEAKED MOUNTAIN DANDELION. Open places, throughout. May-July: Mount Dellenbaugh Road 12 0269 028E
 40 04 094N Clifton 42322

Agoseris heterophylla (Nutt.) E. Greene

ANNUAL GOAT-CHICORY

AMBROSIA

- 1 Plants annual..... *A. acanthicarpa*
- 1 Plants perennial
- 2 Plants shrubs
 - 3 Leaf and leaf segments (when present) $\pm$ filiform
 - 4 Wings of the bur less than 1.5 mm wide; flowers in fall..... *A. monogyra*
 - 4 Wings of the bur 2-8 mm wide; flowers in spring..... *A. salsola*
 - 3 Leaf or leaf segments not filiform
 - 5 Plant fragrant; leaves sticky; inflorescence glandular-pubescent as well as sticky-villose..... *A. ambrosioides*
 - 5 Plants lacking all the above characters
 - 6 Leaves not pinnately divided *A. eriocentra*
 - 6 Leaves pinnately divided into small divisions *A. dumosa*
- 2 Plants herbs..... *A. confertiflora*

Ambrosia acanthicarpa Hook.

ANNUAL BUR-SAGE. Along roads. July-Oct. D-W Ranch Road 12 0234 247E 39 92 772N, Highway 389 12 0339 880E 40 80 460N Clifton 41175.

Ambrosia ambrosioides Cav.

AMBROSIA-LEAVED BURR-RAGWEED. Signal Road 12 0263 888E 38 28 302N Clifton 38850.

Ambrosia confertiflora DC.

SLIMLEAF BUR-SAGE. Washes, along road, slopes and flats, 1000-7100 ft, April-Nov. Hualapai Mountain Road 12 0230 549E 38 94 751N Clifton 38581, Blake Ranch Road 12 0244 690E 38 77 056N.

Ambrosia dumosa (A. Gray) Payne

BURRO-WEED. Highway 95 11 0759 610E 38 09 947N Clifton 38998. [*Franseria d. A. Gray*]

Ambrosia eriocentra (A. Gray) Payne

WOOLLY BUR-SAGE. Nov. D-W Ranch Road 12 0235 481E 38 98 350N Clifton 38607.

Ambrosia monogyra (T. & G.) Strother & B. Baldwin

SINGLE-WHORL CHEESEBUSH. West Spring St.

Ambrosia salsola (T. & G.) Strother & B. Baldwin

- a Wings appressed, enclosing the fruit var. *fasciculata*
- a Wings spreading
 - b Wings $\pm$ 7, margins not much fimbriate, whitish-green; beak not fimbriate, styles $\pm$ 2.5 mm long var. *pentalepis*
 - b Wings $\pm$ 10-13, margins quite fimbriate, rose; beak fimbriate, styles $\pm$ 4 mm long var. *salsola*

var. ***fasciculata*** (A. Nels.) Strother & B. Baldwin

Warm Springs Wash 11 0730 605E 38 47 811N Clifton 38757

var. ***pentalepis*** (Rydb.) Strother & B. Baldwin

SINGLE-WHORLED WHITE CHEESEBUSH. Aubrey Hills 11 0762 558E 38 04 920N Clifton 38990.

var. ***salsola***

WHITE CHEESEBUSH. Highway 95 11 0763 306E 38 03 306N Clifton 38989.

AMPHIPAPPUS

Amphipappus fremontii T. & G. var. ***spinosus*** (Nelson) C.L. Porter

ROUGH-LEAVED CHAFF-BUSH. Temple Bar Road 11 0735 762E 39 85 800N Clifton 42342.

ANISOCOMA

Anisocoma acaulis T. & G.

SCALE-BUD. Fairly frequent, usually below the pinyon belt; sandy washes and other sandy places. Boriana Mine Road 11 0773 344E 38 62 240 Clifton 39332.

ANTENNARIA Pussytoes

Antennaria marginata E. Greene

MARGINATE EVERLASTING. Above 5000 ft.; dry, open, or thinly wooded places. April-July

ARTEMISIA Sagebrush, Wormwood, Sagewort

- 1 Leaves with the lower pinnatifid with 5-9 segments ***A. pygmaea***
- 1 Leaves simple to trilobed
 - 2 Leaf or leaf segments filiform, 1 mm or less wide
 - 3 Inflorescence leafy-bracteate with some of the leaves extending well past the flowering branches ***A. filifolia***
 - 3 Inflorescence may be leafy-bracteate in the lower part, but leaves not extending beyond the flowering branches
 - 4 Leaves 15-30 mm long; plants lacking tuft of none flowering branches at base ***A. carruthii***
 - 4 Leaves 5-12 mm long; plants bearing tufts of none flowering branches at base ***A. frigida***
 - 2 Leaf or leaf segments, when present wider than 1 mm (at least in part)
 - 5 Leaves, except the extreme upper, blunt at the apex with 3 lobes; plants woody at least at base
 - 6 Leaves bearing green, glandular swellings that show through thin tomentum at 10x ***A. nova***
 - 6 Leaves lacking green, glandular swellings
 - 7 Herbage pleasantly aromatic; heads often with 1 or 2, 2-lobed pistillate corollas ***A. bigelovii***
 - 7 Herbage more acrid aromatic; heads all perfect ***A. tridentata***
 - 5 Leaves with none of them blunt; plants herbaceous
 - 8 Herbage all dark green, glabrous or occasionally puberulent or villous-puberulent, not tomentose ***A. dracunculus***
 - 8 Herbage not obviously dark green, at least part or all the plant with tomentose hairs ***A. ludoviciana***

Artemisia dracunculus L.

DRAGON SAGEWORT, TARRAGON. dry, open places. July-Oct.

Artemisia bigelovii A. Gray

FLAT SAGEBRUSH. Beaver Dam Mountains. 12 0248 766E 40 96 415N Clifton 41671.

Artemisia carruthii A. Wood

CARRUTH'S SAGEBRUSH. Camp Levi Levi 12 0235 119E 38 86 555N Clifton 41222. [var. *wrightii* (A. Gray) S. Blake

Artemisia filifolia Torr.

SAND-SAGE. Dry sandy places. Aug.-Oct. Highway 389 12 0361 776E 40 88 757N Clifton 41153.

Artemisia frigida Willd.

PRAIRIE-SAGEWORT, FRINGED SAGEBRUSH. Mount Dellenbaugh Road 12 0266 975E 40 29 815N Clifton 42317

Artemisia ludoviciana Nutt.

- a Leaves with margin often narrowly revolute, tomentose on both sides var. ***albula***
- a Leaves with margin not revolute, green above, tomentose below var. ***sulcata***

var. ***albula*** (Woot.) Shinn.

WHITE SCENTED MUGWORT. Dry slopes in openings. July-Oct. Grapevine Wash 770 068E 39 74 983N Clifton 41334.

var. ***sulcata*** (Rydb.) G. Clifton Comb. nov.

GREEN SCENTED MUGWORT. Bitter Seeps Wash 12 0351 832E 40 78 966N Clifton 41707.

Artemisia nova A. Nels.

BLACK SAGEBRUSH. Limited to northern part of the county,; dry, shallow soil in open places. July-Oct. Mt. Trumbull Loop 12 0350 731E 40 77 310N Clifton 41711

Artemisia pygmaea A. Gray

PYGMY SAGEBRUSH. Limited to northern part of the county; open barren places. Aug.-Sep. Mt. Trumbull Loop 12 0350 731E 40 77 310N Clifton 41710.

Artemisia tridentata Nutt.

BIG SAGEBRUSH. There seems to be two forms of this taxon with one coarse, more woody with the branches erect, smells different than the next, which has a less woody, less coarse, branches often wand-like. Buck and Doe Road 12 0244 474E 39 63 260N Clifton 41354, Buck and Doe Road 12 0241 500 E 39 68 252N Clifton 41352. Sep-Oct.

ATRICHOSERIS***Atrichoseris platyphylla*** A. Gray

TOBACCO-WEED, GRAVEL-GHOST. Oatman Road 11 0734 125E 38 6`1 423N Clifton 39191.

BACCHARIS

- 1 Stems glandular *B. brachyphylla*
- 1 Stems glabrous
 - 2 Heads solitary at the tips of very short, leafy branchlets, these racemosely arranged *B. pteronioides*
 - 2 Heads not supported by leafy branchlets
 - 3 Plants with many stems, some what broom-like, essentially leafless at flowering; leaves when present less than 35 mm long
 - 4 The largest leaves widely oblanceolate or wider; pistillate involucre less than 4.5 mm long; staminate involucre less than 4 mm long *B. sergiloides*
 - 4 The largest leaves linear to narrowly oblanceolate; pistillate involucre greater than 5.3 mm long; staminate involucre greater than 4 mm long *B. sarothroides*
 - 2 Plants few stemmed, not broom-like; leaves persistent, the larger over 35 mm long
 - 5 Pappus of pistillate flowers not much elongating in fruit; leaves often with fine teeth; inflorescence not leafy-bracteate
 - 6 Larger leaves 6-12 cm long; inflorescence terminal or on their immediate subsidiaries *B. glutinosa*
 - 6 Larger leaves up to 6 cm long; inflorescence terminal as well as on numerous leafy lateral branches *B. viminea*
 - 5 Pappus of the pistillate flowers elongating in fruit, becoming 8-12 mm long; inflorescence large, leafy-bracteate *B. salicina*

Baccharis brachyphylla A. Gray

SHORT-LEAVED BACCHARIS. Blake Ranch Road 12 0245 741E 38 95 872N Clifton 41305.

Baccharis glutinosa Pers.

SEEP-WILLOW. Below 4000 ft.; dry washes. Jun-Oct. Big Sandy River 12 0263 643E 38 27 670N Clifton 38847.

Baccharis pteronioides DC.

YERBA-DE-PASMO. Below 6500 ft. moist to wet places. Apr-Sep. Flag Mine Road 12 0237 900E 38 85 629N Clifton 40740.

Baccharis salicina T. & G.

EMORY'S SEEP-WILLOW. Colorado River 11 0704 076E 39 86 342N Clifton 39207. [*B. emoryi* A. Gray]

Baccharis sarothroides A. Gray

DESERT-BROOM.

Baccharis sergiloides A. Gray

SQUAW WATERWEED, DESERT BACCHARIS. Below 5500 ft.; moist places. Sep-Feb. Hualapai Mountain Road 12 0238 605E 38 83 967N Clifton 41297.

Baccharis viminea DC.

MULE-FAT. Mar-Jun. Grapevine Spring 11 0764 673E 38 99 873N Clifton 39221.

BAHIA***Bahia dissecta*** (A. Gray) Britt.

YELLOW RAGWEED. Above 4600 ft.; open places that are rocky, sandy or gravelly. Aug.-Oct. Mt. Trumbull 12 0309 027E 40 29 805N Clifton 41752, Knight Creek 12 0276 676E 38 89 478N Clifton 41414.

BAILEYA

- 1 Rays 10-20 mm long; peduncles generally greater than 10 cm long, $\pm$ scape-like *B. multiradiata*
- 1 Rays 6-10 mm long; peduncles generally less than 10 cm long, generally leafy-bracteate *B. pleniradiata*

Baileya multiradiata Harv. & A. Gray

SHOWY DESERT-MARIGOLD. Along roads, openings in pinyon-juniper. April-early Dec. D-W Ranch Road 12 0234 314E 38 92 574N Clifton 38562.

Baileya pleniradiata A. Gray

WOOLLY DESERT-MARIGOLD. Beaver Dam 12 0237 474E 40 88 380N Clifton 42210

BALSAMORHIZA

Balsamorhiza hookeri Nutt.
var. ***hispidula*** (W. Sharp) Cronq.

BEBBIA

Bebbia juncea (Benth.) E. Greene

var. ***aspera*** E. Greene

SWEETBUSH. Dry slopes, washes, along roads, banks, below 5000 ft. flowering most of the year. Hualapai Mountain Road 12 0233 313E 38 92 540N Clifton 38573, Cane Spring Wash 12 0259 967E 38 66 431N.

BRICKELLIA

- 1 Leaves stiff, bright green, spiny toothed; phyllaries with the outer broad, inner narrower ***B. atractyloides***
- 1 Leaves and involucre otherwise
 - 2 Leaves essentially entire
 - 3 Leaves glandular -puberulent..... ***B. oblongifolia*** var. ***linifolia***
 - 3 Leaves glandular-punctate, appearing varnished ***B. longifolia***
 - 2 Leaves serrate to irregularly few toothed
 - 4 Heads 20-25 mm tall; herbage early white-tomentose ***B. incana***
 - 4 Heads 8-14 mm tall; herbage not white-tomentose
 - 5 Leaves with petioles 1-3 mm long to almost subsessile
 - 6 Leaves ovate to suborbicular, less than twice as long as wide; inflorescence tomentose as well as glandular ***B. microphylla***
 - 6 Leaves elliptic, about 3 times longer than wide; inflorescence glandular ***B. confusa***
 - 5 Leaves with petioles 4 mm to much longer, if shorter, than inflorescence leafy-bracteate
 - 7 Leaves sharply few toothed at base ***B. coulteri***
 - 7 Leaves toothed well toward the tip
 - 8 Peduncles densely stipitate-glandular ***B. floribunda***
 - 8 Peduncles not noticeably stipitate-glandular
 - 9 Heads most often glomerulose; plants shrubby
 - 10 Phyllaries ± glabrous..... ***B. californica***
 - 10 Phyllaries puberulent ***B. desertorum***
 - 9 Heads not glomerulose; plants herbaceous ***B. grandiflora***

Brickellia atractyloides A. Gray

SPEAR-LEAF BRICKELLBUSH. March-Sept. (Jan). Alamo Road 12 0226 224E 38 51 199N Clifton 38797, Mt. Trumbull Loop Road 12 0270 556E 40 79 460N

Brickellia californica (T. & G.) A. Gray

CALIFORNIA BRICKELLBUSH. dry open places, often among rocks. Aug.-Sept. (Dec.) Hualapai Mountain Road 12 0230 433E 38 94 826N Clifton 38614, Willow Ranch Exit 12 0278 093E 38 96 779N Clifton 8231.

Brickellia confusa G. Clifton

CONFUSED BRICKELLBUSH. Grapevine Canyon 12 0233 685E 39 75 633N Clifton 41337.

Brickellia coulteri A. Gray

COULTER'S BRICKELLBUSH. Rocky canyons and slopes, below 4500 ft. Mid Mar-Nov. Kaiser Spring Wash 12 0272 021E 38 28 855, Clifton 39312.

Brickellia desertorum Cov.

DESERT BRICKELLBUSH. Sawmill Canyon 12 0729 000E 38 94 929N Clifton 41320.

Brickellia floribunda A. Gray

MANNY-FLOWERED BRICKELLBUSH

Brickellia grandiflora (Hook). Nutt.

LARGE-FLOWERED BRICKELLBUSH. open slopes or in woodlands. July-Oct. Hualapai Mountain County Park 12 0235 936E 38 87 017N Clifton 41380.

Brickellia incana A. Gray

WOOLLY BRICKELLBUSH. Below 5500 ft.; dry washes and flats. May-Oct. Griffith Road 11 0761 053E 38 80 326N Clifton 38672.

Brickellia longifolia S. Wats.

LONG-LEAVED BRICKELLBUSH. Beaver Dam Mountains 12 0250 931E 40 95 420N Clifton 41676.

Brickellia microphylla (Nutt.) A. Gray var. ***watsonii*** (B. L. Rob.) Welsh

WATSON'S LITTLE-LEAF BRICKELLBUSH. Beaver Dam Mountains. 12 0248 766E 40 96 415N Clifton 41670.

Brickellia oblongifolia Nutt. var. ***linifolia*** (D.C. Eat.) Rob.

NARROW-LEAVED BRICKELLBUSH. dry rocky slopes. June-Aug. Cerbat Mountains 11 0757 505E 39 26 203N Clifton 42185, Grapevine Canyon 234 350E 39 76 436N Clifton 42345.

CALYCOSERIS (Group 1)

1 Strap-shaped corollas white; achenes with roughened ribs..... ***C. wrightii***

1 Strap-shaped corollas yellow; achenes smooth or nearly so ***C. parryi***

Calycoseris parryi A. Gray

YELLOW TACK-STEM. Antler Mine 12 0228 566E 38 63 787N Clifton 39336.

Calycoseris wrightii A. Gray

WHITE TACK-STEM. Lake Havasu City 11 0753 560E 38 15 445N Clifton 38911.

CENTAUREA

1 Corolla yellow ***C. melitensis***

1 Corolla white to pink or pale purple ***C. diffusa***

Centaurea diffusa Lam.

DIFFUSE KNAPWEED. 5400 ft. Nov. Hualapai Mountain Road 12 0234 721E 38 90 184N Clifton 38597

Centaurea melitensis L.

NAPA THISTLE. Big Sandy River 12 063 381E 38 38776N Clifton 39850.

CHAENACTIS Pincushion

1 Plants biannual; pappus generally 8-20, about the same length; above the desert..... ***C. douglasii***

1 Plants annual; pappus generally 8 or less, if 8 the outer much shorter than the inner; mostly desert plants

2 Lower stem and leaves whitish scaly ***C. carphoclinia***

2 Lower stem and leaves ± cobwebby to glabrous

3 Corollas 9-11 mm long; anthers ± included ***C. macrantha***

3 Corollas less than 9 mm long; anthers exerted

4 Phyllaries with the tips densely puberulent; pappus in two series, the inner much longer than the outer..... ***C. xantiana***

4 Phyllaries glabrous to variously pubescent ± throughout; pappus generally in one series

5 Phyllaries soon becoming glabrous; stem base becoming glabrous by flowering..... ***C. fremontii***

5 Phyllaries persistently glandular-hairy or cobwebby; stem base thinly cobwebby by flowering ***C. stevioides***

Chaenactis carphoclinia A. Gray

PEBBLE PINCUSHION. Hot desert pavement, rocky slopes, below 3000 ft. Feb-May. McCracken Mine Road 12 0247 670E 38 16 129N. Clifton 38824.

Chaenactis douglasii (Hook.) H. & A. var. ***douglasii***

DOUGLAS HOARY PINCUSHION, DUSTY-MAIDENS. Tom Brown Road 12 0274 166E 38 62 485N Clifton 41315, Mt Trumbull 12 0309 350E 40 29 362N, Cerbat Mountains 11 0757 505E 39 26 203N Clifton 42186. [var. *achilleifolia* (H. & A.) A. Gray, var. *montana* M.E. Jones]

Chaenactis fremontii A. Gray

FREMONT'S PINCUSHION. Oatman Road 11 0734 039E 38 61 610N Clifton 39193

Chaenactis macrantha D.C. Eat.

LARGE-FLOWERED PINCUSHION. Late Feb- Black Canyon 12 0275 325E 38 27 984N Clifton 39004, Lizard Point 268 384E 40 91 796N Clifton 42248.

Chaenactis stevioides H. & A.

BROAD-FLOWERED PINCUSHION. Alamo Road 12 0250 724E 38 06 479N Clifton 39167, Alamo Road 11 0761 204E 38 59 909N Clifton 39172.

Chaenactis xantiana A. Gray

XANTUS' PINCUSHION. Highway 63 11 0705 095E 39 86 360N Clifton 39215.

CHAETOPAPPA

Chaetopappa ericoides (Torr.) G. Nesom

ROSE-HEATH.; Open dry slopes and flats. May-Aug. Truxton Wash 12 0272 344E 39 29 500N Clifton 39738. [*Leuecelene e.* (Torr.) E. Greene].

CHLORACANTHA (Group 3)

Chloracantha spinosa (Benth.) G. Nesom

MEXICAN DEVILWEED. Barrackman Road 11 0717 590E 38 60 582 Clifton 39961, Big Sandy River 12 0263 285E 38 38 464N Clifton 15779. [*Aster s.* Benth.]

CHRYSOPSIS nom. conserv.

Note: This author sees no reason to include this genus in *Heterotheca* because if it is done, than many of the others genera within the Aster group could be done likewise and if carried to the extreme all the genera in the Aster group could be made subsections of one large genus, which would accomplish nothing.

Chrysopsis villosa (Pursh) Nutt. var. ***hispida*** (Hook.) A. Gray

HISPID GOLDEN ASTER. Openings, often in sand, throughout. May-Oct. Mt. Trumbull Loop Road 12 0286 026E 40 47 045N Clifton 42310. [*Heterotheca v.* (Pursh) Shinn. var. *h.* (Hook.) Harms].

CHRYSOTHAMNUS Rabbit-Brush

- 1 Twigs covered by a felt-like tomentum..... ***C. nauseosus***
- 1 Twigs glabrous or finely hairy
 - 3 Leaves not resinous-punctate
 - 4 Phyllaries narrowly acute or acuminate, often shortly awn-pointed ***C. depressus***
 - 4 Phyllaries obtuse or rounded, sometimes short acute ***C. scopulorum***
 - 3 Leaves resinous-punctate
 - 5 Phyllaries with a swollen, green tip ***C. teretifolius***
 - 5 Phyllaries lacking a swollen tip ***C. paniculatus***

Chrysothamnus depressus Nutt.

LONG-FLOWERED RABBITBRUSH. Frees Wash 12 0236 668E 38 92 713N Clifton 22875, Cedar Ridge 12 0331 712E 40 82 998N Clifton 41686.

Chrysothamnus nauseosus (Pallas) Britt.

- a Leaves essentially lacking at flowering time var. ***junceus***
- a Leaves with at least a good number present at flowering time
 - b Achenes glabrous
 - c Leaves generally 3.5-4.5 mm long, greenish; involucre fairly hairy..... var. ?
 - c Leaves generally less than 3 mm long, whitish; involucre essentially glabrous var. ***leiospermus***
 - b Achenes hairy
 - d Stems yellow-green var. ***oreophilus***
 - d Stems grayish var. ***graveolens***

var. ? Quail Canyon 270 579E 40 79 611

var. ***graveolens*** (Nutt.) Piper

GRAY RUBBER RABBITBRUSH. Some say that the stems are supposed to be yellow-green, but these plants are gray. D-W Ranch Road 12 0234 314E 38 92 574N Clifton 38563.

var. ***junceus*** (E. Greene) H. M. Hall

LEAFLESS RUBBER RABBITBRUSH. Quail Canyon 12 0270 519E 40 79 611N Clifton 41761.

var. ***leiospermus*** (A. Gray) H. Hall

DESERT RUBBER RABBITBRUSH. Crevices in large granite boulders. Sep. These plants are like the ones that grow in the Clark Mountains in California, but they are somewhat different than the ones outside of this area. Camp Levi Levi 12 0235 562E 38 86 929N Clifton 41395.

var. ***oreophilus*** (A. Nels.) H. M. Hall

YELLOW-GREEN RUBBER RABBITBRUSH. Buck and Doe Road 12 0241 500E 39 68 252N Clifton 41353, Highway 389 12 0329 220E 40 84 959N Clifton 41683.

Chrysothamnus paniculatus (A. Gray) H.M. Hall

PUNCTATE RABBITBRUSH. Slopes, washes, along roads, below 4400 ft. Sept-Nov. Clifton 38582.

Chrysothamnus scopulorum (M. E. Jones) G. Clifton

ROCK RABBITBRUSH. If *C. gramineus* belongs in this genus, so does this taxon. *C. gramineus* is more different from this genus than is this taxon. [*Haplopappus* s.(M. E. Jones) S. F. Blake].

Chrysothamnus teretifolius (Durand & Hilg.) H.M. Hall

NEEDLE-LEAVED RABBITBRUSH. Black Mountains 737 540E 38 98 324N Clifton 43357

Chrysothamnus viscidiflorus (Hook.) Nutt.

var. ***stenophyllus*** (A. Gray) H. M. Hall

NARROW-LEAVED GREEN RABBITBRUSH. According to keys the only difference between this taxon and the species is the height, however the plants in the area of this collection are taller and it has no stem leaves at flowering. Some have lumped this taxon into the species. In most of the range of the species the stem leaves are present at flowering. Obviously sometimes the key differences are missed by persons who work with plants. Highway 389 12 0329 220E 40 84 959N Clifton 41682.

CIRSIIUM Thistle

- 1 Outer phyllaries most often deflexed ***C. neomexicanum***
- 1 Outer phyllaries not much deflexed
 - 2 Plants with some or all the leaves merely spinulose-toothed ***C. virginense***
 - 2 Plants with leaves otherwise
 - 2 Flower deep red to crimson (ours, other colors else where)
 - 4 Involucre turbinate; style tip generally 0.8-1.5 (2) mm long ***C. arizonicum***
 - 4 Involucre broad; style tips mostly 3-7 mm long ***C. ochrocentrum***
 - 2 Flowers at most red-purple ***C. wheeleri***

Note: A number of these taxa are very poorly understood. Some of the line drawings don't even begin to do justice to some of these species. The workers may have tried to do a good job, but it is apparent that they don't have enough collected specimens to come to the right conclusions (if this is really possible). Some of the keys don't function very well. And as always no one person agrees with the next.

Cirsium arizonicum (A. Gray) Petr.

ARIZONA THISTLE. Wheeler Wash 12 0237 778E 38 85 538N Clifton 40698.

Cirsium neomexicanum A. Gray

DESERT THISTLE. Late Mar-Jun. Sawmill Canyon 11 0768 990E 38 95 063N Clifton 39284.

Cirsium ochrocentrum A. Gray

YELLOW-SPINED THISTLE. Fort Rock Exit 12 0284 600E 38 96 492N Clifton 40758.

Cirsium virginense S. Welsh

VIRGIN THISTLE

Cirsium wheeleri (A. Gray) Petr.

WHEELER'S THISTLE. Lang's Run 12 0299 305E 40 31 626N Clifton 41756.

CONYZA

- 1 Herbage glandular, densely viscid-villous ***C. coulteri***
- 1 Herbage subglabrous to fairly densely hirsute ***C. canadensis***

Conyza canadensis (L.) Cronq.

HORSEWEED. Grapevine Spring 11 0764 673E 38 99 873N Clifton 39223.

Conyza coulteri A. Gray

COULTER'S WOOLWORT. Old Highway 93 12 0247 518E 38 92 757N Clifton 28268.

COREOPSIS (Group 3)

Coreopsis californica (Nutt.) H. Sharsm. var. ***newberryi*** (A. Gray) E. B. Sm.

NEWBERRY'S TICKSEED. It is said that *C. douglasii* grows in this area, however it is only known from sw California.

COTULA

Cotula coronopifolia L.

BRASS BUTTONS. freshwater and saline marshes, sluggish streams; introduced from south Africa. Big Sandy 12 0263 675E 38 38 627N Clifton 39321.

CREPIS

Crepis occidentalis Nutt.

var. ***costata*** A. Gray

Little Tanks 12 0286 188E 40 47 000N Clifton 42308.

DICORIA

Dicoria canescens A. Gray

DESERT TWINBUGS. Beaver Dam 12 0237 474E 40 88 380N Clifton 42216.

DYSSODIA

Dyssodia papposa (Vent.) Hitchc.

FETID-MARIGOLD. Old Highway 66 12 0285 250E 39 36 800N Clifton 41368.

ECLIPTA

Eclipta prostrata (L.) L.

FALSE DAISY.

ENCELIA

1 Inflorescence branching

2 Leaves densely hairy, lacking strigose hairs; ligules with emarginate tips..... ***E. farinosa***

2 Leaves moderately hairy, often with some strigose hairs; ligules with tips deeply lobed ***E. farinosa*** X ***E. frutescens***

1 Inflorescence solitary

3 Ray flowers lacking ***E. frutescens***

3 Ray flowers present

4 Surface of the leaf exposed between the hairs, gland-dotted ***E. resinifera***

4 Surface of the leaf felted, not exposed, not gland-dotted ***E. virginensis***

Encelia farinosa T. & G.

BRITTLEBUSH, INCIENSO. Oatman Road 11 0742 466E 38 80 298N Clifton 38661, Oatman Road 11 0760 039E 38 88884, Cane Spring Wash 12 0259 967E 38 66 431N.

Encelia frutescens (A. Gray) A. Gray

BUSH ENCELIA. Lake Havasu 11 0740 098E 38 26 976N Clifton 39765.

Encelia resinifera C. Clark

GLAND-DOTTED ENCELIA. Rocky slopes, 2000-5000 ft. Widely scattered in the county. Late Mar-Jun. Sawmill Canyon 11 0768 706E 38 94 960 Clifton 39283.

Encelia virginensis Nelson

VIRGIN RIVER ENCELIA. Rocky slopes, 2200-5000 ft. Limited to the Virgin River area. Beaver Dam Mountains 12 0251 037E 40 94 980N Clifton 42243.

ENCELIOPSIS

1 Leaves rounded, obtuse, to abruptly acute or mucronate at tip, gray, not silvery, rays 11-28, most often about 21.. ***E. nudicaulis***

1 Leaves tending to be acute to acuminate, silvery; rays up to 40, most often about 34..... ***E. argophylla***

***Enceliopsis argophylla* (D. Eaton) A. Nels.**

SILVER-LEAVED SUNRAY. The plants from Detrital Valley grow on Gypsum type soil, have at least 30 or more ray flowers, have the petal lobes of the disk flowers hairy and the pappus composed of two awn and a low crown. The plants from the Beaver Dam Mountains grow on limestone, have fewer than 21 rays flowers, have the petal lobes glabrous and the pappus composed of two hairy, paleaceous awns and not much of a crown. Beaver Dam Mountains 12 0248 782E 40 96 646N Clifton 42231 Detrital Valley 11 0727 240E 39 78 669N Clifton 39688, Beaver Dam Mountains 12 0248 782E 40 96 646N Clifton 42231.

***Enceliopsis nudicaulis* (A. Gray) A. Nels.**

NAKED-STEMMED SUNRAY. Only from extreme ne part of the county.

ERICAMERIA

- 1 Leaves evidently resinous-punctate
- 2 Leaves cuneate to spatulate or obovate, 3-15 mm wide *E. cuneata* var. *spatulata*
- 2 Leaves $\pm$ linear, 1-2 (3) mm wide
- 3 Heads large, with many rays *E. linearifolia*
- 3 Heads small, with 1 to several rays *E. laricifolia*
- 1 Leaves not resinous-punctate *E. cervinus*

***Ericameria cervinus* Rydb.**

DEER HEATH-GOLDENROD.

***Ericameria cuneata* (A. Gray) McClatchie var. *spatulata* (A. Gray) H.M. Hall**

SPATULATE-LEAVED ERICAMERIA. [*Haplopappus* c. var. s. (A. Gray) S.F. Blake]

***Ericameria laricifolia* (A. Gray) Shinn.**

TURPENTINE-BUSH. D-W Ranch Road 12 0234 720E 38 93 194N Clifton 38553. [*Haplopappus* l. A. Gray]

***Ericameria linearifolia* (DC.) Urb. & J. Wussou**

INTERIOR GOLDENBUSH. D-W Ranch Road 12 0234 314E 38 92 574N Clifton 38564. [*Haplopappus* l. DC.]

ERIGERON Wild Daisy

- 1 Herbage with some glandular hairs present
- 2 Plants with some or all the leaves bearing lobes
- 3 Phyllaries strigose and glandular; leaf lobes linear *E. oreophilus*
- 3 Phyllaries with short glandular hairs and sparse long, spreading hairs; leaf lobes quite broad *E. lobatus*
- 2 Plants with leaves not as above *E. platyphyllus*
- 1 Stems lacking glandular hairs
- 4 Stems glabrous; plants reed-like, not forming a well developed basal rosette *E. oxyphyllus*
- 4 Stems hairy; plants not reed-like, often forming a tuft of basal leaves
- 5 Cauline leaves ample, quite broad; plants quite tall
- 6 Basal clump of leaves lacking by flowering; stems not obviously glandular-hairy *E. speciosus* var. *macranthus*
- 6 Basal clump of leaves present by flowering; stems obviously glandular-hairy *E. platyphyllus*
- 5 Cauline leaves reduced, narrow; plants often short
- 7 Stem hairs spreading
- 8 Plants annual or biennial; disk-corollas 2-3 mm long; pappus with the outer series setose scales or pallas that bear short setae *E. divergens*
- 8 Plants perennial; disk-corollas 3.5-5 mm long; pappus with the outer series of broad scales... *E. concinnus* var. *concinnus*
- 7 Stem hairs appressed
- 9 Plants producing sterile branches from below; achenes 2-nerved *E. flagellaris*
- 9 Plants lacking sterile branches; achenes 4-nerved *E. utahensis*

***Erigeron concinnus* (H. & A.) T. & G.**

PRETTY FLEABANE. Branch of Truxton Wash 12 0277 194E 39 18 054N Clifton 39748, Old 66 12 0285 250E 39 36 800N Clifton 41361, Mt. Trumbull Loop Road 12 0270 556E 40 79 460N Clifton 42271. [*E. pumilus* Nutt. ssp. *concinoides* Cronq.]

***Erigeron divergens* T. & G.**

DIFFUSE FLEABANE. This is an extremely variable taxon. There are plants the have a central erect axis with spreading branches; the pappus has the outer row composed of pallas that bear setae at their apex. There are plants that have no central axis and are often sprawling; pappus with the outer row composed of very few short setae. Some time these grow together as on Mt Trumbull. Other places they grow by themselves. Hualapai Mountain Road 12 0233 380E 38 92 613N Clifton 38628,

North Fork Knight Creek 12 0277 450E 38 90 781N Clifton 39878, Mt. Trumbull 12 0309 027E 40 29 805N Clifton 41750 (sprawling phase), 41751 (erect phase).

Erigeron flagellaris A. Gray

TRAILING FLEABANE. East Branch Tuckayou Wash 12 0280 826E 39 03 237N Clifton 39871.

Erigeron lobatus A. Nels.

LOBED FLEABANE

Erigeron oreophilus Greenm

MOUNTAIN LOVING FLEABANE. Kaiser Spring Wash 12 0271 976E 38 28 788N Clifton 39831, Camp Levi Levi Road 12 0235 570E 38 87 324N Clifton 41239.

Erigeron oxyphyllus E. Greene

WAND FLEABANE. Growing in the shade of large boulders, 2000-3000 ft. The type came from near Yucca. Late Jan-May. Alamo Road 12 0226 224E 38 51 199N Clifton 38798.

Erigeron platyphyllus E. Greene

BROAD-LEAVED DAISY. These plants have a dense clump of leaves at the base of the plant at flowering time. Jul-Oct. Camp Levi Levi 12 0235 266E 38 86 747N Clifton 41225, Hualapai Mountain County Park 12 0235 760E 38 87 120N Clifton 41382, Mt. Trumbull 12 0308 817E 40 29 918N Clifton 41749.

Erigeron utahensis A. Gray

UTAH DAISY. Open sandy or rocky places, below 2000-4500 ft. April-June. Beaver Dam Mountains 12 0248 782E 40 96 646N Clifton 42224.

ERIOPHYLLUM

1 Heads lacking rays *E. pringlei*

1 Heads with well developed rays

2 Ligules white *E. lanosum*

2 Ligules yellow *E. wallacei*

Eriophyllum lanosum (A. Gray) A. Gray

WHITE-RAYED WOOLLY SUNFLOWER. McCracken Mine Road 12 0247 670E 38 16 129N. Clifton 38813, Willow Beach Road 11 0715 423E 39 71 649N Clifton 38771.

Eriophyllum pringlei A. Gray

PRINGLE'S WOOLLY SUNFLOWER. Alamo Road 11 0773 198E 38 50 541N Clifton 391545, Chicken Spring Road 12 0259 294E 38 42 566N Clifton 39294.

Eriophyllum wallacei (A. Gray) A. Gray

WALLACE'S WOOLLY SUNFLOWER. Alamo Road 11 0711 169E 38 54 940N Clifton 38792, Cane Spring Wash 12 0259 967E 38 66 431N, Grand Wash Cliffs 12 0239 740E 39 42 007N.

EUPATORIUM

Eupatorium herbaceum (A. Gray) E. Greene

DESERT EUPATORIUM. Camp Levi Levi 12 0235 282E 38 86 892N Clifton 41226, Mt. Trumbull 12 0308 817E 40 29 918N.

FILAGO

1 Stems generally leafless between the lower forks, $\pm$ glabrous, purplish to black *F. arizonica*

1 Stems equally leafy, cobwebby, grayish to greenish

2 Plants generally with a central axis; lobes of disk flowers 4, mostly reddish tinged *F. californica*

2 Plants lacking any kind of a central axis; lobes of the disk flowers 5, yellowish or brownish *F. depressa*

Filago arizonica A. Gray

ARIZONA COTTON-ROSE Six Mile Crossing Road 12 0282 325E 38 28 716N Clifton 39488.

Filago californica Nutt.

CALIFORNIA COTTON-ROSE. Signal Road 12 0258 680E 38 17 847N Clifton 38960, Cook Canyon 11 0766 155E 38 97 166N Clifton 38973, Frees Wash 12 0236 563E 38 93 487N Clifton 39252, Grand Wash Cliffs 12 0239 740E 39 42 007N.

Filago depressa A. Gray

DWARF COTTON-ROSE. Shack Spring Canyon 11 0769 099E 38 94 210N Clifton 38898, Oatman Road 11 0743 047E 38

80 116N Clifton 38888, Signal Road 12 0258 680E 38 17 847N Clifton 38961, Cane Spring Wash 12 0259 967E 38 66 431N, Grand Wash Cliffs 12 0239 740E 39 42 007N.

GAILLARDIA

- 1 Rays completely yellow
- 2 Leaves pinnatifid
 - 3 Cauline leaves evident; pappus awned..... *G. pinnatifida*
 - 3 Cauline leaves not evident; pappus obtuse*G. arizonica*
- 2 Leaves entire or nearly so*G. parryi*
- 1 Rays red or purple, sometimes yellow tipped or multicolored..... *G. pulchella*

Gaillardia arizonica A. Gray

ARIZONA BLANKET-FLOWER. Alamo Road 12 0245 211E 38 28 588N Clifton 39159.

Gaillardia parryi E. Greene

PARRY BLANKET-FLOWER. Mostly in clay soil, not as often in sand, mostly in the pinyon-juniper; 4000-6000 ft. May-June (-Sept.).

Gaillardia pinnatifida Torr.

HOPI BLANKET-FLOWER. Often in sandy or gravelly soil in the desert in open places, sometimes as a weed along roads; below 5500 ft. April-June (-Aug.). Highway 389 12 0339 880E 40 80 460N Clifton 41174, Jones Hill 12 0289 205E 40 41 882N Clifton 41757.

Gaillardia pulchella Foug.

FIRE-WHEEL, INDIAN-BLANKET. Hackberry 12 0253 514E 39 17 072N Clifton 8216.

GERAEA

Geraea canescens A. Gray

DESERT SUNFLOWER. Topock Marsh 11 0727 170E 38 58 887N Clifton 38767.

GLYPTOPLEURA

Glyptopleura setulosa A. Gray

HOLY-DANDELION. Red Lake 11 0761 147E 39 52 062N Clifton 39719.

GNAPHALIUM

Note: The plants in the *G. wrightii* complex are composed of a polymorphic mess. No one person agrees as to their proper placement.

- 1 Plants annual, moist places
- 2 Flowers white; phyllaries lustrous light brown below with whitish tips..... *G. palustre*
- 2 Flowers reddish or yellowish; phyllaries yellowish-white or brownish-stramineous
 - 3 Inner phyllaries truncate-serrate at the tip; pappus falling as a ring; center of flower reddish, or sometimes pinkish*G. luteo-album*
 - 3 Inner phyllaries rounded and incised at the tip; pappus not falling as a ring, center of flower yellowish.....*G. stramineum*
- 1 Plants perennial
 - 4 Leaves bright green and glandular on upper surface, white tomentose below *G. macounii*
 - 4 Leaves tomentose throughout or at least on the lower surface, not glandular.....*G. wrightii*

Gnaphalium luteo-album L.

EUROPEAN CUDWEED. Growing in moist places. Late Mar-May. Six Mile Crossing Road 12 0275 393E 38 33 100N Clifton 39493.

Gnaphalium macounii DC.

GLANDULAR CUDWEED. . Aug.-Sept.

Gnaphalium palustre Nutt.

LOWLAND CUDWEED. Cook Canyon 11 0766 155E 38 97 166N Clifton 38972.

Gnaphalium stramineum Kunth

COTTON-BATTING CUDWEED. moist often disturbed places, sand bars, along roads. June-Nov.: [*G. chilense* Spreng].

Gnaphalium wrightii A. Gray

WRIGHT'S CUDWEED. Mid Feb- Hualapai Mountains 11 0768 456E 38 92 532N Clifton 39031.

GRINDELIA Gumweed

- 1 Rays lacking..... *G. aphanactis*
 1 Rays obvious..... *G. squarrosa*

Grindelia aphanactis Rydb.

RAYLESS RESIN-WEED.

Grindelia squarrosa (Pursh) Dunal

var. *serrulata* (Rydb.) Steyererm.

SERRULATE RESIN-WEED. Dry open places, 4000-6000 ft. July-Sept. Highway 389 12 0361 990E 40 88 971N Clifton 13570, Highway 389 12 0357 857E 40 85 125N Clifton 41693.

GUTIERREZIA

- 1 Phyllaries 12 or more; disk flowers often more than 4, ray flowers often more than 3..... *G. sarothrae*
 1 Phyllaries 4-6; disk flowers up to 4, ray flowers 1-3 *G. microcephala*

Gutierrezia microcephala (DC.) A. Gray

STICKY SNAKEWEED. D-W Ranch Road 12 0234 314E 38 92 574N Clifton 38561, Twomile Wash 12 0351 874N 40 78 606N Clifton 41165.

Gutierrezia sarothrae (Pursh) Britton & Rusby

BROOM SNAKEWEED, MATCHWEED. Openings in pinyon-juniper, along roads and other disturbed places. July-early Dec. Oatman Road 11 0747 279E 38 79 118N Clifton 38659.

HELIANTHELLA***Helianthella microcephala*** (A. Gray) A. Gray

SMALL-HEADED DWARF SUNFLOWER.

HELIANTHUS Sunflower

- 1 Plants strictly annual, herbage variously hairy, but not with a few scattered stout hair
 2 Involucral bracts slender; leaves light yellow-green; plants of very sandy places *H. anomalus*
 2 Involucral bracts wider; leaves darker green; plants generally of waste places, not very sandy
 3 The receptacular bracts 3-lobed, outer 2 lobes acute, the central lobe larger and expanded, the central ones in the head conspicuously white-bearded at the tip, so that the center of the dark disk appears to have a white center..... *H. petiolaris*
 3 The receptacular bracts broadly rounded at the apex; the phyllaries ovate or ovate-oblong, narrowed into an acuminate tip; plants annual..... *H. annuus*
 1 Plants perennial, spreading by slender creeping roots; herbage glabrous or often with scattered stout hairs *H. ciliaris*

Helianthus annuus L.

var. *annuus*

COMMON SUNFLOWER. below 8,500 ft.; along road margins, disturbed places. This plant acts like a weed, but it is native to the w. U.S. and has been cultivated since pre-Columbian times. June-Sept. Highway 389 12 0361 776E 40 88 757N Clifton 41161, Old 66 12 0285 250E 39 36 800N.

Helianthus anomalus S. F. Blake

WESTERN SUNFLOWER Beaver Dam 12 0237 474E 40 88 380N Clifton 42209

Helianthus ciliaris DC.

BLUEWEED. Often found in $\pm$ alkaline soil, in open places, often weedy, below 5000 ft. June-Aug.

Helianthus petiolaris Nutt.

PRAIRIE-SUNFLOWER. Highway 389 12 0339 880E 40 80 460N Clifton 41173.

HETEROSPERMA

***Heterosperma pinnatum* Cav.**

WINGPETAL. Branch of Knights Creek 12 0277 277E 38 90 603N Clifton 10348, Old Highway 66 12 0283 000E 39 36 397N.

HETEROTHECA***Heterotheca subaxillaris* (Lam.) Britt. & Rusby**

CAMPHORWEED. Kingman 227 943E 39 03 447N Clifton 43310

HIERACIUM Hawkweed***Hieracium fendleri* Sch. Bip.**

FENDLER'S HAWKWEED.

HYMENOPAPPUS***Hymenopappus filifolius* Hook.**

- a Cauline leaves at least 5, the lower very well developed
 - b Involucre 4-6 mm high; inflorescence quite leafy..... var. *pauciflorus*
 - b Involucre 6-12 mm high; inflorescence not real leafy
 - c Involucre generally 9-12 mm high; plants of rocky places var. *megacephalus*
 - c Involucre 6-9 mm high
 - d Plants generally in sandy places; leaflets short; base of plants not appearing bulbous var. *tomentosus*
 - d Plants of rocky slopes; leaflets long; base of plants appearing bulbous because of the dense wool var. *longifolia*
- a Cauline leaves less than five, none as well developed as the basal
 - e Involucre mostly 9-12 mm high var. *lugens*
 - e Involucre mostly 6-9 mm high var. *nanus*

var. *longifolia* G. Clifton var. nov.

LONG LEAFLET CUTLEAF. Beaver Dam Mountains 12 0248 782E 40 96 646N Clifton 42229.

var. *lugens* (E. Greene) Jeps.

YELLOW-FLOWERED CUTLEAF. Hualapai Mountain Road 12 0233 313E 38 92 540N Clifton 38570.

var. *megacephalus* B. L. Turner

LARGE-SEPAL CUTLEAF.

var. *nanus* (Rydb.) B. L. Turner

SMALL CUTLEAF. Big Wash Road 11 0752 255E 39 27 400N Clifton 42178

var. *pauciflorus* (I. M. Johnst.) B. L. Turner

SMALL FLOWERED CUTLEAF. Growing on pink sand, Highway 389 12 0361 776E 40 88 757N Clifton 41151.

var. *tomentosus* (Rydb.) B. L. Turner

MANY-LEAVED CUTLEAF.

HYMENOTHRIX

- 1 Anthers included; leaves $\pm$ uniform to the inflorescence *H. loomisii*
- 1 Anthers exerted; leaves only about half way to the inflorescence *H. wrightii*

***Hymenothrix loomisii* S. F. Blake**

LOOMIS' THIMBLEHEAD. Along roads, openings in pinyon-juniper woodland. June-Dec. D-W Ranch Road 12 0234 314E 38 92 574N Clifton 38556.

***Hymenothrix wrightii* A. Gray**

WRIGHT'S THIMBLEHEAD.

HYMENOXYS

- 1 Plants lacking leaves on the stem..... *H. acaulis*
- 1 Plants with leaves on the stem
 - 2 The flowering heads exerted well above the leaves..... *H. cooperi*

- 2 The flowering heads $\pm$ included in the leaves ***H. rusbyi***

Hymenoxys acaulis (Pursh) K. Parker

var. ***arizonica*** (E. Greene) K. Parker

NAKED STEMMED GOLDFLOWER. Tom Brown Road 273 967E 38 62 437N Clifton 41312, Parashant Wash 268 330E 40 16 972N Clifton 42320.

Hymenoxys cooperi (A. Gray) Cockerell

var. ***cooperi***

COOPER'S GOLDFLOWER. Wolf Hole Pass 12 0274 576E 40 65 884N Clifton 42301. These plants have a single stem with a branching inflorescence and the style branches of the ray flowers are long exserted.

Hymenoxys rusbyi (A. Gray) Cockerell

RUSBY'S GOLDFLOWER. On slopes in openings in yellow pine forest. Some of the collections have the leaves and or their lobes way to narrow to be this taxon. This would fit the preceding except that the pappus is very short, not acuminate and the styles of the ray flowers are not much exserted.. Flag Mine Road 12 0238 200E 38 84 533N Clifton 40943, Mustang Reservoir 274 844E 40 37 471N Clifton 42315, Flag Mine Road 237 235E 38 85 513N Clifton 37097.

ISOCOMA

- 1 Phyllaries with a thicken tip, bearing a large round gland; pappus white ***I. acradenia*** var. ***eremophila***
 1 Phyllaries not as above; pappus stramineous or brown
 2 Involucre 6-8 mm tall, tips green ***I. rusbyi***
 2 Involucre 3.5-5 mm tall, tips not green or obscurely so ***I. pluriflora***

Isocoma acradenia (E. Greene) E. Greene var. ***eremophila*** (E. Greene) Nesom

ALKALI JIMMYWEED. Golden Valley 11 0754 653E 39 00 975N Clifton 41324. [*Haplopappus a.* (E. Greene) Blake ssp. *e.* (E. Greene) Hall].

Isocoma pluriflora (T. & G.) E. Greene

SOUTHERN JIMMYWEED. [*Haplopappus heterophyllus* (A. Gray) Blake].

Isocoma rusbyi E. Greene

RUSBY'S JIMMYWEED. Six Mile Crossing Road 12 0283 210E 38 28 339N Clifton 28184. [*Haplopappus r.* (E. Greene) Cronq.].

Isocoma sp. These plants have the pappus white like *I. acradenia* but the phyllaries don't have a thicken apex with a large gland. Wheeler Wash 12 0237 900E 38 85 629N Clifton 40741.

IVA

Iva axillaris L.

POVERTY WEED. Fairly frequent, below 8500 ft.; along road, lake shores. June-Sept. Mt Trumbull Loop 12 0350 573E 40 76 354N Clifton 41712.

LACTUCA

Lactuca serriola L

PRICKLY LETTUCE. Hualapai Mountain Road 12 0234 721E 38 90 184N Clifton 38594, Warm Springs 746 272E 38 64 564N.

LAYIA

Layia glandulosa (Hook.) H. & A.

WHITE LAYIA. below 5400 ft. Mar-Jun. Kaiser Spring Wash 12 0271 657E 38 28 799N Clifton 39305, Borianna Mine Road 11 0773 341E 38 62 366, Willows Ranch Road 12 0278 190E 38 96 433N Clifton 39858.

LESSINGIA

Lessingia glandulifera A. Gray

var. ***glandulifera***

YELLOW-FLOWERED LESSINGIA. [*L. Lemmonii* A. Gray]

LEUCOSYRIS

Leucosyris carnosus (A. Gray) E. Greene var. ***intricata*** (A. Gray) Cronq.
SHRUBBY ALKALI ASTER. [*Aster intricatus* (A. Gray) S.F. Blake].

MACHAERANTHERA

- 1 Rays yellow
 - 2 Plants annual..... ***M. gracilis***
 - 2 Plants perennial, almost shrubby ***M. pinnatifida***
- 1 Ray not yellow
 - 3 Leaves pinnatifid (at least the lower)
 - 4 Green tips of the phyllaries spreading, noticeably narrower than the whitish base..... ***M. tanacetifolia***
 - 4 Green tips of the phyllaries erect, not noticeably narrower than the whitish base ***M. tagetina***
 - 3 Leaves entire or merely toothed
 - 5 Ray flowers lacking pappus ***M. arida***
 - 5 Ray flowers bearing pappus
 - 4 Herbage with crinkly hairs that are long and short; involucre with 7-8 rows of phyllaries..... ***M. asteroides***
 - 4 Herbage lacking any long crinkly hairs ***M. canescens***

Note: This group of plants are extremely variable with as many named taxa as there are people to name them. Not one person agrees with another as to the proper name for each taxon. The names used below may or may not belong to our plants. It is very obvious that the methods of pollination have not been look at very careful. Pollination and morphological characters would have to be correlatable in the naming of each specific taxon.

Machaeranthera arida B. Turner & D. Home

DESERT TANSY-ASTER Red Lake 11 0760 990E 39 51 455N Clifton 41328.

Machaeranthera asteroides (Torr.) E. Greene

The distinction of this species from *M. canescens* is hard to see at times. It usually has more rows of phyllaries than does *M. canescens*. Most authors don't agree as to how to separate these two taxa A large number of our plants have long crinkly hairs (to the point of being almost tomentose in places on the plant), which is not mention in any literature. This author is applying these above plants to the species itself until it is learned otherwise. Recently these plants have been put in the genus *Psilactis*, however they are not distinct enough from the genus *Machaeranthera*.

- a Herbage gray, also with some long crinkly hair; heads larger var. ***asteroides***
- a Herbage not as gray, lacking long crinkly hairs; heads smaller var. ***glandulosa***

var. ***asteroides***

NEW MEXICO BARE-RAYED ASTER. Old 66 12 0285 250E 39 36 800N Clifton 41237, D-W Ranch Road 12 0234 314E 38 92 574N Clifton 38555, Hualapai Mountain Road 12 0235 225E 38 89 534N Clifton 38593.

var. ***glandulosa*** B. L. Turner

GLANDULAR BARE-RAYED ASTER

Machaeranthera canescens (Pursh) A. Gray

HOARY-ASTER. Along roads, openings in pinyon-juniper, below 8000 ft. June-early Dec. Highway 389 12 0357 857E 40 85 125N Clifton 41695.

Machaeranthera gracilis (Nutt.) Shinn.

GRASS LEAF TANSY-ASTER. Old Trails Road 11 0767 914E 38 95 847N Clifton 38650.

Machaeranthera pinnatifida (Hook.) Shinn

var. ***gooddingii*** (A. Nels.) S. F. Blake

GOODDING'S LACY TANSY-ASTER. Alamo Road 12 0257 016E 37 97 839N Clifton 38877.

Machaeranthera tagetinus E. Greene

MESA TANSY-ASTER. Red Lake 11 0760 996E 39 51 149N Clifton 39392, Branch of Knight Creek 12 0277 332E 38 90 684N Clifton 21415.

Machaeranthera tanacetifolia (Kunth) Nees

TAKHOKA-DAISY. Highway 389 12 0361 776E 40 88 757N Clifton 41156.

MALACOTHRIX

- 1 Leaves not lobed; phyllaries with broad scarious margins..... *M. coulteri*
- 1 Leaves pinnate or deeply lobed; phyllaries lacking broad scarious margins
 - 2 Ligules only about the same length or just a little longer than the involucre..... *M. clevelandii*
 - 2 Ligules long exserted beyond the involucre
 - 3 Rachis of basal leaves narrow with linear lobes..... *M. glabrata*
 - 3 Rachis of basal leaves broad with broad lobes
 - 4 The few cauline leaves sagittate or auriculate; peduncles and involucre glabrous or nearly so *M. sonchoides*
 - 4 The cauline leaves sessile but not sagittate or auriculate; peduncles and involucre very often bearing some coarse stipitate glands or gland-tipped setae *M. torreyi*

Malacothrix clevelandii A. Grayvar. ***stebbinsii*** (W. Davis & Raven) Cronq.

STEBBINS' DANDELION. Six Mile Crossing 12 0284 307E 38 26 860N Clifton 39462.

Malacothrix coulteri A. Gray

SNAKE'S-HEAD. Six Mile Crossing Road 12 0283 138E 38 28 525N Clifton 39456.

Malacothrix glabrata A. Gray

DESERT DANDELION. Meadow Creek 11 0748 427E 38 79 536N Clifton 39173, Detrital Wash 11 0725 827E 39 78 841N Clifton 39687.

Malacothrix sonchoides (Nutt.) T. & G.

SOW-THISTLE .

Malacothrix torreyi A. Gray

TORREY'S MALACOTHRIX. Sandy areas and gravelly slopes. Six Mile Crossing Road 12 0283 826E 38 27 447N Clifton 39476.

MELAMPODIUM

Melampodium leucanthum T. & G.

SHOWY BLACKFOOT. Along roads, openings in pinyon-juniper. March-early Dec. D-W Ranch Road 12 0234 314E 38 92 574N. Clifton 38559, Hualapai Mountains 11 0768 487E 38 92 596N Clifton 39030, Alamo Road 12 0245 211E 38 28 588N Clifton 39160.

MONOPTILON

- 1 Plant more open; ligule 5-8.5 mm long; pappus of several scales $\pm$ dissected into bristles *M. bellioides*
- 1 Plants more compact; ligule 3-5 mm long; pappus a crown and one plumose-tipped awn..... *M. bellidiforme*

Monoptilon bellidiforme A. Gray

DESERT STAR. Grand Wash Cliffs 12 0239 740E 39 42 007N Clifton 39265.

Monoptilon bellioides (A. Gray) H.M. Hall

MOJAVE DESERT STAR. Late Jan- McCracken Mine Road 12 0247 670E 38 16 129N. Clifton 38814, Alamo Road 12 0255 480E 38 00 448N Clifton 38872, Lake Havasu City 11 0753 560E 38 15 445N Clifton 38907.

- 1 Stems 7-10 dm tall; leaves with few divisions, the terminal one large, roundish, 2.5-5 cm wide..... *P. quercetorum*
- 1 Stems shorter than 7 dm; leaves with more divisions, the terminal under 2.5 cm wide or $\pm$ entire
 - 1 Leaves $\pm$ entire..... *P. werneriaefolius*
 - 1 Leaves pinnatifid *S. multilobatus*

PALAFOXIA

Palafoxia arida Turner & Morris var. ***arida***

SPANISH NEEDLE. Griffith Road 11 0761 291E 38 80 388N Clifton 38671.

PARTHENIUM

***Parthenium incanum* H. B. K.**

MARIOLA. Hualapai Mountain Road 12 0230 855E 38 94 502N Clifton 38617, Grapevine Canyon 12 0233 746E 39 75 700N.

PECTIS

- 1 Ray flowers obvious, above the leaves; plants erect ***P. papposa***
 1 Ray flowers small, among the leaves; plants spreading ***P. prostrata***

***Pectis papposa* Harv. & A. Gray**

MANY-BRISTLE CHINCHWEED. Hualapai Mountain Road 12 0230781E 38 94 506N Clifton 38631.

***Pectis prostrata* Cav.**

SPREADING CHINCHWEED. Branch of Knight Creek 12 0277 292E 38 90 810N Clifton 27085.

PERITYLE

- 1 Rays white
 2 Plants annual ***P. emoryi***
 2 Plants perennial ***P. ciliata***
 1 Rays lacking
 3 Stems shortly glandular-scabrous to scabro-puberulent ***P. congesta***
 3 Stems soft villose-puberulent ***P. tenella***

***Perityle ciliata* (L. Dewey) Rydb.**

HAIRY ROCK-DAISY. Camp Levi Levi 12 0235 015E 38 86 547N Clifton 41219.

***Perityle congesta* (M. E. Jones) Shinn.**

GRAND CANYON ROCK-DAISY.

***Perityle emoryi* Torr.**

EMORY'S ROCK-DAISY. Rocky slopes, cliffs, below 3000 ft. Mid Jan-May, Aug-Oct. Alamo Road 12 0228 720E 38 48 213N Clifton 38716.

***Perityle tenella* (M. E. Jones) J. F. Macbr.**

DIXIE ROCK-DAISY. Cliff crevices and rocky slopes, above 4000 ft. The plants in Grapevine Canyon have leaves of this taxon but stem hairs as in *P. congesta*. May-Aug. Grapevine Canyon 233 685E 39 75 633N Clifton 41335.

PETRADORIA***Petradoria pumila* (Nutt.) E. Greene**

- a Leaves very narrow 1-2 mm wide; heads 4-flowered, 2 ray and 2 disk var. ***graminea***
 a Leaves wider than 2 mm; heads generally 5-flowered var. ***pumila***

var. *pumila*

GRASSY ROCK GOLDENROD. There are often plants that will look like the typical to some extent, but will miss on of the characters. Blye Canyon 12 0280 253E 39 27 465N Clifton 41606, Cedar Ridge 12 0331 712E 40 82 998N Clifton 41687.

var. *graminea* (Woot. & Standl.) S. Welsh

NARROW-LEAVED GRASSY ROCK GOLDENROD. A good share of these plants have a single ray flower and 2 staminate flowers per head. Aug-Sep. Bobcat Reservoir 12 0322 594E 40 41 235 Clifton 41720.

PEUCEPHYLLUM***Peucephyllum schottii* A. Gray**

PYGMY-CEDAR. Colorado River 11 0704 076E 39 86 342N Clifton 39206.

PICRADENIOPSIS***Picradeniopsis woodhousei* (A. Gray) Rydb.**

WOODHOUSE'S FALSE BAHIA. Hualapai Mountain Road 12 0229 257E 38 95 400N Clifton 40711.

PLEIACANTHUS

Pleiacanthus spinosus (Nutt.) Rydb.

THORNY SKELETON-PLANT. There seems to be a matter of opinion as to which genus all the plants in this group belong. Since this taxon stands alone among both of the other genera, it only seems right to put this taxon in its own genus. This taxon is the only one with spiny branches and wool at the base of the plant. Cedar Ridge 12 0331 837E 40 82 944N Clifton 41688.

PLEUROCORNIS

Pleurocoronis pluriseta (A. Gray) King & Robinson

ARROW-LEAF. Feb-May. Aubrey Hills 11 0761 428E 38 04 646N Clifton 38932. [*Hofmeisteria* p. A. Gray]

PLUCHEA

- 1 Plants a coarse, ± fibrous-rooted annual ***P. odorata***
 1 Plants a freely branching shrub ***P. sericea***

Pluchea odorata (L.) Cass.

SWEETSCENT.

Pluchea sericea (Nutt.) Cov.

ARROW-WEED. This taxon is often put in the genus *Tessaria* which may be justified. Mid Feb- Big Sandy River 12 0263 595E 38 38 696N Clifton 38999.

POROPHYLLUM

Porophyllum gracile Benth.

SLENDER PORELEAF. Griffith Road 11 0761 764E 38 80 512N Clifton 38667.

PRENANTHELLA (Group 1)

Prenanthea exigua (A. Gray) Tomb

EGBERTIA. Temple Bar Road 11 0722 568E 39 68 954N Clifton 39676. [*Lygodesmia* e. A. Gray]

PSATHYROTES

- 1 Margins of the leaves with long multicellular hairs ***P. pilifera***
 1 Margins of the leaves lacking the long hairs
 2 Inner and outer phyllaries about the same width, outer erect; pappus in 1 row ***P. annua***
 2 Inner narrower than the outer, outer recurved; pappus in 3-4 rows ***P. ramosissima***

Psathyrotes annua (Nutt.) A. Gray

MEALY ROSETTES.

Psathyrotes pilifera A. Gray

HAIRY BRITTLE-STEM. Open often barren soil that is often or gypsiferous, about 4680 ft. Aug.-Oct. Highway 389 12 0358 400E 40 85 640N Clifton 41703.

Psathyrotes ramosissima (Torr.) A. Gray

VELVET ROSETTES or TURTLEBACK. Old Highway 95 11 0741 010E 38 28 553N Clifton 39764.

PSILOSTROPHE

- 1 Herbage white-wooly; leaf blades entire ***P. cooperi***
 1 Herbage pubescent, not wooly, lower leaf blades often lacinate ***P. sparsiflora***

Psilostrophe cooperi (A. Gray) E. Greene

COOPER'S PAPER-DAISY. Slopes, mesas, flats, and plains, 2000-5000 ft. May bloom any time if moisture is right. Hualapai Mountain Road 12 0229 431E 38 95 286N Clifton 38578.

Psilostrophe sparsiflora A. Gray

FEW-FLOWERED PAPER-DAISY. Old 66 12 0273 526E 39 32 975N Clifton 41235.

RAFINESQUIA

- 1 Ligules 15-20 mm long; rachis of the leaves very narrow *R. neomexicana*
 1 Ligules 5-8 mm long; rachis of the leaves broad *R. californica*

Rafinesquia californica Nutt.

CALIFORNIA CHICORY. Cook Canyon 11 0766 616E 38 97 109N Clifton 39438, Warm Springs 746 272E 38 64 564N.

Rafinesquia neomexicana A. Gray

DESERT CHICORY. McCracken Mine Road 12 0250 332E 38 12 248N Clifton 38830, Signal Road 12 0255 282E 38 18 063N Clifton 38839, Grand Wash Cliffs 12 0239 740E 39 42 007N.

RUDBECKIA

Rudbeckia laciniata L. var. *ampla* (A. Nels.) Cronq.
 GREEN-HEAD CONEFLOWER.

SANVITALIA

Sanvitalia abertii A. Gray

ABERT'S SANVITALIA. Hualapai Mountain Road 12 0230 769E 38 94 522N Clifton 38632, Old 66 12 0285 250E 39 36 800N.

SENECIO Butterweed

Note: They are in the process of making a number of genera out of this group of plants. Their may be some genetic reasons but it doesn't help our understanding of these plants out in the field. So this author leaves them in a single genus.

- 1 Cauline leaves clasping
 2 Ray flowers lacking *S. mohavensis*
 2 Ray flowers present..... *S. lemmonii*
 1 Cauline leaves not clasping or almost lacking
 3 Leaves or leaflets narrowly linear; shrubs or subshrubs
 4 Bracteoles short and inconspicuous
 5 Herbage nearly or quit glabrous; phyllaries 8 or ± 13; leaves simple (ours)..... *S. spartioides*
 5 Herbage ± persistently (may be thinly or irregularly so) woolly-tomentose; phyllaries ± 21 seldom only 13; leaves pinnate..... *S. flaccidus*
 4 Bracteoles prominent *S. douglasii*
 3 Leaves not as above; plants not shrubs
 6 Plants low, up to 20 cm tall; leaves simple and revolute *S. werneriaefolius*
 6 Plants taller, well over 20 cm tall; leaves pinnatifid
 7 Stems with the cauline leaves well developed up to the inflorescence *S. eremophilus*
 7 Stems with the leaves reduced
 8 Leaves with comparatively few divisions, the terminal one 2.5-5 cm wide; plant ± glaucous..... *S. quercetorum*
 8 Leaves with more divisions, the terminal one generally less than 2.5 cm wide; plants not glaucous..... *S. multilobatus*

Senecio douglasii DC.

var. *monoensis* (E. Greene) Jeps.

MONO SHRUBBY BUTTERWEED. Dry, sandy to rocky soil, in numerous habitats. Flowering almost throughout the year. Thunderhead Drive 12 0234 502E 38 93 303N Clifton 38552.

Senecio eremophilus Richards.

var. *mcdougallii* (A. Heller) Cronq.

MACDOUGAL'S DESERT RAGWEED. Mt. Trumbull 12 0309 026E 40 29 796N Clifton 41753.

Senecio flaccidus Less.

EASTERN SHRUBBY BUTTERWEED. Fort Rock Exit 12 0284 685E 38 96 409N Clifton 40755.

Senecio lemmonii A. Gray

LEMMON'S RAGWORT. Wash bottoms in sand, rocky bluffs, 1500-3500 ft. These plants are mostly perennial, but some appear to be annual or at least flowering the first year. Feb-May. Kaiser Spring Wash 12 0271 657E 38 28 799N Clifton 39304,

Kaiser Spring Wash 12 0272 021E 38 28 855, Clifton 39314, Mackenzie Creek 12 0231 266E 38 67 135N Clifton 39347.

Senecio mohavensis A. Gray

MOHAVE BUTTERWEED. McCracken Mine Road 12 0247 670E 38 16 129N. Clifton 38828.

Senecio multilobatus A. Gray

BASIN BUTTERWEED. Cook Canyon 11 0766 500E 38 97 377N Clifton 39437, Blake Ranch Road 12 0244 757E 38 94 453, Mt. Trumbull 12 0308 817E 40 29 918N. [*Packera m.* (A. Gray) W. Weber & Löve].

Senecio quercetorum E. Greene

OAK WOODS BUTTERWEED. [*Packera q.* (E. Greene) C. Jeffrey].

Senecio spartioides T. & G.

BROOM or NARROW-LEAVED BUTTERWEED. Camp Levi Levi Road 12 0235 570E 38 87 324N Clifton 41232.

Senecio werneriiifolius A. Gray

var. *revoluta* G. Clifton var. nov.

ALPINE BUTTERWEED. Among rocks, openings in forest, 7000-8400 ft. June-July. This taxon ranges from San Francisco Mountain to Hualapai Mountains. It differs from the species in that most of the leaves are tightly revolute, the rays are larger, oblong and pinched at the apex so that the teeth are very close together. It most likely is its own species. Hayden Peak 12 0235 206E 38 85 819N Clifton 40717. [*Packera w.* (A. Gray) W. Weber & Löve].

SOLIDAGO Goldenrod

- 1 Lower leaves usually withered by flowering..... *S. canadensis*
- 1 Lower leaves present at flowering
 - 2 Plants essentially glabrous (scaberulous leaf-margins) or often sparsely hispidulous-puberulent in the inflorescence *S. missouriensis*
 - 2 Plants hairy throughout
 - 3 Leaves quite uniform in size and shape up the stem; inflorescence not secund..... *S. wrightii*
 - 3 Leaves with the middle larger than the lower and upper; inflorescence generally secund..... *S. velutina*

Solidago canadensis L.

var. *gilvocanescens* Rydb.

MEADOW GOLDENROD. Drying streams and other moist places. Our plants from the Hualapai Mountains don't really fit any of the described varieties. The leaves are glabrous above and hairy on the mid nerve, sometimes a few scattered hairs also present on the lower surface. Sep-Oct. Frees Wash 12 0236 578E 38 92 538N Clifton 23294.

Solidago missouriensis Nutt.

MISSOURI GOLDENROD.

Solidago velutina DC.

MEXICAN GOLDENROD. July-Nov. Camp Levi Levi 12 0235 119E 38 86 555N Clifton 41221, Mt. Trumbull 12 0308 817E 40 29 918N. [*S. altissima* L. misapplied, *S. sparsiflora* A. Gray].

Solidago wrightii A. Gray

WRIGHT'S GOLDENROD. Camp Levi Levi 12 0235 015E 38 86 547N Clifton 41220, Branch of Knight Creek 12 0277 332E 38 90 684N Clifton 18507.

SONCHUS Sow-Thistle

- 1 Basal auricles of the leaves acute; achenes striate, transversely wrinkled..... *S. oleraceus*
- 1 Basal auricles of the leaves rounded; achenes 3-nerved on each side; not wrinkled..... *S. asper*

Sonchus asper (L.) Hill ssp. *asper*

PRICKLY SOW-THISTLE. Waste places, also in native habitat as along streams and meadows; introduced from Europe. July-Oct. Old Trails Road 11 0767 921E 38 95 606N Clifton 38899.

Sonchus oleraceus L.

COMMON SOW-THISTLE. Waste places; introduced from Europe. July-Oct. Colorado River 11 0704 359E 39 86 544N Clifton 39212.

STEPHANOMERIA

- 1 Plants a taprooted annual; achenes rugose-tuberculate and often pitted; pappus white or nearly so *S. exigua*
- 1 Plants not in all respects as above; perennial
 - 2 Involucre 9-15 mm tall; 10-20 flowers

- 3 Pappus brownish, base of awns not plumose *S. parryi*
- 3 Pappus white, plumose to base *S. thurberi*
- 2 Involucre 5-9 mm tall; 3-9 flowers
- 4 Pappus tawny or golden-stramineous, base not plumose for 1-2+ mm..... *S. pauciflora*
- 4 Pappus white, base not plumose for 0.5 mm..... *S. tenuifolia*

***Stephanomeria exigua* Nutt.**

ANNUAL WIRE-LETTUCE. Open, sandy or gravelly places, below 7000 ft. In late fall the plants are often quite robust and the tap root sometimes is not collected. May-July. Bill Williams River 11 0773 605E 37 94 900 Clifton 39776, Highway 389 12 0329 220E 40 84 959N Clifton 41684, Beaver Dam 12 0237 474E 40 88 380N Clifton 42218

***Stephanomeria parryi* A. Gray**

PARRY'S WIRE-LETTUCE.

***Stephanomeria pauciflora* (Nutt.) A. Nels.**

HAIRLESS or FEW-FLOWERED WIRE-LETTUCE. Sandy or graves have the phyllaries as long as 13 mm. Sandy to gravelly soil in open places, below 5000 ft. Some of the plant May-June (-Nov). D-W Ranch Road 12 0235 481E 38 98 350N Clifton 38608, Bulrush Canyon 12 0348 622E 40 71 965N Clifton 41169.

***Stephanomeria tenuifolia* (Torr.) Hall**

SLENDER WIRE-LETTUCE. Rocky slopes and crevices, throughout. June-Mid Oct

***Stephanomeria thurberi* A. Gray**

THURBER'S WIRE-LETTUCE. Fort Rock Exit 12 0284 668E 38 96 477N Clifton 40749

STYLOCLINE

Note: These taxa can not be keyed out unless they are mature

- 1 The chaff scales scarious-winged throughout, phyllaries 2-4, scarious throughout (if present) *S. gnaphalioides*
- 1 The chaff scales scarious-winged near tip only; phyllaries lacking or vestigial, or 1-3 soon deciduous
- 2 Heads not large balls of cotton, the green of the center of the chaff scale can be seen, the cotton can be scraped from the green with damaging it *S. psilocarphoides*
- 2 Heads are large balls of cotton, the green center can not be seen, the cotton can not be scraped from the center without complete damage to it
- 2 Upper leaves awl-like to narrowly lanceolate; when branched the lower part of the branch naked *S. micropoides*
- 2 Upper leaves ± elliptic to oblanceolate or obovate; when branched the branch bearing leaves throughout *S. intertexta*

***Stylocline gnaphalioides* Nutt.**

EVERLASTING NEST STRAW. Alamo Road 12 0241 952E 38 32 750N Clifton 38717, Graveyard Wash 258 680E 38 17 847N Clifton 38959.

***Stylocline intertexta* Morefield**

MOREFIELD'S NEST STRAW.

***Stylocline micropoides* A. Gray**

DESERT NEST STRAW. Six Mile Crossing Road 282 325E 38 28 716N Clifton 39489

***Stylocline psilocarphoides* M. Peck**

PECK NEST STRAW. Big Wash Road 11 0752 255E 39 27 400N Clifton 42179, Black Canyon 12 0278 454E 38 20 641N Clifton 39005

SYNTRICHOPAPPUS

***Syntrichopappus fremontii* A. Gray**

YELLOW-RAYED FREMONT'S-GOLD. Cook Canyon 11 0766 128E 38 97 270N Clifton 38975.

SYMPHYOTRICHUM

(Aster)

- 1 Plants annual..... *S. expansum*
- 1 Plants perennial
- 2 The involucre bracts with at least the outer shortly but evidently spinulose-mucronate; stems evenly hairy *S. falcatum*
- 2 The involucre bracts not evidently spinulose-mucronate; stems with hair in lines below the leaves..... *A. lanceolatum*

***Symphyotrichum expansum* (Poepp.) G. Newsom**

DESERT AMERICAN-ASTER. Six Mile Crossing 12 0284 156E 38 26 734N Clifton 35192, Knight Creek Spring 12 0276 097E 38 89 514N. [*Aster exilis* Ell.].

***Symphyotrichum falcatum* (Lindl.) Nesom**

var. ***commutatum*** (T. & G.) Nesom

ROUGH WHITE AMERICAN-ASTER. [*Aster c.* T. & G.].

***Symphyotrichum lanceolatum* (Willd.) Nesom**

var. ***hesperium*** (A. Gray) Nesom

WESTERN LINED AMERICAN-ASTER. Usually in full sun on streambanks and other moist to wet places, throughout. July-Sept. [*Aster h.* A. Gray]

TARAXACUM***Taraxacum laevigatum* (Willd.) DC.**

RED-SEED DANDELION.

***Taraxacum officinale* Weber**

COMMON DANDELION. Knight Creek Spring 12 0275 984E 38 89 527N Clifton 39909.

TETRADYMIA

1 Main leaves not forming spines ***T. canescens***

1 Main leaves forming spines ***T. axillaris***

***Tetradymia axillaris* Nelson**

var. ***longispina*** (M. E. Jones) Strother

LONG-SPINED HORSEBRUSH. Dry, open places, below 4500 ft. This taxon has often been made a variety of *T. spinosa* and is said to be confluent with it, however these two never come together and are not confluent in any respect. April-June.

***Tetradymia canescens* DC.**

GRAY HORSEBRUSH. Dry, open places, often in brush, above 5000 ft. June-Aug. Little Tanks 12 0285 990E 40 46 059N Clifton 42313.

THELESERMA

1 Ray-flowers generally present (lacking); pappus up to 0.75 mm long or lacking ***T. subnudum***

1 Ray-flowers lacking; pappus of two awns with retrorse hairs ***T. megapotamicum***

***Thelesperma megapotamicum* (Spreng.) Kuntze**

HOPI-TEA. Fort Rock Exit 12 0284 600E 38 96 492N Clifton 40752.

***Thelesperma subnudum* A. Gray**

NAVAJO-TEA. Dry, open places, below 4500 ft. June-Aug. Cedar Ridge 12 0331 837E 40 82 944N Clifton 13593, 41688, Wolf Hole Pass 12 0274 576E 40 65 884N Clifton 422978.

THYMOPHYLLA

1 Leaves simple; heads virtually sessile ***T. acerosa***

1 Leaves pinnatisect into 3-7 slender segments; heads on ± naked peduncles ***T. pentachaeta***

***Thymophylla acerosa* (DC.) Strother**

AMERICAN PRICKLYLEAF. May- Sep. Blye Canyon 12 0280 077E 39 27 583 Clifton 41604, Beaver Dam Mountains. 12 0248 766E 40 96 415N, Beaver Dam Mountains 12 0248 782E 40 96 646N Clifton 42233 [*Dyssodia acerosa* DC.].

***Thymophylla pentachaeta* (DC.) Small**

var. ***belenidium*** (DC.) Strother

FIVE-NEEDED PRICKLYLEAF. Sawmill Canyon 12 0769 366E 38 94 750N Clifton 41318. [*Dyssodia thurberi* (A. Gray) B. L. Rob.]

TOWNSENDIA

- 1 Flowering heads elevated above the leaves; pappus of ray and disk flowers about the same length, about 1 mm long *T. smithii*
- 1 Flowering heads scarcely elevated above the leaves; pappus of ray and disk flowers not the same length
- 2 Plants generally a perennial with a well branched (often largely subterranean) caudex; some leaves extending above the heads *T. incana*
- 2 Plants strictly an annual; leaves generally extending only to the base of the heads *T. annua*

Townsendia annua Beaman
ANNUAL TOWNSEND-DAISY.

Townsendia incana Nutt.
HOARY TOWNSEND-DAISY Often in very sandy soil, sometimes in clay, in open places, 4000-6800 ft. April-July. Branch of Truxton Wash 12 0276 454E 39 21 109N Clifton 39742, Wolf Hole Pass 274 576E 40 65 884N Clifton 42294.

Townsendia smithii L. M. Shultz & A. H. Holmgren
SMITH'S TOWNSEND-DAISY.

TRAGOPOGON

Tragopogon dubius Scop.
YELLOW SALSIFY. Old 66 12 0285 250E 39 36 800N Clifton 41372, Mt. Trumbull 12 0308 817E 40 29 918N.

TRICHOPTILIUM

Trichoptilium incisum A. Gray
YELLOW-HEAD. Gravelly to somewhat rocky slopes, below 2500 ft. Jan-May. McCracken Mine Road 12 0247 670E 38 16 129N. Clifton 38811.

TRIXIS

Trixis californica Kell.
var. *californica*
CALIFORNIA TRIXIS. Blooming ± throughout the year, but mainly Feb-June. Alamo Road 12 0228 720E 38 48 213N Clifton 38713.

UROPAPPUS

Uropappus lindleyi (DC.) Nutt.
SILVER PUFFS. Clack Canyon 11 0766 889E 38 99 396N Clifton 39020.

VERBESINA

Verbesina encelioides (Cav.) A. Gray
var. *exauriculata*. Rob. & Greenm.
GOLDEN CROWNBEARD. April-July, Oct-early Dec. Frees Wash 12 0236 172E 38 94 068N Clifton 38599, Pine Lake 12 0238 573E 38 86 457N Clifton 40939.

VIGUIERA

- 1 Plants annual *V. annua*
- 1 Plants perennial
- 2 Leaves deltoid-ovate; pappus present *V. parishii*
- 2 Leaves lance-ovate to linear-lanceolate; pappus lacking *V. multiflora*

Note: *V. annua* and *V. multiflora* have been put in the genus *heliomeris* which is defensible, but doesn't add much to the understanding of the plants.

Viguiera annua (M. E. Jones) S. F. Blake
SOUTHERN GOLDENEYE Open gravelly or sandy places that are from dry to moist, below 6000 ft. Apparently when this taxon and *V. longifolia* were crossed with each other the pollen they produced was only 29-56 percent stainable. Grapevine

Canyon 12 0236 634E 39 78 593N Clifton 41350. June-Oct. [*V. longifolia* (Robins. & Greenm.) S. F. Blake, misapplied]

Viguiera parishii E. Greene

PARISH'S GOLDENEYE. Rocky slopes, cliffs, below 4600 ft. Blooms most any time the year. Hualapai Mountain Road 12 023 906E 38 94 433N Clifton 38620, McCracken Mine Road 12 0247 670E 38 16 129N Clifton 38747. [*V. deltoidea* A. Gray var. *p.* E. Greene) Vasey & Rose

Viguiera multiflora (Nutt.) S. F. Blake

SHOWY GOLDENEYE. May-June. Mt. Trumbull Loop Road 12 0270 556E 40 79 460N Clifton 42273, Grapevine Canyon 233 685E 39 75 633N Clifton 41336.

WYETHIA

Wyethia scabra Hook.

BADLANDS MULES-EAR.

XANTHIUM

- 1 Axiles bearing a 3-forked spine; leaves lanceolate, entire or with a few coarse teeth or pinnate lobes ***X. spinosa***
 1 Axiles lacking spines; leaves broadly ovate to suborbicular or reiform, margins finely toothed and sometimes shallowly 3-5-lobed..... ***X. strumarium*** var. ***canadense***

Xanthium spinosa L.

SPINY COCKLEBUR. Knight Creek Spring 12 0275 984E 38 89 527N Clifton 39908.

Xanthium strumarium L. var. ***canadense*** (P. Mill.) T. & G.

COCKLEBUR. Fields, waste places, alluvial flats, throughout (?). April-Oct.,

XYLORHIZA

Xylorhiza tortifolia (T. & G.) E. Greene

- a Herbage with a variable amount of long, soft hairs as well as being glandular var. ***tortifolia***
 a Herbage essentially glandular except the leaf margins or sometimes leaf surface subglabrous.....var. ***imberbis***

var. ***imberbis*** (Cronq.) T. J. Wats.

UTAH WOODY-ASTER [*Machaeranthera t.* (T. & G.) Cronq. & D. Keck var. *i.* Cronq.].

var. ***tortifolia***

MOJAVE WOODY-ASTER. Gravelly to rocky places, 2000-5000 ft. Jan-May. McCracken Mine 12 0245 277E 38 15 517N Clifton 38750, Six Mile Crossing Road 12 0282 418E 38 28 775N. Clifton 39484. [*Machaeranthera t.* (T. & G.) Cronq. & D. Keck].

ZINNIA

Zinnia grandiflora Nutt.

LARGE-FLOWERED ZINNIA. D-W Ranch Road 12 0236 482E 38 94 297N Clifton 38604.

BERBERIDACEAE Barberry Family

MAHONIA Barberry

Note: The plants that are the real *Berberis* have spines on the stem and simple leaves.

- 1 Plants a tall shrub with leaves lobed
 2 The terminal leaf quit a bit longer than the lateral ***M. haematocarpa***
 2 The terminal leaf about the same size as the lateral ***M. fremontii***
 1 Plants a short subshrub with leaves not lobed ***M. aquifolium*** var. ***repens***

Mahonia aquifolium (Pursh) Nutt. var. ***repens*** (Lindl.) G. Clifton

DWARF BARBERRY. rocky slopes. April-May; Mt. Trumbull 12 0309 172E 40 29 509N Clifton 41742. [*Berberis repens* Lindl.]

Mahonia fremontii (Torr.) Fedde

FREMONT'S MAHONIA. Open or brushy slopes, canyons, throughout. Mt Trumbull Loop 12 0324 500E 40 41 400N Clifton 41717.

Mahonia haematocarpa Wooton

RED FRUITED MAHONIA. Alamo Road 12 0230 158E 38 45 594N Clifton 38801.

BETULACEAE Birch Family**ALNUS*****Alnus oblongifolia*** Torr.

ARIZONA ALDER. Along flowing streams, about 2215 ft. Mar-Apr. Six Mile Crossing 12 0284 168E 38 26 800N Clifton 39467.

BIGNONIACEAE**CHILOPSIS*****Chilopsis linearis*** (Cav.) Sweet

var. ***arcuata*** Fosb.

DESERT-WILLOW. Bullhead 11 0721 541E 38 94 513N Clifton 39943. [ssp. *a.* (Fosb.) Henrickson].

BORAGINACEAE Borage Family

- 1 Flowers shades of blue.....***Lappula***
- 1 Flowers white or yellow
 - 2 Flowers yellow
 - 3 Corolla tube 15-35 mm long, lobes erose, sometimes almost fimbriate.....***Lithospermum***
 - 3 Corolla tube shorter than 15 mm; lobes entire
 - 4 Plants annual.....***Amsinckia***
 - 4 Plant perennial.....***Oreocarya***
 - 2 Flowers white, some genera have a yellow eye
 - 5 Style bifid.....***Tiquilia***
 - 5 Style capitate
 - 6 Plants glabrous, glaucous; leaves succulent.....***Heliotropium***
 - 6 Plants hairy, not glaucous and leaves not succulent
 - 7 Calyx armed with prickles, becoming bur-like (like grappling hooks).....***Harpagonella***
 - 7 Calyx not as above
 - 8 Nutlets spreading, broad with long hooked hairs on the margins.....***Pectocarya***
 - 8 Nutlets erect, rough or smooth
 - 9 Nutlets easily separated (if more than one); annuals, if biannual to perennial plants with numerous branching stems from the base.....***Cryptantha***
 - 9 Nutlets not easily separated; plants single to few branched from base; mostly perennial.....***Oreocarya***

AMSINCKIA Fiddleneck

Note: There are as many different types of plants within each of the named species. There are all self pollinated with numerous local populations that would qualify as species. Since these taxa are wide spread, it is obvious that there are more kinds than there is people to name all of them. Example: Honey Lake Valley in California there are some of the same differences that as are found in this area.

- 1 Sepals elongating in fruit, these generally with 2 partly or almost completely fused.....***A. tessellata***
- 1 Sepals hardly elongating in fruit, generally all 5 distinct almost to base.....***A. intermedia***

Amsinckia intermedia Fischer & C. Meyer

COMMON or RANCHER'S FIDDLENECK. , below 4500 ft.; grassy open places. Jan-May. Alamo Road 12 0241 952E 38 32 750N Clifton 38723. Kaiser Spring Wash 12 0271 657E 38 28 799N Clifton 39302. These plants are dark green, lax, with

broad, spreading leaves, stem hairs sparse, spreading, $\pm$ uniform in size, with very large pustulate bases, style to just below the stamens. Shack Spring Canyon 11 0769 113E 38 94 286N Clifton 38894 These plants are strict with erect, narrow leaves that are pale green, stem hairs ascending, hardly having a pustulate base and a thin layer of smaller hairs. Cook Canyon 11 0764 767E 38 99 339N Clifton 38941, Clack Canyon 11 0766 998E 38 99 305N Clifton 39019, Oatman Road 11 0735 597E 38 74 672N Clifton 39185.

Aubrey Hills 11 0762 507E 38 05 171N Clifton 38928.

Amsinckia tessellata A. Gray

a Leaves generally erect, narrow, yellow-green; fruit bearing a dorsal, median ridge.....var. ***tessellata***

a Leaves generally widely spreading, broad and dark green; fruit lacking a dorsal, median ridge var. ***latifolia***

var. ***latifolia*** G. Clifton var. nov.

BROAD-LEAVED CHECKER FIDDLENECK. Clack Canyon 11 0766 998E 38 99 305N Clifton 39018, Oatman Road 11 0735 597E 38 74 672N Clifton 39184.

var. ***tessellata*** A. Gray

TESSELLATE or CHECKER FIDDLENECK. Highway 93 11 0704 996E 39 86 851N Clifton 38689, Highway 93 12 0274 448E 38 27 176N, Broad, drooping leaved and not ms

CRYPTANTHA

Note: Some groups of these plants seem to vary so much that many of the plants have to be put in one species or the other arbitrarily or else some plants need to be named. In plants that are supposed to have 4 nutlets, sometimes they don't all mature.

- 1 Each flower subtended by a leafy bract; plants often containing lots of purple dye
 - 2 Mature calyx falling away like a lid from its base; calyx 2.5-4 mm long..... ***C. circumscissa***
 - 2 Mature calyx not falling away; calyx about 2 mm long ***C. micrantha***
- 1 Each flower lacking a subtending leafy bract or only the lower ones (if with leaf bracts throughout than leaves conspicuously pustulate) plants usually not containing allot of purple dye
 - 3 Nutlets with broad wings that crenate or lobed (at least in 3 nutlets)
 - 4 Nutlets with all 4 similar, margins uniformly lobed; flowers very small; calyx sparsely pubescent ***C. cycloptera***
 - 4 Nutlets with 3 the same, margins crenate, the fourth lacking winged margins; flowers quite large; calyx densely hairy, almost gray; flowers latter than the last..... ***C. pterocarya***
 - 3 Nutlets lacking broad wings that are crenate or lobed
 - 5 Nutlets margins strongly acute, knife-like to narrowly winged
 - 6 Nutlets generally 4
 - 7 Nutlet angles knife-like to winged
 - 8 Nutlets with three smaller and shorter than the one larger nutlet
 - 9 Plants biannual to perennial (may flower first year) each flowering branch few-flowered, plants gray..... ***C. racemosa***
 - 9 Plants annual; each flowering branch with a considerable number of flowers; plants dark green ***C. inaequata***
 - 8 Nutlets all the same ***C. holoptera***
 - 7 Nutlet angles acute ***C. angustifolia***
 - 6 Nutlets 1 or 2 ***C. utahensis***
 - 5 Nutlets margin rounded
 - 10 Inflorescence leafy-bracteate along much of the axis, these bracts have a few long setae giving inflorescence a bristly appearance ***C. maritima***
 - 10 Inflorescence generally not leafy bracteate, if appearing so than bracts not as above
 - 11 Segments of the fruiting sepals with a very strongly thickened, pale brown and somewhat cartilaginous midrib ***C. crassisejala***
 - 11 Segments of the fruiting sepals with the midrib not as above
 - 12 Nutlets smooth and shining
 - 13 Nutlets 1-3 (usually 1); style surpassed by the nutlets ***C. gracilis***
 - 13 Nutlets 4; style about reaching tip of nutlets..... ***C. fendleri***
 - 12 Nutlets roughened, sometimes minutely so
 - 14 Fruiting calyx strongly spreading and $\pm$ recurved because the perfect nutlet is curved ***C. recurvata***
 - 14 Fruiting calyx and nutlet not as above
 - 15 Plants become sprawling or scrambling among low bushes; stems brittle; calyx closely appressed and

- becoming widely spaced along the axis; fruit narrowly lanceolate *C. dumetorum*
- 15 Plants not combining the above characters
- 16 Sepals in fruit 5-10 mm long, densely soft hairy and bearing narrow to broad based larger hairs
- 17 The longer hairs narrow at the base and not much different than the soft hairs; fruit whitish, apex not curved outward *C. barbiger*
- 17 The longer hairs broad based, markedly different from the softer hairs; fruit greenish, apex slightly curved outward..... *C. clokeyi*
- 16 Sepals not as above
- 18 Nutlets 1-2 *C. decipiens*
- 18 Nutlets generally 4
- 18 Sepals 5-10 mm in fruit; nutlets 2-2.5 mm long..... *C. nevadensis*
- 18 Sepals less than 5 mm long in fruit; nutlets 1-2 mm long *C. muricata*

***Cryptantha angustifolia* (Torr.) E. Greene**

NARROW-LEAVED CRYPTANTHA. There are two forms of this taxon. One has very small flowers with the petals almost erect because they are not any longer than the sepals, the fornice ring is not well developed, the anthers seem to be well down in the tube, and they are much smaller plants. The second one has the flowers much larger (3-4 mm across) with the petals widely spreading, the fornice ring is well developed, the anthers are closer to the top of the tube, and they are much larger plants. Jan-May. Alamo Road 11 0767 166E 38 57 682N Clifton 38703, Alamo Road 12 0241 952E 38 32 750N Clifton 38728, Topock Marsh 11 0727 170E 38 58 887N Clifton 38765, Lake Havasu City 11 0753 560E 38 15 445N Clifton 38900, Aubrey Hills 11 0762 507E 38 05 171N Clifton, Highway 95 11 0759 610E 38 09 947N Clifton 39277, Red Lake 11 0761 147E 39 52 062N Clifton 39714.

***Cryptantha barbiger* (A. Gray) E. Greene**

BEARDED CRYPTANTHA. Fairly frequent, below the pinyon belt growing in washes and other sandy places. All the plants that have been looked at have 4 nutlets. The style seems to be a little longer than the nutlets. The keys from the Flora from the west have this taxon with 1 nutlet, which, if used would make these plants *C. clokeyi* which is only known from the Barstow area. If the keys are used from this area it could easily key to *C. muricata* which has supposedly been collected from the Yucca area. In the past *C. clokeyi* was a variety of *C. muricata* So these 3 taxa are not very well understood, by any of the authors which have attempted to separate them in their keys. These plants don't have the habit of growth that *C. muricata* exhibits, nor do they completely fit this taxon either. Jan-Apr. Alamo Road 12 0241 952E 38 32 750N Clifton 38726, Alamo Road 12 0226 224E 38 51 199N Clifton 38799, Clack Canyon 11 0767 001E 38 99 225N Clifton 38881, Cane Spring Wash 12 0259 967E 38 66 431N, Grapevine Spring Canyon 11 0764 907E 39 00 212N Clifton 39219.

***Cryptantha circumscissa* (H. & A.) I. Johnst.**

GREENEOCHARIS, WESTERN CRYPTANTHA. Mid Feb-May. Shack Spring Canyon 11 0769 099E 38 94 210N Clifton 38897, Cane Spring Wash 12 0259 967E 38 66 431N, Grand Wash Cliffs 12 0239 740E 39 42 007N. [*Greeneocharis* c. (H. & A.) Rydb.].

***Cryptantha costata* Brandeg.**

RIBBED CRYPTANTHA.

***Cryptantha crassiseppala* (T. & G.) E. Greene**

var. *elachantha* I. M. Johnst.

SMALL-FLOWERED THICK-SEPALED CRYPTANTHA. The species itself has large flowers. Truxton Wash 12 0272 344E 39 29 500N Clifton 39735.

***Cryptantha cycloptera* E. Greene**

DESERT WING-NUT CRYPTANTHA. Highway 93 11 0705 095E 39 86 360N Clifton 39216.

***Cryptantha decipiens* (M.E. Jones) A. Heller**

GRAVEL CRYPTANTHA. The type came from Yucca. Jan-May. Alamo Road 12 0226 224E 38 51 199N Clifton 38794, Alamo Road 12 0248 200E 38 09 947N Clifton 38838, Cane Spring Wash 12 0259 967E 38 66 431N, Highway 63 11 0705 095E 39 86 360N Clifton 39214. Alamo Road 12 0226 224E 38 51 199N Clifton 38794, Alamo Road 12 0248 200E 38 09 947N Clifton 38838, Cane Spring Wash 12 0259 967E 38 66 431N, Highway 63 11 0705 095E 39 86 360N Clifton 39214.

***Cryptantha fendleri* (A. Gray) E. Greene**

FENDLER'S CRYPTANTHA. Camp Levi 10 0235 515E 38 86 619N Clifton 40733.

***Cryptantha gracilis* Osterh.**

SLENDER CRYPTANTHA. Fairly frequent, below the pinyon belt, growing in washes, 1500-7000 ft. Jan-June. Alamo Road 12 0241 952E 38 32 750N Clifton 38718, Cook Canyon 11 0764 745E 38 99 079N Clifton 39229, Blake Ranch Road 12 0244 255E 38 88 335N Clifton 39799.

***Cryptantha holoptera* (A. Gray) J. F. Macbr.**

ROUGH-STEMMED CRYPTANTHA. The plants are dirty brown like they were dead. Petroglyph Wash 718 357E 39 92 454N Clifton 43459

Cryptantha inaequata I. M. Johnst.

PANAMINT CRYPTANTHA. Colorado River 11 0704 076E 39 86 342N Clifton 39204.

Cryptantha maritima (E. Greene) E. Greene

GUADALUPE CRYPTANTHA. Desert washes, gravelly slopes, sandy places, below 2500 ft. Jan-May. McCracken Mine Road 12 0247 670E 38 16 129N Clifton 38742, Lake Havasu City 11 0753 560E 38 15 445N Clifton 38902.

Cryptantha micrantha (Torr.) I. M. Johnst.

LEAST CRYPTANTHA. Alamo Road 12 0227 683E 38 49 840N Clifton 38800, Cane Spring Wash 12 0259 967E 38 66 431N, Grand Wash Cliffs 12 0239 740E 39 42 007N.

Cryptantha muricata (H. & A.) A. Nels. & J. Macbr. var. ***denticulata*** (E. Greene) I. Johnst.

SMALL PRICKLY CRYPTANTHA. Cook Canyon 11 0764 767E 38 99 339N Clifton 38942, Highway 95 11 0759 610E 38 09 947N Clifton 39276.

Cryptantha nevadensis Nelson & Kenn.

- 1 Stems and inflorescence strict; sepal segments more strict at the apex.....var. ***rigida***
 1 Stems and inflorescence flexuous; sepal segments bent outward at apex var. ***nevadensis***

var. ***nevadensis***

NEVADA CRYPTANTHA. Alamo Road 12 0248 200E 38 09 947N. Clifton 38837, Lake Havasu City 11 0753 560E 38 15 445N Clifton 38906, Grand Wash Cliffs 12 0239 740E 39 42 007N, Hualapai Valley 12 0236 374E 39 43 917N Clifton 39366, Clack Canyon 11 0766 775E 38 99 226N Clifton 39412.

var. ***rigida*** I. Johnst.

STRICT NEVADA CRYPTANTHA. Borianna Canyon 12 0231 266E 38 66 776N Clifton 39339, Clack Canyon 11 0767 241E 38 98 695N Clifton 39414, Timber Wash 12 0243 284E 38 82 500N, Blake Ranch Road 12 0246 096E 38 76 689N Clifton 39814.

Cryptantha pterocarya (Torr.) E. Greene

WING-NUT CRYPTANTHA. There seems to be two forms of this taxon One has the sepals less hairy, thus appearing green, the flowers are smaller across, the fruit is more oval, the growth habit is more strict. The other has the sepals very hairy with not much green, the flowers are larger, the fruit is broadly lanceolate, the habit is more lax., McCracken Mine Road 12 0247 670E 38 16 129N Clifton 38827, Meadow Creek 11 0748 427E 38 79 536N Clifton 39178, Oatman Road 11 0734 039E 38 61 610N Clifton 39195, large flowered, calyx gray. Alamo Road 12 0226 224E 38 51 199N Clifton 38794, Alamo Road 12 0248 200E 38 09 947N Clifton 38838, Cane Spring Wash 12 0259 967E 38 66 431N.,

Cryptantha racemosa (S. Wats.) E. Greene

BUSHY CRYPTANTHA.

Cryptantha recurvata Cov.

CURVED-NUT CRYPTANTHA. Detrital Valley 11 0727 400E 39 78 292N Clifton 39694.

Cryptantha stenoloba (I. M. Johnst.) G. Clifton comb. nov.

INFLATED WING-NUT CRYPTANTHA. Beaver Dam 12 0237 474E 40 88 380N Clifton 42208, Blankenship Valley 738 724E 38 30 443N Clifton 43366.

Cryptantha utahensis (A. Gray) E. Greene

SCENTED CRYPTANTHA. Detrital Valley 11 0727 400E 39 78 292N Clifton 39695.

HARPAGONELLA***Harpagonella palmeri*** A. Gray

PALMER'S GRAPPLING HOOK. McCracken Mine Road 12 0247 670E 38 16 129N Clifton 38852, Alamo Road 12 0249 956E 38 07 984N Clifton 38834, Shack Spring Canyon 11 0769 113E 38 94 286N Clifton 38893.

HELIOTROPIUM

- 1 Plants annual; corolla limb 8-12 mm wide; inflorescence not obviously in coiled spikes.....***H. convolvulaceum***
 1 Plants perennial; corolla limb quite narrow; inflorescence in obvious coiled spikes.....***H. curassavicum***

Heliotropium convolvulaceum (Nutt.) A. Gray

The var. *convolvulaceum* is east of Mohave County and has larger flowers. It is said that they differ from each other in that the variety has spreading pungent bristles on the stems and leaves, however that doesn't seem to be the case completely. Specimens from the Mohave Desert in California have most of the hairs appressed except on the margins of the leaves and petioles.

var. ***californicum*** (E. Greene) I. M. Johnst.

CALIFORNIA WIDE-FLOWER HELIOTROPE Highway 389 12 0361 776E 40 88 757N Clifton 41152.

***Heliotropium curassavicum* L.**

SALT HELIOTROPE. Alamo Lake 12 0261 641E 37 94 151N Clifton 39169.

LAPPULA

***Lappula redowskii* (Hornem.) E. Greene**

- a Marginal prickles fused at base forming a thickened crown..... var. *cupulata*
 a Marginal only slightly fused at base nor forming a thickened crown..... var. *redowskii*

var. *cupulata* (A. Gray) M. E. Jones

THICKENED CROWN WESTERN STICKSEED. Six Mile Crossing Road 12 0282 455E 38 28 787N Clifton 39486,
 Truxton 12 0269 780E 39 29 790N Clifton 39731, Lizard Point 268 384E 40 91 796.

var. *redowskii* (Hornem.) E. Greene

WESTERN STICKSEED. Hualapai Mountain Road 12 0230 895E 38 94 513N Clifton 39346, Grapevine Canyon 12 0233
 746E 39 75 700N, Mt. Trumbull Loop Road 12 0270 317E 40 80 364N.

LITHOSPERMUM

***Lithospermum incisum* Lehm.**

SHOWY or PLAINS STONESEED. Dry open places on flats and slopes, above 4400 ft. Late April-July. Branch of Truxton
 Wash 12 0277 912E 39 16 288N Clifton 39752.

OREOCARYA

- 1 Flowers yellow..... *O. confertiflora*
 1 Flowers white, the fornices may be yellow
 2 The upper surface of the leaves glabrous..... *O. semiglabra*
 2 The upper surface of the leaves hairy
 3 The corolla tube exserted from the calyx; fornices 1-1.5 mm tall
 4 Petals generally reflexed after anthesis; nutlets densely muricate-tuberculate, murications often with a minute
 to evident, short setose tip, scar closed, lacking raised margins..... *O. fulvocanescens*
 4 Petals not reflexed; nutlets conspicuously rugose or rugose-tuberculate, scar open with evident raised margins
 *O. flavoculata*
 3 The corolla tube included in the calyx; fornices less than 1 mm tall
 5 Nutlets appearing smooth *O. cinerea*
 5 Nutlets roughened
 6 Plants depressed, stem often scarcely exceeding the basal leaves, when longer tending to be prostrate or
 nearly so..... *O. depressa*
 6 Plants erect..... *O. virginensis*

***Oreocarya cinerea* E. Greene**

var. *cinerea*

LOW BOWNUT CATS-EYE. Along roads, openings in pinyon-juniper, 4500-8000 ft. These plants differ from the typical in
 that the stems have spreading long hairs and shorter, almost tomentose hairs under the longer hairs. The typical has stem hairs
 all appressed. April-early Dec. R-W Ranch Road 12 0234 314E 38 92 574N Clifton 38557, Windy Point Campground 11
 0758 017E 39 25 126N Clifton 39658. [*Cryptantha c.* (E. Greene) Cronq. var. *a.* (E. Greene) Cronq., *Oreocarya a.* E.
 Greene].

***Oreocarya confertiflora* E. Greene**

GOLDEN-FLOWERED or BASIN YELLOW CATS-EYE. Dry, open places, sometimes in sand, most often in other kinds of
 soil, throughout. The flowers turn white in age. The seeds are smooth and glossy. April-June. Beaver Dam Mountains 12 0248
 782E 40 96 646N Clifton 42227, Mt. Trumbull Loop Road 12 0271 809E 40 77 515N Clifton 42277. [*Cryptantha c.* (E. Greene)
 Payson].

***Oreocarya depressa* (M. E. Jones) J. F. Macbr.**

DENT-NUT CATS-EYE. [*Cryptantha abata* I. Johnst.].

***Oreocarya fulvocanescens* (S. Wats.) E. Greene**

TAWNY CATS-EYE. [*Cryptantha f.* (S. Wats.) Payson].

Oreocarya humilis (A. Gray) E. Greene

ROUND-SPIKED CATS-EYE. Six Mile Crossing Road 12 0283 360E 38 28 493N Clifton 39447.

Oreocarya semiglabra (Barneby) G. Clifton Comb. nov.

SMOOTH CATS-EYE. [*Cryptantha* s. Barneby].

Oreocarya virginensis (M.E. Jones) J. Macbride

VIRGIN VALLEY CATS-EYE. [*Cryptantha* v. (M. E. Jones) Payson

PECTOCARYA

- 1 Nutlets orbicular-obovate; herbage with coarse, spreading setose hairs ***P. setosa***
- 1 Nutlets linear; herbage lacking spreading setose hairs
 - 2 Cauline nutlets dimorphic, 2 not winged, margins entire, 2 winged margins dentate ***P. heterocarpa***
 - 2 Cauline nutlets ± uniform
 - 3 Nutlet margins toothed above middle ***P. penicillata***
 - 3 Nutlet margins toothed along the whole margin
 - 4 Nutlets strongly recurved to coiled, margins not winged ***P. recurvata***
 - 4 Nutlets straight to somewhat curved, margins ± winged ***P. platycarpa***

Pectocarya heterocarpa (I. Johnst.) I. Johnst.

CHUCKWALLA COMBSEED. Jan-Apr. Alamo Road 11 0767 166E 38 57 682N Clifton 38705, Highway 93 11 0704 996E. 39 86 851N Clifton 38690, Shack Spring Canyon 11 0769 099E 38 94 210N Clifton 38896, Cane Spring Wash 12 0259 967E 38 66 431N, Red Lake 11 0761 147E 39 52 062N Clifton 39713.

Pectocarya penicillata (H. & A.) A. Dc.

SHORT-LEAVED COMBSEED

Pectocarya platycarpa (Munz & I. Johnst.) Munz & I. Johnst.

BROAD-FRUITED COMBSEED. Open places in sand to fine gravel, desert floors to pinyon-juniper, below 6400 ft. Jan-Apr. Cook Canyon 11 0766 155E 38 97 166N Clifton 38974, Frees Wash 12 0236 563E 38 93 487N Clifton 39247, Grand Wash Cliffs 12 0239 740E 39 42 007N, Packsaddle Campground 11 0756 941E 39 26 761N.

Pectocarya recurvata I. Johnst.

RECURVED COMBSEED. Mid Dec-May. Alamo Road 11 0767 166E 38 57 682N Clifton 38706, McCracken Mine Road 12 0247 670E 38 16 129N Clifton 38738, 38825, Frees Wash 12 0236 563E 38 93 487N Clifton 39246.

Pectocarya setosa A. Gray

BRISTLY PECTOCARYA. Clack Canyon 11 0766 726E 38 99 504N Clifton 39022, Frees Wash 12 0236 563E 38 93 487N Clifton 39245.

Pectocarya sp. Clack Canyon 11 0766 726E 38 99 504N Clifton 39023, Route 66 12 0239 057E 39 16 697N Clifton 39262.

PLAGIOBOTHRYS

- 1 Calyx circumscissile in fruit ***P. arizonicus***
- 1 Calyx not circumscissile in fruit ***P. jonesii***

Plagiobothrys arizonicus (A. Gray) A. Gray

ARIZONA POPCORN FLOWER. Alamo Road 12 0248 200E 38 09 947N Clifton 38836, Cane Spring Wash 12 0259 967E 38 66 431N, Grand Wash Cliffs 12 0239 740E 39 42 007N, Borianna Canyon 12 0230 797E 38 67 305N.

Plagiobothrys jonesii A. Gray

JONES' POPCORN FLOWER. Jan-Apr. McCracken Mine Road 12 0247 670E 38 16 129N Clifton 38741, Grand Wash Cliffs 12 0239 740E 39 42 007N.

TIQUILIA

- 1 Leaves narrowly lanceolate to linear tapering into an ill defined petiole, conspicuously setose ***T. latior***
- 1 Leaves broad ± abruptly narrowing into a ± defined petiole, not as conspicuously setose
 - 2 Plants annual; corolla not much longer than the calyx ***T. nuttallii***
 - 2 Plants perennial; corolla well exerted beyond the calyx
 - 3 Branches alternate; style not from between the nutlets ***T. canescens***
 - 3 Branches opposite; style from between the nutlets
 - 4 Rhizomes present; stems ± glandular; the 4-7 veins on the leaves deeply sunken ***T. plicata***

- 4 Rhizomes lacking; stems not glandular; the 2-3 pairs of veins shallow..... *T. palmeri*

Tiquilia canescens (DC.) A. Richards.

WOODY CRINKLEMAT. Sawmill Canyon 11 0768 706E 38 94 960 Clifton 39282.

Tiquilia latior (I. Johnst.) A. Richards.

MATTED CRINKLEMAT. Beaver Dam Mountains 12 0245 470E 40 95 513N Clifton 42222

Tiquilia nuttallii (Hook.) A. Richards.

ROSETTE CRINKLEMAT. Infrequent, below 6000 ft.; sandy places in desert scrub, along sandy shoulders of dirt roads. June-Sept.

Tiquilia palmeri (A. Gray) A. Richards.

PALMER'S CRINKLEMAT. Detrital Valley 11 0727 740E 39 78 560N Clifton 39696.

Tiquilia plicata (Torr.) A. Richards.

FAN-LEAF CRINKLEMAT. Franconia Road 11 0751 126E 38 46 935N Clifton 39763.

BRASSICACEAE Mustard Family

- 1 Flowering plants **GROUP 1**

- 1 Fruiting plants..... **GROUP 2**

GROUP 1 Flowering plants

- 1 Flowers yellow or orange-yellow or cream

- 2 Herbage with various types of branching hairs

- 3 Leaves variously lobed

- 4 Petals less than 3.6 mm long..... *Descurainia*

- 4 Petals longer than 3.6 mm long

5

- 1 Calyx dark violet; petals with violet veins..... *Eruca*

- 1 Calyx and petals not as above

- 2 Plants often suffrutescent; petals 12-16 mm long, bright yellow, hairy on the inner surface below the blade..... *Stanleya*

- 2 Plants not suffrutescent; if petals over 12 mm than not bright yellow and not hairy on the inner surface

- 3 Sepals and petals purplish; petals only slightly exerted, becoming exerted in the plant press..... *Pennellia*

- 3 Sepals and petals otherwise

- 4 Petals shallowly lobed at apex *Draba*

- 4 Petals entire or lacking

- 5 Petals lacking or not yellow

- 6 Plants growing in water *Rorippa*

- 6 Plants growing in dry places

- 7 Leaves auriculate

- 8 Plants annual

- 9 Plants lacking a well developed basal rosette; native places..... *Thysanocarpus*

- 9 Plants with a well developed basal rosette and around habitation or waste places *Capsella*

- 8 Plants perennial..... *Thlaspi*

- 7 Leaves not auriculate

- 10 Plants perennial with a woody caudex *Halimolobos*

- 10 Plants annual

- 10 Petals generally yellow, may fade white

- 10 Petals white or lacking

- 11 Herbage with some of the hairs branched *Athysanus*

- 11 Herbage lacking any branched hairs

12

- 1 Flowers other colors than yellow, or orange

- 2 Flowers white or petals lacking

- 2 Plants not growing in water

- 3 Petals 10-16 mm long

- 4 Cauline leaves not auriculate *Schoenocrambe*

- 4 Cauline leaves auriculate *Thelypodopsis*

- 3 Petals 0-9 mm long
 - 5 Plants annual
 - 6 Cauline leaves auriculate-clasping
 - 6 Cauline leaves not auriculate
 - 6 Plants with some of the hairs branched..... *Draba*
 - 6 Plants with all simple hairs *Lepidium*
 - 4 Plants mostly larger, biennial to perennial
 - 7 Petals 2-3 mm long
 - 8 Plants lacking a woody caudex *Pennellia*
 - 7 Petals 4-9 mm long
 - 9 Cauline leaves auriculate
 - 10 Herbage glabrous, mostly glaucous
 - 10 Herbage with simple or branched trichomes *Arabis*
 - 9 Cauline leaves not auriculate
 - 11 Plants glabrous; basal leaves lyrate to pinnately lobed, rarely entire *Thelypodium*
 - 11 Plants with lower stems hairy; basal leaves entire to slightly sinuate, sometimes dentate, rarely present at flowering..... *Pennellia*
 - 1 Flowers yellow, or orange
 - 12 Leaves pinnatifid *Descurainia*
 - 12 Leaves simple
 - 13 Petals 12-25 mm long *Erysimum*
 - 13 Petals 5.5-10.5 *Lesquerella*

GROUP 2 Fruiting plants

- 1 Fruit less than 4 times longer than wide
 - 2 Fruit 1-chambered, 1-seeded, not dehiscent
 - 3 Fruit with hooked hairs; pubescence of stem of forked hairs..... *Athysanus*
 - 3 Fruit lacking hooked hairs; pubescence of stem simple or lacking..... *Thysanocarpus*
 - 2 Fruit not as above
 - 4 Fruit globose, inflated-like
 - 5 Siliques with deep sinuses between the halves on both ends..... *Physaria*
 - 5 Siliques lacking sinuses between the halves *Lesquerella*
 - 4 Fruit strongly compressed contrary to the plane of the septum
 - 6 Cauline leaves auriculate-clasping
 - 7 Plants annual..... *Capsella*
 - 7 Plants perennial..... *Thlaspi*
 - 6 Cauline leaves not as above
 - 8 Hairs branched
 - 9 Siliques like lenses of a pair of spectacles
 - 10 Sepals erect, connivent; petals linear *Dithyrea*
 - 10 Sepals spreading at anthesis; petals obovate *Dimorphocarpa*
 - 9 Siliques not as above *Hutchinsia*
 - 8 Hairs not branched or plants glabrous
 - 11 Fruit with deep sinuses between the halves at both ends *Coronopus*
 - 11 Fruit not as above
 - 12 Fruit from slightly to obviously notched..... *Lepidium*
 - 12 Fruit not notched..... *Hutchinsia*
 - 4 Fruit compressed or not, if compressed, than parallel to the septum
 - 13 Leaves lyrate, pinnately lobed, pinnate to 3-pinnate
 - 14 Plants growing in water *Rorippa*
 - 14 Plants not growing in water *Descurainia*
 - 13 Leaves simple
 - 15 Plants annual..... *Draba*
 - 15 Plants perennial..... *Halimolobos*
- 1 Fruit 4 times longer than wide
 - 16 Fruit born on a gynophore 1-3 cm long *Stanleya*

- 16 Fruit not born on a gynophore or if so than less than 1 cm long
- 17 Herbage bearing some stipitate-glandular hair..... *Chorispora*
- 17 Herbage lacking stipitate-glandular hairs
- 18 Siliques with definite beaks, may be a seed or two in the lower part
- 19 Fruit deflexed..... *Streptanthella*
- 19 Fruit appressed-erect to ascending or spreading
- 20 Fruit appressed-erect
- 21 Fruit dark violet *Eruca*
- 21 Fruit green..... *Hirschfeldia*
- 20 Fruit ascending to spreading
- 22 Fruit dehiscent by valves..... *Brassica*
- 22 Fruit not dehiscent by valves *Raphanus*
- 16 Siliques lacking a definite beak, styles sometimes may be beak-like, but they are clearly demarcated from the valve
- 23 Herbage glabrous or with simple hairs
- 24 Fruit deflexed
- 25 Leaves auriculate *Caulanthus*
- 25 Leaves not auriculate *Guillenia*
- 24 Fruit not deflexed
- 26 Cauline leaves auriculate
- 27 Fruit flattened; inflorescence few flowered..... *Streptanthus*
- 27 Fruit terete; inflorescence densely many flowered *Thelypodopsis*
- 26 Cauline leaves not auriculate
- 28 Fruit on pedicels 7-13 mm long
- 29 Fruit born on a short gynophore..... *Thelypodium*
- 29 Fruit sessile *Sisymbrium*
- 28 Fruit sessile to subsessile *Schoenocrambe*
- 23 Herbage having branched hairs throughout or in part
- 30 Middle cauline leaves auriculate..... *Arabis*
- 30 Middle cauline not auriculate
- 31 Valves glabrous or rarely sparsely pubescent when young..... *Pennellia*
- 31 Valves pubescent
- 32 Hairs in part 2-rayed *Erysimum*
- 32 Hairs generally all more than 2-rayed *Malcolmia*

ARABIS Rock-Cress

- 1 Leaves densely overlapping; pedicels long and slender; inflorescence a dense flat-topped cluster of pale pink flowers
..... *A. gracilipes*
- 1 Leaves not as overlapping; pedicels otherwise; inflorescence not flat-topped; flowers darker in color
- 2 Fruit hairy *A. pulchra*
- 2 Fruit glabrous..... *A. perennans*

Arabis gracilipes E. Greene

FLAGSTAFF ROCK CRESS. Mount Dellenbaugh Road 12 0269 028E 40 04 094N Clifton 42323

Arabis perennans S. Wats.

The difference between the two varieties is often nebulous indeed and due to self pollination, the differences may be contrived only.

- a The base of the stem with more coarse, simple hairs than branched hairs; lower cauline leaves ciliate with simple hairs var. *fendleri*
- a The base of the stem with very few, if any simple hairs; middle cauline leaves lacking any simple cilia..... var. *perennans*

var. *fendleri* (S. Wats.) G. Clifton comb. nov.

FENDLER'S ROCK CRESS. . Mid Mar-May. Antelope Wash 12 0238 241E 38 84 500N Clifton 39396, [*A. fendleri* (S. Wats.) E. Greene].

var. *perennans*

PERENNIAL ROCK CRESS. Jan-July. Clack Canyon 11 0767 360E 38 99 159N Clifton 38857, Grapevine Canyon 12 0233 746E 39 75 700N Clifton 39388, East Branch Tuckayou Wash 12 0280 889E 39 03 148N Clifton 39868, Mt. Trumbull 12 0308 817E 40 29 918N.

Arabis pulchra M.E. Jones
 var. ***pallens*** M. E. Jones
 BEAUTIFUL ROCK CRESS.

ATHYSANUS

Athysanus pusillus (Hook.) E. Greene
 DWARF ATHYSANUS. Poachie Range 12 0271 934E 38 16 474N Clifton 39012, Clack Canyon 11 0766 726E 38 99 504N.

BRASSICA

- 1 Cauline leaves auriculate ***B. rapa***
 1 Cauline leaves not auriculate ***B. tournefortii***

Brassica rapa L.

FIELD MUSTARD. waste places; introduced from Europe. Variety *campestris* doesn't develop the enlarged root as does the variety *rapa*. April-June. [*B. campestris* L.].

Brassica tournefortii Gouan

TOURNEFORT'S MUSTARD. This has covered large areas of the desert. The beak has a number of main veins even though it is said that they have only 1 main vein. Gem Acres Road 11 0760 024E 38 53 607N Clifton 38678, Clack Canyon 11 0767 369E 38 99 398N Clifton 38856, Cane Spring Wash 12 0259 967E 38 66 431N.

CAPSELLA

Capsella bursa-pastoris (L.) Medikus.

SHEPHERD'S PURSE. disturbed waste places; introduced from Europe. April-July: W. Spring Street 11 0767 473E 38 98 129N Clifton 38785.

CAULANTHUS

Caulanthus cooperi (S. Wats.) Payson

COOPER'S WILD CABBAGE Jumbo Wash 11 0711 864E 39 70 162N Clifton 38786, Willow Beach Road 11 0711 717E 39 71 468N Clifton 38774, Oatman Road 11 0743 633E 38 80 088N Clifton 39179, Grapevine Canyon 12 0233 746E 39 75 700N.

CHORISPORA

Chorispora tenella (Pallas) DC.

SLENDER CHORISPORA. Jumbo Wash 11 0711 864E 39 70 162N Clifton 38786, Willow Beach Road 11 0711 717E 39 71 468N Clifton 38774, Oatman Road 11 0743 633E 38 80 088N Clifton 39179, Grapevine Canyon 12 0233 746E 39 75 700N.

CORONOPUS

Coronopus didymus (L.) Smith

LESSER SWINE CRESS. Temple Bar 11 0741 352E 39 91 272N Clifton 42344.

DESCURAINIA

Note: Some of the varieties are wide spread. They often grow together. The distinctions may be mechanical

- 1 Fruit fusiform; styles 0.5 mm or longer ***D. californica***
 1 Fruit not tapered at both end; styles less than 0.3 mm long
 2 Fruit acute to acuminate, tapering to the apex; styles usually evident; seed usually in one row
 3 Leaves 2- to 3-pinnate..... ***D. sophia***
 3 Leaves simple pinnate, but leaflets often lobed
 4 Herbage whitish canescent..... ***D. obtusa***
 4 Herbage green, ± glabrous ***D. incisa***
 2 Fruits rounded to obtuse; styles very short; seeds usually in 2 rows
 4 Sepals early green, turning yellowish; leaflets obtuse; petals yellow; early inflorescence yellow ***D. pinnata*** var. ***glabra***

- 4 Sepals early green, soon turning purplish with white scarious margins; petals often white; early inflorescence appearing purplish-white *D. pinnata* var. *halictorum*

Descurainia californica (A. Gray) O. Schulz

CALIFORNIA TANSY-MUSTARD.

Descurainia incisa (A. Gray) Britt.

var. *incisa*

Branch of Truxton Wash 12 0277 089E 39 18 092N Clifton 39750, Bly Canyon 280 519E 39 27 750N Clifton 41610

Descurainia obtusa (E. Greene) O. Schulz

BLUNT-FRUITED TANSY-MUSTARD.

Descurainia pinnata (Walt.) Britt. var. *glabra* (Woot. & Standl.) Shinn.

WESTERN TANSY-MUSTARD. 15000-4500 ft. Jan-May. Jumbo Wash 11 0711 864E 39 70 162N Clifton 38786, Willow Beach Road 11 0711 717E 39 71 468N Clifton 38774, Oatman Road 11 0743 633E 38 80 088N Clifton 39179 [ssp. *g.* (Woot. & Standl.) Detl.].

Descurainia pinnata (Walt.) Britt. var. *halictorum* (Cockerell) M. Peck

WESTERN TANSY-MUSTARD. Open sandy slopes and ridges. Mid Jan-June. Oatman Road 11 0743 165E 38 80 133N Clifton 38751.

Descurainia sophia (L.) Webb.

FLIXWEED, TANSY-MUSTARD. Grapevine Canyon 12 0233 746E 39 75 700N Clifton 39385.

DIMORPHOCARPA

Dimorphocarpa wislizenii (Engelm.) Rol.

WISLIZEN'S SPECTACLE-POD. Sandy places, below 5500 ft. Feb.-Nov. Highway 389 12 0361 776E 40 88 757N Clifton 41155. [*Dithyrea* w. Engelm.]

DITHYREA

Dithyrea californica Harvey

CALIFORNIA SPECTACLE-POD. Mid Jan-May. Alamo Road 11 0767 166E 38 57 682N Clifton 38704, Oatman Road 11 0734 039E 38 61 610N Clifton 39188.

DRABA

- 1 Upper stems hairy and fruit hairy..... *D. cuneifolia* var. *integrifolia*
 1 Upper stems and fruit glabrous *D. reptans*

Draba cuneifolia T. & G.

var. *integrifolia* S. Wats.

WEDGE-LEAF WHITLOW-GRASS. Sandy to finely gravelly places, 1000-7000 ft. Dec-April Burrow Creek 12 0274 873E 38 24 010N Clifton 38698, Alamo Road 12 0241 952E 38 32 750N Clifton 38727, Cane Spring Wash 12 0259 967E 38 66 431N.

Draba reptans (Lam.) Fern.

CAROLINA WHITLOW-GRASS. D-W Ranch Road 12 0235 288E 38 98 224N Clifton 39242.

ERUCA

Eruca vesicaria (L.) Cav

var. *sativa* (Mill.) G. Clifton Comb. nov.

GARDEN-ROCKET, SALAD-ROCKET. Dec-Apr. McConnico 11 0764 638E 38 92 651N Clifton 38675

ERYSIMUM

- 1 Petals 13-25 mm long *E. capitatum*
 1 Petals 5-7 mm long
 2 Herbage with most of the hairs attached in the middle leaving both end free; perennial *E. inconspicuum*

2 Herbage with all branched hairs; annual..... *E. repandum*

Erysimum capitatum (Dougl.) E. Greene

DOUGLAS WALLFLOWER. The other varieties are in California. It is said that there are two varieties in Arizona, but this author fails to see any marked difference between the two. Hualapai Mountain Road 12 0232 920E 38 92 666N Clifton 39363, Flag Mine Road 12 0237 900E 38 84 655N Clifton 40743.

Erysimum inconspicuum (S. Wats.) MacMillan

SMALL-FLOWERED WALLFLOWER, SMALL-FLOWERED PRAIRIE ROCKET. Infrequent, below 7000 ft.; dry, often alkaline soil, dry slopes, sandy places, roadsides, among sagebrush. There is another variety in eastern Canada. May-Aug.

Erysimum repandum L.

SPREADING WALLFLOWER.

GUILLENIA

Guillenia lasiophylla (H. & A.) E. Greene

CALIFORNIA MUSTARD. below 3500 ft. Jan.-April. Alamo Road 12 0245 233E 38 28 390N Clifton 38732, Grand Wash Cliffs 12 0239 740E 39 42 007N. [Thelypodium l. (H. & A.) E. Greene]

HALIMOLOBOS

Halimolobos diffusa (A. Gray) O. Schulz

DIFFUSE HALIMOLOBOS.

HIRSCHFELDIA

Hirschfeldia incana (L.) Lagr-Fossat

MEDITERRANEAN MUSTARD. introduced from Mediterranean. Late Mar-June. Kaiser Spring Wash 12 0271 639E 38 28 902N Clifton 39838.

HUTCHINSIA

Hutchinsia procumbens (L.) Desv.

HUTCHINSIA. Infrequent, below 7000 ft.; flats and valley bottoms, in moist, often saline or alkaline soil. Pierce Springs. [*Hymenolobos p.* (L.) T. & G.].

LEPIDIUM Pepper-Grass

Note: This group of plants, particularly the *L. montana* and *L. alyssoides* is extremely polymorphic. The keys that have been written are very sloppy. Example the key for *L. alyssoides* says that the lobes, if present, are linear, however in the description for the species it says that the lobes are ovate to oblong, which could easily fit *L. montana*. So until someone straightens out this group of plants it will indeed be hard to decide where our plants belong.

1 Plants perennial

2 Plants glaucous, woody well above base; siliques 4-7 mm wide *L. fremontii*

2 Plants not green, not much woody; siliques less than 4 mm wide *L. montana*

1 Plants annual

3 Fruit with surface and or margins hairy *L. lasiocarpum*

3 Fruit glabrous

4 Petals 1-3 mm long; style present *L. virginicum*

4 Petals lacking or very small *L. densiflorum*

Lepidium densiflorum Schrad.

DENSE-FLOWERED PEPPER-GRASS.

Lepidium fremontii S. Wats.

FREMONT'S PEPPER-GRASS Rocky ledges, sandy washes, barren knolls, bluffs, and rocky slopes, below 5000 ft. Jan-June. Sawmill Wash 11 0767 882E 38 95 1 5N Clifton 38779, Grapevine Canyon 12 0233 746E 39 75 700N Clifton 39389.

Lepidium lasiocarpum T. & G.

HAIRY POD PEPPER-GRASS. Jan-July. McCracken Mine Road 12 0247 670E 38 16 129N Clifton 38736, Topock Marsh 11 0727 170E 38 58 887N Clifton 38766, Highway 93 11 0704 996E. 39 86 851N Clifton 38691, Cane Spring Wash 12 0259

967E 38 66 431N. [var. *georgianum* (Rydb.) C. Hitchc. misapplied].

Lepidium montanum Nutt.

Note: To a great degree the types of hair are used to separate these varieties without other characters. But this often doesn't work. Another character that is used is whether the plants are suffrutescent or not. This is also subject to interpretation.

- a Caudices elevated above ground.....var. ***jonesii***
- a Caudices at ground level
 - b Rachises of the inflorescence densely cinereous with minute oblong trichomes var. ***cinereum***
 - b Rachises of the inflorescence bearing three kinds of hairs (including the above).....var. ***montanum***

var. ***cinereum*** C. L. Hitchc.) Rol.

CINEROUS MOUNTAIN PEPPER-GRASS. Old 66 12 0285 250E 39 36 800N Clifton 41240.

var. ***jonesii*** (Rydb.) C. Hitchc.

JONES' PEPPER-GRASS. Grapevine Canyon 12 0233 746E 39 75 700N Clifton 39384.

var. ***montanum***

MOUNTAIN PEPPER-GRASS White Hills 11 0746 684E 39 62 390N Clifton 39708, Wolf Hole Pass 12 0274 576E 40 65 884N Clifton 42302, Mt. Trumbull Loop Road 272 329E 40 88 910N Clifton 42256.

Lepidium virginicum L.

- a Inflorescence hairy var. ***pubescens***
- a Inflorescence glabrous..... var. ***medium***

var. ***medium*** (E. Greene) C. Hitchc.

HAIRLESS WILD PEPPER-GRASS. The pedicels on the plants from Boriana Canyon are terete like the species. Boriana Canyon 12 0230 886E 38 67 489N Clifton 39344.

var. ***pubescens*** (E. Greene) Thell.

WILD PEPPER-GRASS. Creek side sand deposits, gravelly ledges, below 7500 ft. Jan-Aug. Burro Creek 12 0274 873E 38 24 010N Clifton 38699, Clack Canyon 11 0766 726E 38 99 504N Clifton 39024, Knight Creek 12 0276 558E 38 89 296N Clifton 39899.

LESQUERELLA

Note: Some of the taxa form very complex groups, which are not very well understood. They at times seem to incorporate characters of several species in the same population. Some of the perennials flower the first year and even the second year appearing as annuals.

- 1 Fruit glabrous on the exterior ***L. gordonii***
- 1 Fruit hairy on the exterior
 - 2 Caudex buried, thickened with old leaf bases; leaves involute and uniformly very narrow..... ***L. intermedia***
 - 2 Caudex, if present, not as above; leaves generally flat
 - 3 Branched caudex woody ***L. cinerea***
 - 3 Branched caudex, if present, not woody
 - 4 Flowering stems elongate; inflorescence elongating..... ***L. tenella***
 - 4 Flowering stems short; inflorescence not elongating ***L. arizonica***

Lesquerella arizonica S. Wats.

ARIZONA BLADDER-POD. These plants often appear annual. The leaves are quite variable. Six Mile Crossing Road 12 0283 360E 38 28 493N Clifton 39444, Branch of Truxton Wash 277 089E 39 18 092N Clifton 39749

Lesquerella cinerea S. Wats.

BASIN BLADDER-POD. Burro Creek 2500 ft.

Lesquerella gordonii (A. Gray) S. Wats.

GORDON'S BLADDER-POD. Truxton 12 0269 780E 39 29 790N Clifton 39728.

Lesquerella intermedia (S. Wats.) A. Heller

INTERMEDIATE BLADDER-POD. Mt. Trumbull Loop Road 12 0271 809E 40 77 515N Clifton 42283

Lesquerella tenella A. Nels.

MOAPA BLADDER-POD. Desert flats, gravelly to rocky slopes, below 4000 ft. Jan-Apr. Alamo Road 11 0767 166E 38 57 682N Clifton 38702, Shack Spring Canyon 11 0769 247E 38 93 993N, Cane Spring Wash 12 0259 967E 38 66 431N, Red Lake 11 0761 147E 39 52 062N Clifton 39718.

MALCOLMIA***Malcolmia africana* (L.) R. Br.**

AFRICAN MALCOLMIA. Frequent, mostly in the Arizona Stripe 1500-4500 ft.; along margins of roads, has invaded much of the native habitat; introduced from the Mediterranean. May-July. Beaver Dam Mountains 12 0251 037E 40 94 980N Clifton 42244.

PENNELLIA***Pennellia longifolia* (Benth.) Rol.**

LONG-LEAVES MOCK THELYPODY. Dry, open yellow pine forests. The petals become well exerted after they are pressed. Mid July-Sep. Camp Levi Levi 12 0235 275E 38 86 681N Clifton 41224, Hualapai Mountain County Park 12 0236 100E 38 87 050N Clifton 41379.

PHYSARIA***Physaria chambersii* Roll.**

CHAMBER'S DOUBLE BLADDERPOD. Fairly frequent, below 10600 ft.; rocky slopes above desert shrubland. Near Pipe Springs. May-July.

RAPHANUS***Raphanus raphanistrum* L.**

JOINTED CHARLOCK. Limited, below 4000 ft.; washes, and waste places; introduced from Mediterranean Europe. Apr. Clack Canyon 11 0767 412E 38 99 336 N Clifton 4217.

RORIPPA***Rorippa nasturtium-aquaticum* (L.) Hayek**

WATER-CRESS. about springs and streams. Big Sandy 12 0263 675E 38 38 627N Clifton 39318, Bill Williams River 11 0773 605E 37 94 900N, Knight Creek 12 0276 558E 38 89 296N. [*Nasturtium officinale* R. Br.].

SCHOENOCRAMBE***Schoenocrambe linearifolia* (A. Gray) Rollins**

CALLOUSED RUSH MUSTARD. [*Sisymbrium l.* (A. Gray) Al-Payson].

SISYMBRIUM

- 1 Petals 2.5-4 mm long, barely longer than the sepals..... *S. irio*
- 1 Petals 6-10 mm long, quite a bit longer than the sepals
- 2 Petals 6-8 mm long; outer 2 sepals with erect horns at tip; fruit $\pm$ 1 mm wide *S. altissimum*
- 2 Petals 8-10 mm long; outer 2 sepals lacking horns; fruit often wider than 1 mm *S. orientale*

***Sisymbrium altissimum* L.**

TUMBLE MUSTARD. Waste places, Creek side sand deposits, above 1900 ft.; introduced from Europe Jan-July. Burro Creek 12 0274 873E 28 24 010N Clifton 38697, Grapevine Canyon 12 0233 746E 39 75 700N.

***Sisymbrium irio* L.**

LONDON ROCKET. Jan-May. Alamo Road 12 0245 233E 38 28 390N Clifton 38731.

***Sisymbrium orientale* L.**

INDIAN HEDGE-MUSTARD. Oct-early Dec., Jan-Apr. Hualapai Mountain Road 12 0230 765E 38 94 437N Clifton 38585.

STANLEYA***Stanleya pinnata* (Pursh) Britt.**

PRINCE'S PLUME. Rocky slopes, washes, canyon slopes, and road cuts, below 7500 ft. May-July. Bulrush Canyon 12 0348 622E 40 71 965N Clifton 41167.

STREPTANTHELLA***Streptanthella longirostris*** (S. Wats.) Rydb.

STREPTANTHELLA. Low sage or shadscale scrub and sometimes in mixed chenopod scrub, sand dune-like areas, below 7700 ft. Late April-May. Fivemile Wash 11 0731 105E 38 54 265N Clifton 39196, Lake Havasu 11 0739 808E 38 27 170N, Route 66 12 0239 057E 39 16 697N.

STREPTANTHUS***Streptanthus cordatus*** Nutt. var. ***cordatus***

PERENNIAL STREPTANTHUS. Clay Springs Road 12 0241 354E 39 57 309N Clifton 39382, Six Mile Crossing Road 12 0283 360E 38 28 493N Clifton 39446.

THELYPODIOPSIS***Thelypodopsis ambiguum*** (A. Gray) Al-Shehbaz

LONG VALLEY TUMBLE-MUSTARD. Small openings in pinyon-juniper woodland. Apr-Jun. Branch of Truxton Wash 12 0277 912E 39 16 288N Clifton 39751.

THELYPODIUM

- 1 Cauline leaves auriculate ***T. wrightii***
 1 Cauline not auriculate ***T. integrifolium*** var. ***longicarpum***

Thelypodium integrifolium (T. & G.) Endl.

var. ***longicarpum*** (Al-Shehbaz) G. Clifton Comb. nov.

ENTIRE-LEAVED THELYPODY. Among bushes near seeps and springs. Aug.-Oct.

Thelypodium wrightii A. Gray

WRIGHT'S THELYPODIUM. cliffs, rocky slopes, among large boulders, ridges. Plants may get up to 2.3 m tall. June-Oct. Hualapai Mountain Road 12 0235 142E 38 89 757N Clifton 40710, Flag Mine Road 237 568E 38 85 393N Clifton 37099, Mt Trumbull 12 0309 350E 40 29 362N.

THLASPI***Thlaspi montanum*** L.

MOUNTAIN PENNY CRESS. Antelope Wash 12 0238 241E 38 84 500N Clifton 39394.

THYSANOCARPUS Fringe Pod***Thysanocarpus curvipes*** Hook.

HAIRY FRINGE POD. Most of these plants are glabrous and glaucous. Some have all there leaves ariculate-clasping while some have only the upper few auriculate-clasping. Jan-May. McCracken Mine Road 12 0247 670E 38 16 129N Clifton 38746, Sawmill Canyon 11 0768 485E 38 95 102N Clifton 38782, Alamo Road 12 0246 406E 38 27 212N Clifton 38807, Frees Wash 12 0236 563E 38 93 487N Clifton 39253, Boriana Canyon 12 0230 797E 38 67 305N, Hualapai Mountain Road 12 0232 920E 38 92 666N Clifton 39364.

BUDDLEJACEAE Butterfly-bush Family**BUDDLEJA*****Buddleja utahensis*** Cov.

UTAH BUTTERFLY-BUSH. Limited to limestone in the Virgin River area, 2000-3500 ft. May. Beaver Dam Mountains 12 0251 037E 40 94 980N Clifton 42242.

CACTACEAE Cactus Family

Note: Cactus have been played with by many. They have been moved back and forth from one genus to another as no one person agrees with the next person. This will most likely continue forever.

- 1 Plants with the larger spines broad based, reddish-pink, cross rugulose, the subtending spines hair-like and long..... ***Ferocactus***
- 1 Plants not combining the above characters
 - 2 Plants with the central spines hooked or curled at the ends
 - 3 Areoles $\pm$ 1.5 mm across; styles lacking minute hooked hairs..... ***Mammillaria***
 - 3 Areoles 4.5-6 mm across; styles bearing minute hooked hairs ***Sclerocactus***
 - 1 Plants with no hooked spines
 - 4 Plants appearing as dead sticks or branches of the creosote bush, generally growing under bushes; the very short spine from a very thickened base ***Peniocereus***
 - 4 Plants not as above
 - 5 Plants with areoles $\pm$ 12 mm across; ribs 2.5-3.8 cm deep; plants 3-16 m tall and 30-75 cm in diameter ***Carnegiea***
 - 5 Plants not combining the above characters
 - 6 Stems continuous, lacking obvious joints; areoles lacking small barbed bristles
 - 7 Plants with the areoles covered with wool; one has about 6 broad short radial spines, and a long curved center spine; the second has the sepals long-fimbriate; the third has the petals minutely denticulate ***Pediocactus***
 - 7 The areoles bearing felt, not woolly; none have any of the characters of the above
 - 8 The largest central spine 2.5-3 mm across at its base; fruit densely woolly ***Echinocactus***
 - 8 The largest central spine less than 2 mm across; fruit not densely woolly
 - 9 Fruit bearing spines..... ***Echinocereus***
 - 9 Fruit spineless
 - 10 Tubercles distinct, in spiral rows ***Escobaria***
 - 10 Tubercles born on a rib ***Sclerocactus***
 - 6 Stems segmented, joints obvious; areoles with small barbed bristles ***Opuntia***

CARNEGIEA

Carnegiea gigantea (Engelm.) Britt. & Rose
SAGUARO.

ECHINOCACTUS

Echinocactus polycephalus Engelm. & Bigel.
COTTON-TOP CACTUS.

ECHINOCEREUS

- 1 Flowers scarlet or crimson, remaining open during the night..... ***E. triglochidiatus***
- 1 Flowers lavender to purple, closing at night ***E. engelmannii***

Echinocereus engelmannii (Parry) Lem.

ENGELMANN'S HEDGEHOG CACTUS. There are a number of named varieties, but the distinctions that separate them are often over lapping. Out on the ground they seem to be somewhat different at times. Clack Canyon 11 0766 427E 38 99 552N Clifton 39411, Blake Ranch Road 12 0244 690E 38 77 056N, D-W Ranch Road 12 0235 287E 38 98 266N.

Echinocereus triglochidiatus Engelm. var. ***melanacanthus*** (Engelm.) L. Benson

RED-FLOWERED HEDGEHOG CACTUS. Hualapai Mountain Road 12 0231 014E 38 94 544 Clifton 39351.

ESCOBARIA

- 1 The central spines red with a short white base, radials 20-30 in mature plants; flowers dark pink..... ***E. vivipara*** var. ***arizonica***
- 1 The central spines white with short pink, red, dark red, or black
 - 2 The central spines 4-6, radials 0.9-1.2 cm long; flowers straw-yellow, yellow-green, or pink ***E. vivipara*** var. ***desertii***
 - 2 The central spines 8-12, tipped with red, dark red or black; radials 1.2-2 cm long; flowers magenta to pink or purple
 - 3 The central spines 8-10, 1.2-1.5 cm long dark red or black tipped; radials 1.2-1.5 cm long; flowers magenta to pink ***E. alversonii***
 - 3 The central spines 10-12, 1.9-2.5 cm long, red tipped; radials 1.5-2 cm long; flowers magenta to purple ***E. vivipara*** var. ***rosea***

Escobaria alversonii (Coult.) N. P. Taylor

CUSHION FOX-TAIL CACTUS. Extreme nw part of the county.

Escobaria vivipara (Nutt.) Buxb.var. ***arizonica*** (Engelm.) D. Hunt

ARIZONA SPINY STAR Old 66 12 0265 352E 39 28 378N Clifton 41233.

Escobaria vivipara (Nutt.) Buxb.var. ***deserti*** (Engelm.) D. Hunt

DESERT SPINY STAR. Mount Dellenbaugh Road 269 009E 40 04 027N Clifton 42325

Escobaria vivipara (Nutt.) Buxb.var. ***rosea*** (Clokey) D. Hunt

ROSE SPINY STAR.

FEROCACTUS

Ferocactus cylindraceus (Engelm.) Orc. var. ***lecontei*** (Engelm.) Brav.-Holl.

LECONTE'S BARREL CACTUS. Widely scattered, below 5000 ft. rocky slopes in desert scrub. Highway 95 11 0767 891E 37 99 908N Clifton 38982, Grand Wash Cliffs 12 0239 740E 39 42 007N, Calico Peak 752 250E 39 25 458N. [F. acanthodes (Lamaire) Britt. & Rose]

MAMMILLARIA

- 1 The lower sepals ciliate; petals acuminate; stigmas $\pm$ 3 mm long; radial spines generally 30-60 ***M. tetrancistra***
 1 The lower sepals not ciliate; petals acute; stigmas $\pm$ 1.5 mm long; radial spines generally 20-30..... ***M. microcarpa***

Mammillaria microcarpa Engelm.

DESERT FISHHOOK CACTUS. This taxon has been included in *M. grahamii* by some. It seems to be as much different from *M. grahamii* as others are different from each other.

Mammillaria tetrancistra Engelm.

SPINY FISHHOOK CACTUS. *Mammillaria viridiflora* is known from se Arizona only. Mar-May. Alamo Road 12 0250 561E 38 06 447 Clifton 39163.

OPUNTIA

Note: The plants that are *Opuntia* often cross forming many kind of intermediates. A prime example is *O. phaeacantha* var. *major* and *O. engelmannii* which more often grow together and generally combine their characters. The only way to separate some of these taxa, you must have the fruit. Another problem is that one taxon varies from one place to another, making it hard to write a key. Obviously many plants will not fall into any of the identified species.

- 1 Joints flat, lacking tubercles
 2 Areoles lacking spines ***O. basilaris***
 2 Areoles having spines
 3 Spines all yellowish to sometimes straw-colored; mostly reflexed; stems mostly 1.5-2 m tall, main trunk 1;
 fruit grayish tinged with purple ***O. chlorotica***
 3 Spines not all uniformly yellow; trunk usually more than 1
 4 Plants with styles 9-12 mm long, 3 mm in diameter; anther $\pm$ 2mm long; mature joints 5-10 cm long about as
 long as wide ***O. macrorhiza***
 4 Plants generally not combining the above characters
 5 Plants with filaments all about the same length, $\pm$ 9 mm long; anthers 1.5 mm long; styles $\pm$ 1.5 mm in diameter
 ***O. polyacantha***
 5 Plants with filaments variable in length in the same flower, 3-12 mm long or 9-12 mm long; anthers 2-2.5 mm
 long; styles 3-7 mm in diameter at greatest diameter
 6 Ovary generally spiny, densely so when mature; fruit dry at maturity, tan to brownish, deciduous, laying on
 the ground for a long period of time ***O. erinacea***
 6 Ovary generally spineless and spineless at maturity; fruit fleshy at maturity, reddish to reddish-purple, wine
 color or purple, not deciduous and laying on the ground for long periods of time
 7 Styles basally swollen; stigmas 3-4.5 mm long ***O. martiniana***
 7 Styles may be swollen, but above base; stigmas $\pm$ 6 mm long..... ***O. phaeacantha***
 1 Joints rounded in cross section, tubercles present
 8 Joints with the upper 3-6 mm in diameter, pencil-like
 9 Joints with some of the areoles bearing 1 long spine; style yellow; fruit bright red ***O. leptocaulis***

- 9 Joints with a lot of the areoles bearing more than 1 spine; style green; fruit brown or tan *O. ramosissima*
- 8 Joints 1-6 cm in diameter
 - 10 Spines with rough papillae in crosswise ranks; rare in this county *O. parishii*
 - 10 Spines longitudinally ribbed or grooved
 - 11 Joints 3.6-6 cm in diameter, end joints often braking off and rooting on the ground *O. bigelovii*
 - 11 Joints 1-3 cm in diameter, not falling off and rooting on the ground
 - 12 Fruit essentially spineless; petaloids pale- or lemon-yellow, 10-15 mm long; generally forming mound *O. whipplei*
 - 12 Fruit with quite a few spines, strongly barbed; petaloids, red, purplish, yellow, or greenish-yellow 15-40 mm long
 - 13 Tubercles short, only 1-2 times longer than wide; filaments green *O. echinocarpa*
 - 13 Tubercles longer, over 3 times longer than wide; filaments red- to green-purple *O. acanthocarpa*

***Opuntia acanthocarpa* (Engelm.) J. Bigelow**

- 1 Tubercles 20-23 mm long; spines 10-12 per areole, 2.5-4 cm long var. *coloradensis*
- 1 Tubercles 30-50 mm long; spines 12-20 or 6-11 per areole, 1.2-2.5 mm long
 - 2 Tubercles 30-38 mm long, broad; spines 12-20, most of them about the same length var. *acanthocarpa*
 - 2 Tubercles 30-50 mm long, narrow; spines 6-11, 1.2-2.5 mm long var. *thornberi*

var. *acanthocarpa* (Engelm.) J. Bigel.

BUCKHORN CHOLLA. Beaver Dam Mountains 12 0250 389E 40 94 100N Clifton 42246.

var. *coloradensis* L. Benson

COLORADO RIVER BUCKHORN CHOLLA. Bill Williams Mountains 11 0764 983E 38 15 277N Clifton 39779.

var. *thornberi* (Thornber & Bonker) L. Benson

THORNBERS BUCKHORN CHOLLA.

***Opuntia basilaris* (Engelm.) J. Bigel.**

- a Petaloids pink-magenta var. *basilaris*
- a Petaloids yellow var. *aurea*

var. *aurea* (Baxter) W. Marshall

YELLOW-FLOWERED BEAVERTAIL.

var. *basilaris*

BEAVERTAIL. Mohave Mountains 11 0747 921E 38 35 562N Clifton 39202, D-W Ranch Road 12 0235 287E 38 98 266N.

***Opuntia bigelovii* Engelm.**

TEDDY-BEAR CHOLLA. Grand Wash Cliffs 12 0239 740E 39 42 007N, Spanish Ranch Road 759 458E 38 54 045N Clifton 42167.

***Opuntia chlorotica* (Engelm.) J. Bigel.**

PANCAKE PRICKLY-PEAR. Flag Mine Road 12 0237 900E 38 85 629N Clifton 40740.

***Opuntia echinocarpa* Engelm. & Bigel.**

GOLDEN CHOLLA. Beaver Dam Mountains 247 708E 40 96 193N Clifton 42221

Opuntia erinacea

- 1 Spines generally sparse, 1 or sometimes several per areole var. *utahensis*
- 1 Spines generally quite dense, well over 4 per areoles
 - 2 Pads not shaggy looking var. *erinacea*
 - 2 Pads shaggy looking var. *ursina*

var. *erinacea* Engelm. & Bigel.

MOJAVE PRICKLY-PEAR, OLD MAN CACTUS. Beaver Dam Mountains 247 708E 40 96 193N Clifton 42220

var. *ursina* (A. Weber) Parish

GRIZZLY BEAR CACTUS.

var. *utahensis* (Engelm.) L. Benson

UTAH PRICKLY PEAR. White Hills 11 0755 851E 38 59 456N Clifton 39710

***Opuntia leptocaulis* DC.**

DESERT CHRISTMAS CACTUS, PENCIL CHOLLA. Temple Bar Road 11 0738 468E 39 87 725N Clifton 42343

***Opuntia macrorhiza* Engelm.**

PLAINS PRICKLY PEAR. Flag Mine 12 0237 374E 38 85 084N Clifton 40707.

Opuntia martiniana (L. Benson) Parfitt

MARTIN'S PRICKLY-PEAR. Kaiser Spring Wash 12 0272 294E 38 29 368N Clifton 39837.

Opuntia parishii Orc.

PARISH'S CHOLLA.

Opuntia phaeacantha

- 1 Spine generally of $\pm$ uniform length and on most of the joint
- 2 Joints orbiculate to elliptic 22-30 cm long and 17-22 broad; spines per areole generally 1-4, white or ashy-gray var. ***discata***
- 2 Joints narrowly obovate 17-31 cm long and 10-14 cm wide; spines per areole generally 6-10, dark brown or gray var. ***superbospina***
- 1 Spine generally not of uniform length and generally only on the upper part of the joint
- 3 Joints 7.5-10 cm broad; spines 3-5 above and 1 or 2 below var. ***phaeacantha***
- 3 Joints 10-20 cm broad; spines generally 1-3 var. ***major***

var. ***discata*** (Griffiths) L. Benson & Walkington

CACTUS-APPLE. This taxon has been made a species by some but this author is not convinced that it is justified. [*Opuntia engelmannii* Salm-Dyck].

var. ***major*** Engelm.

WIDE SPREAD PRICKLY-PEAR.

var. ***phaeacantha*** Engelm.

DARK-FLOWERED PRICKLY-PEAR. Big Wash Road 11 0752 255E 39 27 400N Clifton 42180

var. ***superbospina*** (Griffiths) L. Benson

KINGMAN PRICKLY-PEAR

Opuntia ramosissima Engelm.

DIAMOND CHOLLA.

. [*O. phaeacantha* Engelm. var. s. (Griffiths) L. Benson

Opuntia whipplei Engelm. & Bigel.

WHIPPLE'S CHOLLA.

PEDIOCACTUS

Note: Several of these cactus are very hard to find

- 1 Spines hair-like, flexible; petaloids apex margins minutely denticulate ***P. paradinei***
- 1 Spines not hair-like, stiff; petaloids margins densely long fimbriate or glabrous
- 2 Petaloids margins densely long fimbriate; plants 7-10 (13) cm tall; surface of spines spongy-fibrous ***P. sileri***
- 2 Petaloids margins glabrous; plants 1.5-4 (6.2) cm tall; surface of spines, smooth ***P. peeblesianus***

Pediocactus paradinei L. Benson

KAIBAB PINCUSHION CACTUS.

Pediocactus peeblesianus (Croizat) L. Benson

var. ***fickeiseniae*** L. Benson

NAVAHO PINCUSHION CACTUS.

Pediocactus sileri (Engelm.) L. Benson

SILER'S PINCUSHION CACTUS. Limited to an area from Pipe Springs to Fredonia. The type most likely came from the Pipe Springs area.

PENIOCEREUS

Peniocereus greggii (Engelm.) Britt. & Rose

var. ***transmontanus*** (Engelm.) Backeberg

DESERT NIGHT-BLOOMING CACTUS. Reported for this area, but most like not found here.

SCLEROCACTUS

- 1 Central spines not hooked ***S. johnsonii***
- 1 Central spine hooked ***S. parviflorus***

Sclerocactus johnstonii (Engelm.) N. P. Taylor

JOHNSTON'S HOOKLESS CACTUS. Seems to be a matter of opinion as to which genus this taxon belongs. Detrital Valley
11 0729 160E 39 67 937N Clifton 39701. [*Echinomastus j.* (Parry) Baxter, *Neolloydia j.* (Parry) Benson.].

Sclerocactus parviflorus Clover & Jotter

- a From a distance the spines appear uniform in color, white or pinkish.....var. ***parviflorus***
a From a distance the spines appear mottled with some gray, red or brown spines and some white..... var. ***intermedius***

var. ***intermedius*** (Peebles) Woodruff & L. Benson

WHITE-SPINED SMALL-FLOWERED FISHHOOK CACTUS.

var. ***parviflorus***

PINK-SPINED SMALL-FLOWERED FISHHOOK CACTUS.

CAMPANULACEAE Bellflower Family

- 1 Flowers 1.5-3.5 mm long ***Nemacladus***
1 Flowers 8 mm to longer
1 Flowers blue, regular ***Triodanis***
1 Flowers red, irregular..... ***Lobelia***

LOBELIA***Lobelia cardinalis*** L. var. ***graminea*** (Lam.) McVaugh

CARDINAL FLOWER. Moist places, seeping banks, vernal margins of streams and rivers, below 4600 ft. Aug.-Oct

NEMACLADUS

- 1 Corolla yellow with brown spots ***N. rubescens***
1 Corolla white with purplish tips or spots, white with yellow tips, white with lavender veins
2 Corolla 1.5-2 mm long, white with lavender veins; sepals $\pm$ 0.5 mm long; filament tube hairy ***N. gracilis***
2 Corolla 2-3.5 mm long, if corolla 2 mm long, filament tube glabrous ; sepals 1.5-2.5 mm long
2 Pedicels clearly S-curved; petals white with yellow tips ***N. sigmoideus***
2 Pedicels not clearly S-curved; petals white with purplish tips or spots ***N. glanduliferus***

Nemacladus glanduliferus Jeps.

var. ***orientalis*** McVaugh

GLANDULAR THREAD-PLANT. Highway 95 11 0759 610E 38 09 947N Clifton 38997, Detrital Valley 11 0729 160E 39 67 937N Clifton 39700, Cedar Wash 12 0244 470E 38 77 739N Clifton 39810, Mt. Trumbull Loop Road 12 0270 556E 40 79 460N.

Nemacladus gracilis Eastw.

SLENDER THREAD-PLANT. Reported from Yucca, but it is far from its normal range in California.

Nemacladus rubescens E. Greene

DESERT THREAD-PLANT. Parts of corolla lobes dirty brown. Oatman Road 11 0734 039E 38 61 610N Clifton 39194.

Nemacladus sigmoideus G. Robb.

SIGMOID or SMALL-FLOWERED THREAD-PLANT. Detrital Wash 11 0725 894E 39 78 862N Clifton 39698.

TRIODANIS***Triodanis perfoliata*** (L.) Nieuw.

VENUS' LOOKING GLASS.

CAPPARACEAE Capper Family

- 1 Stamens 8-30; ovary $\pm$ sessile..... ***Polanisia***

- 1 Stamens 6; ovary on a stalk-like receptacle
- 2 The stalk-like receptacle extended beyond the 2 nutlets *Wislizenia*
- 2 The stalk-like receptacle ends at the bottom of the capsule *Cleome*

CLEOME

- 1 Petals purple *C. serrulata*
- 1 Petals yellow *C. lutea*

Cleome lutea Hook.

YELLOW BEE PLANT. Areas of desert scrub and along roads. Mid July-Aug. Highway 389 12 0361 776E 40 88 757N Clifton 41159.

Cleome serrulata Pursh

PINK CLEOME, ROCKY MOUNTAIN BEE PLANT. Along roads. June-Sept. Findley Tank 12 0349 763E 40 63 015N Clifton 41172.

POLANISIA

Polanisia dodecandra (L.) DC. var. *trachysperma* (T. & G.) Iltis

RED WHISKER CLAMMY WEED. Blye Canyon 12 0278 929E 39 26 815N Clifton 41603

WISLIZENIA

Wislizenia refracta Engelm.

JACKASS CLOVER. Warm Springs 746 246E 38 64 356N Clifton 43437.

CAPRIFOLIACEAE Honeysuckle Family

- 1 Inflorescence rounded, dome-shaped or flat-topped, flowers many *Sambucus*
- 1 Inflorescence of paired flowers or a few in an elongated raceme *Symphoricarpos*

SAMBUCUS Elderberry

Note: These plants have been played with by many, with various combinations, wholesale lumping or splitting. It appears that no one really knows how these plants should be classified.

Sambucus nigra L.

- a. Leaflets 3-5, generally quite asymmetrical at the base; plants normally above 5000 ft. var. *caerulea*
- a. Leaflets 5-9, generally quite symmetrical at base; plants normally below 5000 ft. var. *mexicana*

var. *caerulea* (Raf.) G. Clifton comb. nov.

BLUE ELDERBERRY. fairly dry openings in forests and about rock outcrops. *S. velutina* Dur. & Hilg. may warrant some kind of status, it has the branchlets and lower surface of the leaves finely hairy and the leaflets drop early in season. June-early Sept. Hayden Peak 12 0235 296E 38 85 768N. Clifton 40723. [*S. caerulea* Raf., *S. glauca* A. Gray].

var. *mexicana* (Presl) G. Clifton comb. nov.

MEXICO ELDERBERRY.

SYMPHORICARPOS Snowberry

- 1 Corolla tube narrow, $\pm$ tubular; corolla spreading *S. longiflorus*
- 1 Corolla tube bell-shaped, corolla lobes $\pm$ erect *S. rotundifolius*

Symphoricarpos longiflorus A. Gray

FRAGRANT SNOWBERRY. above 3500 ft.; rocky slopes. Mid Apr-Jul. White Cliff Wagon Trail Park 11 0768 317E 38 99 253N Clifton 39788.

***Symphoricarpos rotundifolius* A. Gray var. *parishii* (Rydb.) Dempster**

TRAILING MOUNTAIN SNOWBERRY. There seems to be a matter of opinion as to how many species or varieties there are in this group of plants. They often are hard to tell apart with so plants showing character of several types. Therefore this author is not convinced that there should be any named varieties. On the Hualapai mountains there seems to be two kinds of this taxon, one with few trailing branches and one that is quite bushy and $\pm$ erect. Hayden Peak 12 0235 206E 38 85 819N. Clifton 40718. June-Aug.: [*S. parishii* Rydb.].

CARYOPHYLLACEAE Pink Family

- 1 Petals lacking
 - 2 Plants perennial *Scopulophila*
 - 2 Plants annual
 - 3 Herbage densely cinerous *Herniaria*
 - 3 Herbage glabrous to slightly hairy
 - 4 Flowers in axillary clusters *Achyronychia*
 - 4 Flowers single *Stellaria*
- 1 Petals present (may be small)
 - 5 Sepals united for some distance
 - 6 Petals united for some distance
 - 7 Styles 2; plants rhizomatous *Saponaria*
 - 7 Styles 5; plants not rhizomatous *Silene*
 - 6 Petals free
 - 5 Sepals $\pm$ free
 - 8 Plants annual
 - 9 Styles 1, lobed above *Drymaria*
 - 9 Styles more than one, distinct to base *Stellaria*
 - 8 Plants perennial *Arenaria*

ACHYRONYCHIA***Achyronychia cooperi* T. & G.**

ONYX FLOWER, FROST-MAT. Warm Springs Wash 11 0730 806E 38 48 613N Clifton 38760, Oatman Road 11 0734 039E 38 61 610N Clifton 39186.

ARENARIA Sandwort

- 1 Leaves not spine-tipped, broader in middle *A. lanuginosa* var. *cinerascens*
- 1 Leaves spine-tipped; broader at bottom
 - 2 Sepals acute to acuminate; fruit less than 7 mm long
 - 3 Petals generally quite a bit longer than the sepals *A. macradenia* var. *ferrisiae*
 - 3 Petals not much longer than the sepals
 - 4 Leaves very rigid and sharply pungent *A. fendleri* var. *eastwoodiae*
 - 4 Leaves more lax and less sharply pungent; pine woodlands *A. fendleri*
 - 2 Sepals obtuse; fruit 7-9 mm long *A. aberrans*

Note: In this group of plants it appears that no one really knows what or how they should be put together. There are numerous narrow endemics that have no names. There are not enough collections to really understand these plants. There are plants at Burro Creek that have an open stem system with a few old woody stems, marcescent, dull green and sharp-pointed leaves. There are plants from the Tuckayou Wash that have a many branched caudex, with numerous non woody stems, soon disintegrating, bright green and less sharp-pointed leaves. These plants don't seem to fit any of the named types. Glandular pubescence is used as a character, but throughout the range of this whole group it is not a correlatable feature.

***Arenaria aberrans* M. E. Jones**

MT. DELLENBAUGH SANDWORT. Mt Trumbull 12 0309 074E 40 29 572N, Mt. Dellenbaugh Road 12 0269 028E 40 04 094N Clifton 42328.

***Arenaria eastwoodiae* Rydb.**

EASTWOOD'S SANDWORT. Open rocky slopes, openings in brush, throughout. June-July. Six Mile Crossing Road 12 0283

234E 38 28 458N Clifton 39451. [var. *adenophora* Kearney & Peebles].

Arenaria fendleri A. Gray

FENDLER'S SANDWORT.

Arenaria lanuginosa (Michx.) Rohrb.

var. *cinerascens* (B. L. Robins.) Shinn.

ROCK LOVING SANDWORT. Camp Levi Road 12 0235 753E 38 87 262N Clifton 40713. [*A. confusa* Rydb., ssp. *saxosa* (A. Gray) Maguire].

Arenaria macradenia S. Wats.

DESERT SANDWORT. The plants that are found in other places than Beaver Dam Mountains are ± herbaceous and have yellowish tinged flowers that have the tips spreading. The plants that are in the Beaver Dam mountains are most often shrub like with white flowers with the petals hardly spreading. Highway 93 11 0764 923E 38 99 348N Clifton 39225, Flag Mine Road 12 0238 339E 38 84 325N Clifton 40745, Beaver Dam Mountains 12 0248 782E 40 96 646N Clifton 42226. [var. *ferrisiae* Abrams].

DRYMARIA

1 Cauline leaves fascicled; petals fimbriate-appendaged *D. molluginea*

1 Cauline leaves opposite; petals bifid..... *D. leptophylla*

Drymaria leptophylla (Cham. & Schlecht.) Fenzl

SLENDER-LEAVED DRYMARY. Hualapai Mountain County Park 12 0235 660E 38 87 100N Clifton 41384.

Drymaria molluginea (Lag.) Didr.

VIRGATE DRYMARY.

HERNIARIA

Herniaria hirsuta L. var. *cinerea* (DC.) G. Clifton Comb. nov.

CINEREOUS GRAY HERNIARIA. Box Canyon 12 0266 566E 38 32 216N Clifton 38955.

SAPONARIA

Saponaria officinalis L.

BOUNCING BET, SOAPWORT. Infrequent, around towns and old building sites; introduced from Europe. June-Sept.:

SCOPULOPHILA

Scopulophila rixfordii (Brandeg.) Munz & I. Johnst.

RIXFORD ROCKWORT. Limited, 2000-3500 ft.; crevices in limestone May. Beaver Dam Mountains 12 0251 037E 40 94 980N Clifton 42240.

SILENE Catchfly, Campion

1 Plants annual; stems usually with glutinous bands on some of the internodes *S. antirrhina*

1 Plants perennial; stems lacking glutinous bands

2 Plants lacking a basal clump of leaves; leaf hairs crinkly *S. scouleri*

2 Plants bearing a clump of leaves at the base; leaf hairs not crinkly *S. verecunda*

Silene antirrhina L.

SLEEPY or SNAPDRAGON CATCHFLY. Frequent, washes, slopes, canyons, Aubrey Hills 11 0762 558E 38 04 920N Clifton 38991, Kaiser Spring Wash 12 0272 021E 38 28 855, Clifton 39310.

Silene scouleri Hook.

var. *pringlei* (S. Wats.) C. L. Hitchc. & Maguire

SLENDER-LEAVED CATCHFLY. Flag Mine 12 0236 958E 38 84 997N Clifton 41664

Silene verecunda S. Wats.

var. *andersonii* (Clokey) G. Clifton comb. nov.

ANDERSON'S CATCHFLY. This is a new record for the state of Arizona. Jun-early Oct. Flag Mine 12 0237 139E 38 85 040N Clifton 41665.

SPERGULARIA Sand-Spurrey***Spergularia marina*** (L.) Griseb.

SALT-MARSH SANDSPURRY. June-Aug. Big Sandy 12 0263 675E 38 38 627N Clifton 39320.

STELLARIA Starwort, Chickweed***Stellaria nitens*** Nutt.

SHINY CHICKWEED. Oatman Road 11 0742 918E 38 80 080N Clifton 38889, Poachie Range 12 0273 830E 38 17 170N Clifton 39009.

CELASTRACEAE Bitter-sweet Family

- 1 Plants with branchlet stiff and spine-tipped; leaves reduced to small scales, these soon deciduous..... ***Canotia***
 1 Plants not as above; leaves leathery, revolute, persistent..... ***Mortonia***

CANOTIA***Canotia holacantha*** Torr.

CRUCIFIXION THORN. Gravelly to rocky slopes, 2000-5000 ft. May-Aug. (Nov.). Hualapai Mountain Road 12 0233 313E 38 92 540N.

MORTONIA***Mortonia utahensis*** (Cov.) A. Nels.

UTAH SADDLEBUSH. Canyons and rocky slopes on limestone, 2300-3200 ft. March-May. Beaver Dam Mountains 12 0250 810E 40 95 750N Clifton 42239.

CERATOPHYLLACEAE Hornwort Family**CERATOPHYLLUM*****Ceratophyllum demersum*** L.

SUBMERGED HORNWORT.

CHENOPODIACEAE Goosefoot Family

- 1 Leaves scale-like; upper stems clearly jointed ***Allenrolfea***
 1 Leaves usually with a blade; upper stems not jointed
 2 Leaves ending in a spine or a bristle
 3 Leaves ending in a spine that becomes very prickly ***Salsola***
 3 Leaves ending in a bristle that doesn't become prickly ***Halogeton***
 2 Leaves not ending in a spine or a bristle
 4 Plants subshrubs to shrubs
 5 Leaves with white stellate hairs that later become $\pm$ rusty ***Krascheninnikovia***
 5 Leaves lacking stellate hairs, hairs may be branched, but not stellate
 6 Flowers with the staminate usually separate from the pistillate, in *Atriplex* most often on separate plants; calyx lacking
 7 Leaves minutely scaly ***Atriplex***
 7 Leaves dark green, glabrate or with some branched hairs ***Grayia***
 6 Flowers usually with the stamens and stigmas in the same flower, rarely are some of the pistillate separate, if separate than intermixed; calyx present ***Suaeda***
 3 Plants herbaceous
 8 Plants with pistillate flowers enclosed in two bracts, calyx and petals lacking; staminate calyx segments 3-5 ***Atriplex***
 8 Plants not as above
 9 Leaf $\pm$ wavy-toothed; stem tomentose; calyx surrounded with a wing that is toothed ***Cycloloma***

- 9 Leaf, stem and calyx otherwise
 - 10 Bracts present, leaf-like
 - 11 Leaves toothed to hastate (ours)..... *Monolepis*
 - 11 Leaves not as above *Bassia*
 - 10 Bracts generally lacking..... *Chenopodium*

ALLENROLFEA

Allenrolfea occidentalis (S. Wats.) Kuntze
IODINE BUSH.

ATRIPLEX Saltbush, Orach

- 1 Plants woody, stems generally erect
 - 2 Leaves holly-like..... *A. hymenelytra*
 - 2 Leaves entire
 - 3 Bracts 4-winged, margins wavy to deeply sharp-dentate *A. canescens*
 - 3 Bracts lacking 4 wings
 - 4 Plants a low very spiny shrub *A. confertifolia*
 - 4 Plants usually much taller and not quit as spiny
 - 5 Leaves 2-4 mm wide *A. polycarpa*
 - 5 Leaves 10-50 mm wide *A. lentiformis*
 - 1 Plants not woody, if a little woody, than crawling on ground
 - 6 Plants strongly perennial, crawling on the ground; mature fruit bright red *A. semibaccata*
 - 6 Plants annual
 - 7 Bracts like a wheel..... *A. elegans*
 - 7 Bracts wedge-shaped
 - 8 Anthers red *A. sp.*
 - 8 Anthers yellow
 - 9 Fruit surfaces bearing tubercles *A. sp.*
 - 9 Fruit surfaces lacking tubercles..... *A. sp.*

Atriplex canescens (Pursh) Nutt.

FOUR-WINGED SALTBUSH. upper slopes to valley floors; sandy to gravelly places. Johnston Canyon 11 0767 171E 38 98
687N Clifton 38686

Atriplex confertifolia (Torr. & Frém.) S. Wats.

SPINY SALTBUSH. Red Lake 11 0760 880E 39 51 938N Clifton 39390.

Atriplex elegans (Moq.) D. Dietr.

- a Margins minutely crenate to finely toothed..... var. *fasciculata*
- a Margins of flowering bracts deeply toothed..... var. *elegans*

var. *elegans*

WHEEL-SCALE. West Spring St. 11 0767 404E 38 98 151N Clifton 41247.

var. *fasciculata* (S. Wats.) M. E. Jones

SHORT-TOOTHED WHEEL-SCALE. Red Lake 11 0761 147E 39 52 062N Clifton 39712

Atriplex hymenelytra (Torr.) S. Wats.

DESERT HOLLY. Detrital Valley 11 0727 400E 39 78 292N Clifton 39693.

Atriplex lentiformis (Torr.) S. Wats.

var. *torreyi* (S. Wats.) McMinn

TORREY'S BIG SALTBUSH. Colorado River 11 0721 522E 38 94 619N Clifton 41292. [*A. torreyi* (S. Wats.) S. Wats.].

Atriplex polycarpa (Torr.) S. Wats.

ALL-SCALE. Temple Bar Road 11 0723 353E 39 71 347N Clifton 41249.

Atriplex semibaccata R. Br.

AUSTRALIAN SALTBUSH. Big Sandy River 12 063 381E 38 38776N Clifton 39847.

Atriplex sp. (Anther yellow)

Lake Havasu 11 0760 441E 38 04 500N Clifton 39774.

Atriplex sp. (Anther red)

Red Lake 11 0760 926E 39 51 654N Clifton 39722.

Atriplex sp. (Anther red)

Big Sandy River 12 063 381E 38 38776N Clifton 39846.

BASSIA

- 1 Sepals cottony hairy; bracts of inflorescence hardly longer than the flowers **B. hyssopifolia**
 1 Sepals glabrous or with some hairs on apex; bracts of the inflorescence much longer than the flowers **B. scoparia**

Bassia hyssopifolia (Pall.) Kuntze

FIVE-HORNED SMOTHERWEED. moist subalkaline flats; introduced from Europe. July-Oct.

Bassia scoparia (L.) A. J. Scott

SUMMER-CYPRESS, MEXICAN-FIREWEED. 4000 to 5500 ft., east side; along roads, old fields. The wings on the sepals rarely develop on flowers of early season. It is doubtful that the introduced *Kochia* is much related to our native perennial. It belongs in the genus *Bassia* which only makes sense, because they look alike; introduced from Eurasia. Aug.-Sept. Old Trails Road 11 0767 914E 38 95 847N Clifton 38653.

CHENOPODIUM Goosefoot

- 1 Perianth with yellow, resinous dots **C. graveolens**
 1 Perianth not as above
 2 Pericarp's surface rugose or alveolate
 3 Pericarp's surface rugose with irregular markings **C. murale**
 3 Pericarp's surface regularly and finely alveolate
 4 Herbage densely white farinose, seeds subglobose **C. watsonii**
 4 Herbage moderately farinose to glabrescent, green; seeds flattened **C. berlandieri**
 2 Pericarp's surface smooth or nearly so
 5 Leaves over 3 times as long as wide **C. desiccatum**
 5 Leaves less than 3 times longer than wide
 6 Leaves irregularly dentate throughout **C. album**
 6 Leaves with most of the leaf margin entire, may be basally lobed or with a few teeth
 7 Fruit top exposed by the calyx lobes; fruit 1-1.5 mm wide; leaves thin **C. fremontii**
 7 Fruit enclosed by the calyx lobes; fruit $\pm$ 1 mm wide; leaves thicker **C. incanum**

Chenopodium album L.

LAMB'S-QUARTERS, WHITE GOOSEFOOT. old fields; road ditches and other waste places; introduced from Europe. It is impossible to separate the immature plants of this and *C. berlandieri*. All the collected plants that are old enough to see the fruit have turned out to be *C. berlandieri*. June-Oct.

Chenopodium berlandieri Moq.

BERLANDIER'S GOOSEFOOT. ; moist or dry places, old fields. This taxon is so similar to *C. album* that if one wishes it may be called var. *berlandieri* (Moq.) Mack. & Bush. West Spring St. 11 0767 400E 38 98 167N Clifton 40671, Bobcat Reservoir 12 0322 310E 40 41 356N Clifton 41723. [var. *sinuatum* (Murray) Murray].

Chenopodium desiccatum A. Nels.

DRY GOOSEFOOT. Dry open places, sometime acting like a weed. July-Sept. Highway 389 12 0339 880E 40 80 460N Clifton 41179. [*C. d.* var. *leptophylloides* (J. Murr) H.A. Wahl.].

Chenopodium fremontii S. Wats.

WESTERN GOOSEFOOT. Frees Wash 12 0236 172E 38 94 068N Clifton 38601.

Chenopodium graveolens Willd.

GOLDEN DEW GOOSEFOOT. Old 66 12 0285 250E 39 36 800N Clifton 41369, Flag Mine Road 12 0237 414E 38 84 880N Clifton 26214. [var. *neomexicanum* (Aellen) Aellen].

Chenopodium incanum (S. Wats.) A. Heller

var. **occidentale** D.J. Crawford

WESTERN GOOSEFOOT. W. Spring St. 11 0767 400E 38 98 167N Clifton 40672, Highway 389 12 0339 880E 40 80 460N Clifton 41180.

Chenopodium murale L.

NETTLE-LEAF GOOSEFOOT. W. Spring Street 11 0767 200E 38 98 150N Clifton 38687. Seed coats strongly adherent and rough papillate.

Chenopodium watsonii A. Nels.

WATSON'S GOOSEFOOT. June-Sept. .

CORISPERMUM

Corispermum americanum (Nutt.) Nutt. var. *rydbergii* Mosyakin

RYDBERG'S AMERICAN BUGSEED. [*C. nitidum* Kit. misapplied to our plants].

CYCLOLOMA

Cycloloma atriplicifolium (Sprengel) J. Coulter

WINGED PIGWEED. Beaver Dam 12 0237 474E 40 88 380N Clifton 42212

GRAYIA

Grayia spinosa (Hook.) Moq.

HOPSAGE. Mid Feb-Apr. Clack Canyon 11 0767 152E 38 97 343N Clifton 38966.

HALOGETON

Halogeton glomeratus (M. Bieb.) C. Mey.

HALOGETON. Frequent, below 7,000 ft.; along road margins, waste places, often invading native habitat; introduced from Eurasia. July-Sept. Highway 389 12 0357 857E 40 85 125N Clifton 41692.

KRASCHENINNIKOVIA

Krascheninnikovia lanata (Pursh) Meeuse & Smit

WINTER FAT. Hualapai Mountains 11 0768 982E 38 93 307N Clifton 39029. [*Eurotia l.* (Pursh) Moq.

MONOLEPIS

Monolepis nuttalliana (Schultes) E. Greene

NUTTALL'S POVERTY-WEED. Red Lake 11 0760 880E 39 51 938N Clifton 39391.

Monolepis spathulata A. Gray

PROSTRATE POVERTY-WEED. Six Mile Crossing Road 12 0282 418E 38 28 775N. Clifton 39 483.

SALSOLA

Salsola paulsenii Litv.

BARWIRE RUSSIAN-THISTLE. Lake Havasu 11 0739 935E 38 26 957N Clifton 39767, Lake Havasu 11 0739 833E 38 27 073N Clifton 39199.

Salsola tragus L.

RUSSIAN-THISTLE. Waste places. Bullhead 11 0721 541E 38 94 513N Clifton 39949. [*S. iberica* Sennen & Pau; *S. kali* L. var. *tenuifolia* Tausch.- all misapplied].

SUAEDA Sea-blite, Seepweed

Suaeda moquinii (Torr.) E. Greene

BUSH SEEPWEED. Highway 95 11 0727 206E 38 58 613N Clifton 38682. [*S. torreyana* S. Wats.]

CONVOLVULACEAE Morning-Glory Family

1 Corolla red or lavender, drying violet-purple

2 Leaves lobed or divided *Ipomoea*

2 Leaves entire, not divided *Evolvulus*

- 1 Corolla $\pm$ white
 3 Flowers not pedunculate, in upper axils, appearing like a 1-sided leafy raceme; herbage silky-canescens..... *Cressa*
 3 Flowers single, pedunculate; herbage not silky-canescens.....
 4 Corolla 1.5-3 cm long; peduncles sometimes up to 2 times the length of the subtending leaf..... *Convolvulus*
 4 Corolla 3-4 cm long; peduncles over several times the length of the subtending leaf..... *Calystegia*

CALYSTEGIA Morning-Glory

Calystegia longipes (S. Wats.) Brummitt

var. *linearilobus* (Eastw.) G. Clifton comb. nov.

PIUTE MORNING-GLORY. dry places above the valley floor, often climbing over shrubs. May-July: Hualapai Mountain Road 12 0235 142E 38 89 757N Clifton 40709. [*Convolvulus linearilobus* Eastw.].

CONVOLVULUS Bindweed

- 1 Calyx 3-5 mm long, inconspicuously pubescent or glabrate..... *C. arvensis*
 1 Calyx 6-12 mm long, densely pubescent *C. equitans*

Convolvulus arvensis L.

FIELD BINDWEED. Waste places, along road edges, old fields; introduced from Eurasia. May-mid Oct. Toroweap Valley 12 0315 682E 40 29 808N Clifton 41732.

Convolvulus equitans Benth.

TEXAS BINDWEED. Blye Canyon 12 0280 519E 39 27 750N Clifton 41608.

CRESSA

Cressa truxillensis Kunth

SPREADING ALKALI-WEED.

EVOLVULUS

Evolvulus nuttallianus J. A. Schultes

SHAGGY DWARF MORNING-GLORY. Blake Ranch Road 12 0244 690E 38 77 056N Clifton 39812, Main Street Valley 12 0285 826E 40 50 977N.

IPOMOEA

- 1 Corolla red *I. hederifolia*
 1 Corolla lavender-purple *I. costellata*

Ipomoea costellata L.

CREST-RIBBED MORNING-GLORY. Blake Ranch Road 12 0245 741E 38 95 872N Clifton 10354.

Ipomoea hederifolia L.

SCARLET-CREEPER. Blake Ranch Road 12 0245 741E 38 95 872N Clifton 10356.

CROSSOSOMATACEAE Crossosoma Family

- 1 Petals 3-7 mm long; stamens 4-10; leaves usually oblanceolate; fruit sessile..... *Glossopetalon*
 1 Petals 9-12 mm long; stamens 15-50; leaves usually elliptic; fruit stalked..... *Crossosoma*

CROSSOSOMA

Crossosoma bigelovii S. Wats.

RAGGED ROCKFLOWER, BIGELOW'S CROSSOSOMA. The type came from the mouth of Bill Williams River. Poachie Range 12 0273 830E 38 17 170N Clifton 39006, Grapevine Canyon 12 0233 746E 39 75 700N, Warm Springs Canyon 744

996E 38 65 694N Clifton 43440.

GLOSSOPETALON

Glossopetalon spinescens A. Gray

NEVADA GREASEWOOD. There seems to be trends in this group of plants with several named varieties. These varieties are more than likely justifiable, but may not be meaningful in the overall. However, our plants in Arizona don't look like plants that grow on Serpentine in Shasta County in California. Most of our plants have no hint of stipules. Grapevine Canyon 12 0233 746E 39 75 700N, Clay Springs Road 12 0241 354E 39 57 309N Clifton 39383. [*Forsellesia nevadensis* (A. Gray) E. Greene].

CUCURBITACEAE Gourd Family

- 1 Plants usually prostrate on the ground; fruit a smooth gourd *Cucurbita*
 1 Plants depending upon shrubs for support; fruit spiny *Marah*

CUCURBITA

- 1 Leaves triangular-ovate, not lobed..... *C. foetidissima*
 1 Leaves palmately lobed..... *C. palmata*

Cucurbita foetidissima H. B. K.

STINKING GOURD or CUCUMBER. Wash bottoms, roadsides, below 4000 ft. June-July. Beale Spring 11 0765 565E 38 99 352N Clifton 40673.

Cucurbita palmata S. Wats.

COYOTE MELON. Detrital Wash 11 0728 700E 39 91 706N Clifton 41248.

MARAH

Marah gilensis (E. Greene) E. Greene

GILIA BIG-ROOT. McCracken Mine Road 12 0247 670E 38 16 129N. Clifton 38815.

CUSCUTACEAE Dodder Family

CUSCUTA Dodder

- 1 Capsule separating by a fairly distinct line of cleavage near the base..... *C. umbellata*
 1 Capsule not separating by a distinct line of cleavage
 2 Margin of corolla lobes and margin of sepals denticulate (15X) *C. denticulata*
 2 Margin of corolla lobes and margin of sepals entire
 3 Corolla appendages fringed *C. pentagona*
 3 Corolla appendages essentially lacking..... *C. californica*

Cuscuta californica H. & A.

CALIFORNIA DODDER. Lake Havasu City 11 0753 560E 38 15 445N Clifton 38908.

Cuscuta denticulata Engelm.

SMALL-TOOTHED DODDER. Lake Havasu 11 0760 441E 38 04 500N Clifton 39771, White Rock Canyon 707 493E 39 84 167N Clifton 42341.

Cuscuta pentagona Engelm.

WESTERN FIELD DODDER. Mostly on Asteraceae. July-Oct. Six Mile Crossing 12 0284 156E 38 26 734N Clifton 35191. [*C. campestris* Yuncker].

Cuscuta umbellata Kunth

FLAT-GLOBE DODDER. Willow Creek Ranch 12 0277 084E 38 96 090N Clifton 8237, Toroweap Valley 12 0315 682E 40 29 808N Clifton 41729.

ELAEAGNACEAE Oleaster Family

- 1 Branches bearing thorns; leaves lanceolate to elliptic *Elaeagnus*
 1 Branches thornless; leaves rotund..... *Shepherdia*

ELAEAGNUS

Elaeagnus angustifolia L.

RUSSIAN OLIVE. Red Sands 12 0361 548E 40 88 572N Clifton 41700.

SHEPHERDIA Buffalo Berry

Shepherdia rotundifolia Parry

ROUNDLEAF BUFFALO BERRY. Dry, open, often rocky places or in sandy soil, above 4000 ft. May-July. Cedar Ridge 12 0331 712E 40 82 998N Clifton 13591, 41685.

ERICACEAE Heath Family

ARCTOSTAPHYLOS Manzanita

- 1 Herbage bristly glandular..... *A. pringlei*
 1 Herbage fine tomentose, leaves becoming glabrous *A. pungens*

Arctostaphylos pringlei Parry

PRINGLE'S MANZANITA. Brushy slopes. The other variety is found in California. Mid Jan.-Mar. Wheeler Wash 12 0237 482E 38 85 397N Clifton 40696.

Arctostaphylos pungens Kunth

SHARP-POINTED MANZANITA. Fairly frequent, 3500-8000 ft.; slopes in pinyon-juniper woodland to yellow pine forest. Feb-May. Hualapai Mountain Road 12 0235 133E 38 89 800N Clifton 39359, Big Wash 750 930E 39 24 890N

EUPHORBIACEAE Spurge Family

- 1 Plants a shrub
 2 Leaves crenate..... *Bernardia*
 2 Leaves entire *Tetracoccus*
 1 Plants herbs
 3 Herbage stellate-pubescent *Croton*
 3 Herbage otherwise
 4 Styles divided into filiform segments; pistillate flowers subtended by accrescent, foliaceous bracts that are toothed; often the upper flowers in each cluster composed of two separate seeds..... *Acalypha*
 4 Plants bearing a calyx-like involucre that surrounds a single naked pistillate flower and several naked staminate flowers (the whole combination simulating a perfect flower)
 5 Glands of the involucre lacking petaloid appendages, or if appendages petaloid, than leaf blade linear to lanceolate and margin finely toothed *Euphorbia*
 5 Glands of the involucre having petaloid appendages, if not, than leaf blade broader than lanceolate with base asymmetric, or if leaf blade linear, than margin entire..... *Chamaesyce*
 4 Plants having an obvious calyx, unisexual
 6 Petals present *Ditaxis*
 6 Petals lacking
 7 Herbage coarsely hairy, hairs usually stinging; leaves truncate to $\pm$ lobbed at base *Tragia*
 7 Herbage glabrous *Stillingia*

ACALYPHA

Acalypha neomexicana Muell.-Arg.

NEW MEXICO COPPERLEAF. Branch of Knights Creek 12 0277 277E 38 90 603N Clifton 10347, Old 66 12 0285 250E 39 36 800N.

ARGYTHAMNIA

- 1 Leaves and sepals of the pistillate flowers gland-tipped on the margins.....*A. clariana*
- 1 Leaves and sepals not as above
- 2 Stems glabrous.....*A. cyanophylla*
- 2 Stems appressed hairy.....*A. neomexicana*

Argythamnia clariana Jeps.

GLANDULAR DITAXIS, DESERT SILVERBUSH. The type came from the Mouth of Williams River. Mar-Apr. Bill Williams Mountains 11 0758 365E 38 13 462N Clifton 39782. [*Ditaxis c.* (Jeps.) Webster, *D. adenophora* (A. Gray) Pax & Hoffman, misapplied].

Argythamnia cyanophylla (Woot. & Standl.) J. Ingram

CHARLESTON MOUNTAIN SILVERBUSH. [*Ditaxis c.* Woot. & Standl.]

Argythamnia neomexicana Muell. Arg.

NEW MEXICO SILVERBUSH. Griffith Road 11 0761 764E 38 80 512N Clifton 38666, Alamo Road 12 0228 720E 38 48 213N Clifton 38715, Alamo Road 12 0250 751E 38 13 246N Clifton 38871, Cane Spring Wash 12 0259 967E 38 66 431N. [*Ditaxis n.* (Muell. Arg.) A. Heller].

BERNARDIA

Bernardia incana Mort.

WESTERN MYRTLE-CROTON. Clay Springs Road 12 0240 279E 39 56 907N Clifton 39374.

CHAMAESYCE Prostrate Spurge

Note: Some of these plants are so variable that there is no way to tell them all apart. There are many trends that have been named. They may or may not represent species. The key makes the differences seem distinct enough, but it only fits certain plants in various places. This genus is not distinctly different from *Euphorbia*

- 1 Leaves linear with symmetrical bases
- 2 Fruit over 1.5 mm long; seed smooth*C. parryi*
- 2 Fruit less than 1.5 mm long; seed transversely ridged *C. revoluta*
- 1 Leaves broader than linear with asymmetric bases
- 3 Plants perennial
- 4 Stipules fused into a wide membranous scale*C. albomarginata*
- 4 Stipules not fused
- 5 Flowers single in the axiles and at end of branches
- 6 Involucre and fruit glabrous
- 7 Seeds 2-2.5 mm long; stipules on the lower side of the stem not united.....*C. fendleri*
- 7 Seeds 1-1.5 mm long; stipules on the lower side of the stem united.....*C. polycarpa*
- 6 Involucres and fruit hairy
- 8 Staminate flowers 6 or 7; involucre urn-shaped.....*C. arizonica*
- 8 Staminate flowers well over 6; involucre bell-shaped
- 9 Involucre with short, spreading hairs; appendages as narrow as the reddish or pink gland*C. polycarpa*
- 9 Involucre with appressed, curly hairs; appendages wider than the purple gland..... *C. melanadenia*
- 5 Flowers in dense glomerules, sometimes also solitary in the upper forks.....*C. capitellata*
- 3 Plants annual
- 10 Appendages of the gland lacking
- 11 Involucre 1.5-2 mm long; glands yellow*C. ocellata* var. *arenicola*
- 11 Involucre less than 1 mm long; glands red or pink*C. micromera*
- 10 Appendages obvious
- 12 Leaves completely entire
- 13 Appendages of the gland 3-5-lobed *C. setiloba*
- 13 Appendages of the gland not lobed.....*C. polycarpa*
- 12 Leaves with all or part of the margin serrate; appendages not lobed
- 13 Fruit 2-2.5 mm long; stems pilose *C. serrula*
- 13 Fruit normally less than 2 mm long; stems glabrous
- 14 Seeds smooth or wrinkled; appendage narrower than gland.....*C. serpyllifolia* ssp. *serpyllifolia*
- 14 Seeds transversely ridged; appendage wider than gland*C. glyptosperma*

Chamaesyce sp. This taxon looks just like *C. micromera* except it has obvious white appendages. McCracken Mine Road 12 0247 670E 38 16 129N Clifton 38737, 38826. Aubrey Hills 11 0761 826E 38 04 893N Clifton 38918 yellow gland with narrow white appendages.

Chamaesyce albomarginata (T. & G.) Small

RATTLESNAKE SANDMAT. D-W Ranch Road 12 236 482E 38 94 297N Clifton 38603.

Chamaesyce arizonica (Engelm.) Arthur

ARIZONA SANDMAT. Alamo Road 12 0230 158E 38 45 594N Clifton 38802, Kaiser Spring Wash 12 0271 746E 38 28 800N Clifton 39014.

Chamaesyce capitellata (Engelm.) Millsp.

SOUTHERN SANDMAT.

Chamaesyce glyptosperma (Engelm.) Small

RIDGE-SEEDED SANDMAT. Bitter Seeps Wash 12 0351 832E 40 78 966N Clifton 41708.

Chamaesyce fendleri T. & G.

FENDLER'S SANDMAT. Six Mile Crossing Road 12 0283 210E 38 28 339N Clifton 39443, Mt. Trumbull Loop Road 12 0271 809E 40 77 515N Clifton 42276

Chamaesyce hyssopifolia L.

HYSSOP-LEAF SANDMAT. Kingman 11 0770 550E 38 98 911N Clifton 26219.

Chamaesyce dioica (Kunth) Millsp.

ROYAL SANDMAT. Old Highway 66 12 0283 000E 39 36 397N Clifton 41358. [*C. indivisa* (Engelm.) Millsp.]

Chamaesyce maculata L.

SPOTTED SPURGE, EYEBANE. Pine Lake 12 0238 613E 38 86 527N Clifton 40937.

Chamaesyce melanadenia (Torr.) Millsp.

SQUAW SANDMAT.

Chamaesyce micromera (Engelm.) Woot. & Stan.

DESERT SANDMAT. Washes, gravelly to sandy slopes. Aug-early Dec. Old Trails Road 11 0767 866E 38 95 832N Clifton 38640, Alamo Road 11 0762 996E 38 59 803N Clifton 38862, Highway 93 12 0257 027E 38 83 062N Clifton 41311.

Chamaesyce ocellata (Dur. & Hilg.) Millsp. var. ***arenicola*** (S. Wats.) N. & P. Holmgren

SAND-LOVING SANDMAT. Alamo Road 11 0762 996E 38 59 803N Clifton 38861.

Chamaesyce parryi (Engelm.) Rydb.

PARRY'S SANDMAT. Beaver Dam 12 0237 474E 40 88 380N Clifton 42211

Chamaesyce polycarpa (Benth.) Millsp.

SMALL-SEED SANDMAT. These plants are often annual in many places. Blooming any time of the year. Oatman Road 11 0760 039E 38 88 884N Clifton 38665, McCracken Mine Road 12 0247 670E 38 16 129N Clifton 38737, Branch of Truxton Wash 12 0277 194E 39 18 054N Clifton 39745.

Chamaesyce revoluta (Engelm.) Sm.

THREAD-STEM SANDMAT. Hualapai Mountain Road 12 0230 906E 38 94 433N Clifton 38621, Blake Ranch Road 12 0245 741E 38 95 872N Clifton 10360.

Chamaesyce serpyllifolia (Pers.) Small

THYME-LEAVED SANDMAT. Hualapai Mountain Road 12 0232 930E 38 92 570N Clifton 38626, Old Highway 66 12 0283 000E 39 36 397N Clifton 41359.

Chamaesyce serrula (Engelm.) Woot. & Standl.

SAW-TOOTH SANDMAT. Peach Springs

Chamaesyce setiloba (Torr.) Milsap.

YUMA SANDMAT. Sawmill Canyon 12 0230 771E 38 94 147N Clifton 38624, Oatman Road 11 0741 532E 38 80 212N Clifton 38662, Aubrey Hills 11 0761 708E 38 04 724N Clifton 38930, Cane Spring Wash 12 0259 967E 38 66 431N.

CROTON

Croton californicus Muell.-Arg.

CALIFORNIA CROTON. Warm Springs Wash 11 0730 605E 38 47 811N Clifton 38755. [*C. longipes* M. E. Jones].

EREMOCARPUS

Eremocarpus setigerus (Hook.) Benth.

TURKEY-MULLEIN. Often along roads and other waste places. In 1992, 1993 G. L. Webster reduced this taxon to a section

in the genus *Croton*, however it is a disconcerting feature in that genus and this author prefers to leave it in *Eremocarpus*.

EUPHORBIA

- 1 Glands hidden by 5-7 inflexed, strigose segments; plants often leafless except near flowers.....*E. eriantha*
- 1 Glands not hidden; plants leafy
 - 2 Plants annual
 - 3 Glands with white appendages; glands generally 5.....*E. exstipulata*
 - 3 Glands lacking white appendages; glands generally 1-4
 - 4 Glands 4, often constricted in the middle thus appearing double*E. complicata*
 - 4 Gland single.....*E. dentata*
 - 2 Plants perennial
 - 4 Gland hornless, margin fairly deeply scalloped *E. incisa*
 - 4 Gland short-horned, margin entire to faintly scalloped
 - 5 Cauline leaves generally wider than long, apex not bearing a mucro, bluish-green.....*E. palmeri*
 - 5 Cauline leaves generally longer than wide, apex often mucronate, dark green.....*E. brachycera*

Euphorbia brachycera Engelm.

SHORTHORN SPURGE. Open, usually dandy or gravelly slopes, above 4000 ft. May-June. [*E. lurida* Engelm., *E. robusta* (Engelm.) Small].

Euphorbia complicata G. Clifton sp. nov.

COMPLEX SPURGE. These plants don't seem to be related to any western *Euphorbia*. They differ in having staminodia and often having each gland divided into two. Without looking close these could be confused with *E. davidii*. Blake Ranch Road 12 0245 741E 38 95 872N Clifton 41300.

Euphorbia dentata Michx.

TOOTHED SPURGE. Old Highway 66 12 0283 000E 39 36 397N Clifton 41355.

Euphorbia eriantha Benth.

BETTER SPURGE. Small washes, below 1800 ft. These plants often last several years. By the second year they are leafless except for near the flowers. Feb-Mar. Alamo Road 11 0761 204E 38 59 909N Clifton 39171.

Chamaesyce exstipulata Engelm.

SQUARE-SEED SPURGE. A number of plants within this taxon don't have white appendages and they don't always have 5 glands. Aug-Oct. Hualapai Mountain Road 12 0230 699E 38 94 467E Clifton 38634, Blake Ranch Road 12 0245 741E 38 95 872N Clifton 10355, Old Highway 66 12 0283 000E 39 36 397N Clifton 41357, Toroweap Valley 12 0315 682E 40 29 808N Clifton 41731.

Euphorbia incisa Engelm.

MOJAVE SPURGE. Clack Canyon 11 0766 820E 38 99 486N Clifton 38884.

Euphorbia palmeri Engelm.

PALMER'S SPURGE.

STILLINGIA

- 1 Leaves crowded on lower third of plant, blade bearing a few teeth toward base*S. paucidentata*
- 1 Leaves well distributed up the stem, blade entire*S. linearifolia*

Stillingia linearifolia S. Wats.

QUEEN'S-ROOT, NARROW-LEAVED STILLINGIA. Gem Acres Road 11 0759 966E 38 53 580N Clifton 38679, Cane Spring Wash 12 0259 967E 38 66 431N.

Stillingia paucidentata S. Wats.

MOJAVE TOOTHLEAF.

TETRACOCCLUS

Tetracoccus hallii Brandeg.

HALL'S SHRUBBY-SPURGE.

TRAGIA

***Tragia ramosa* Torr.**

DESERT NOSEBURN. Branch of Truxton Wash 12 0277 194E 39 18 054N Clifton 39747, Wheeler Wash 12 0238 730E 38 86 258N Clifton 40924.

FABACEAE Pea Family

- 1 Plants with gland-dots on part or all over (If on leaves only, these early deciduous, than plants spinescent)
 - 2 Flowers only having a banner *Amorpha*
 - 2 Flowers having all petals present
 - 3 Plants shrubs; spinescent *Psorothamnus*
 - 3 Plants not shrubs, not spinescent
 - 4 Leaves palmately compound
 - 5 Leaves mostly basal or clustered; only beak of fruit exerted from calyx (plants looking more like a lupine) *Pedimelum*
 - 5 Leaves mostly cauline; fruit also exerted from calyx *Psoralidium*
 - 4 Leaves pinnate
 - 6 Calyx lobes broad, lacking a setaceous tip *Marina*
 - 6 Calyx lobes ending in a setaceous tip *Dalea*
 - 1 Plants lacking gland-dots
 - 7 Petals 2.5-3.5 cm long; stamens 8-9 mm long bright red *Caesalpinia*
 - 7 Petals much shorter; stamens much shorter
 - 8 Anthers the dominate part of the flower; flowers small in many-flowered heads, or spikes
 - 9 Plants lacking thorns *Calliandra*
 - 9 Plants bearing thorns
 - 10 Stamens 20 or more *Acacia*
 - 10 Stamens 10 or fewer
 - 11 Flowers in balls; thorns broad-based, curved *Mimosa*
 - 11 Flowers in an elongate spike *Prosopis*
 - 7 Anthers not the dominate part of the flowers, petals larger; flowers otherwise
 - 12 Flowers not obviously composed of a banner, 2 wing petals and 2 petals forming a keel; sepals $\pm$ free
 - 13 Leaves once-pinnate *Senna*
 - 13 Leaves twice-pinnate
 - 14 Plants having thorns *Parkinsonia*
 - 14 Plants lacking thorns *Hoffmanseggia*
 - 12 Flowers obviously composed of a banner, 2 wing petals and 2 petals forming a keel; sepals fused for some distance
 - 15 Plants bearing thorns
 - 16 Calyx bearing glandular hairs; plants herbaceous *Peteria*
 - 16 Calyx otherwise; plants shrubs
 - 17 Plants in the oak-pine association; leaflets numerous; flowers fragrant *Robinia*
 - 17 Plants of the lower desert; leaflets few; flowers not real fragrant *Olneya*
 - 15 Plants lacking thorns
 - 18 Plants shrubs
 - 19 Leaves simple; flowers red *Cercis*
 - 19 Leaves pinnate; flowers other than red *Sophora*
 - 18 Plants herbaceous
 - 20 Keel petals curled in a circle *Phaseolus*
 - 20 Keel petals curved or straight
 - 21 Plants bearing tendrils
 - 22 Flowers 6-7 mm long *Vicia*
 - 22 Flowers 22-29 mm long *Lathyrus*
 - 21 Plants not bearing tendrils
 - 23 The veins of the leaflets obviously reaching the margins, often distally excurrent into teeth
 - 24 Flowers yellow or bluish
 - 25 Pod not coiled *Melilotus*
 - 25 Pod coiled *Medicago*
 - 24 Flowers white or red *Trifolium*
 - 23 The veins of the leaflets not reaching the margins or not obvious, margins entire

- 26 Leaflets digitately 5-17-foliolate; stamens all fused at the base *Lupinus*
- 26 Leaflets otherwise; stamens with an upper free stamen
- 27 Flowers with some yellow present
- 28 Leaf rachis ending as a bristle *Sesbania*
- 28 Leaf rachis ending with a leaflet *Lotus*
- 27 Flowers racemose or spicate, other than yellow *Astragalus*

ACACIA

Acacia greggii A. Gray

ARIZONA CATCLAW. Lake Havasu 11 0760 441E 38 04 500N Clifton 39775.

AMORPHA

- 1 Main leaf axis lacking prickle-like glands *A. fruticosa*
- 1 Main leaf axis producing prickle-like glands *A. californica* var. *californica*

Amorpha californica L.

CALIFORNIA FALSE INDIGO. The differences that separate this taxon and the next are often quite small. The other variety is found in California. May-June. Potato Patch 10 0235 029E 39 86 559N Clifton 40728.

Amorpha fruticosa L.

EASTERN FALSE INDIGO. Wheeler Wash 12 0238 884E 38 86 351N Clifton 40931.

ASTRAGALUS Locoweed, Rattleweed

Note: In order to key out this group of plants all the characters have to be present (the pods are very important). Some plants within any given population may not contain the necessary elements for keying. Some characters that are used to separate taxon are often so close to being the same thing that they often don't mean anything-example caulescent versa short caulescent or even subcaulescent. Numerous plants from various places contain characters for several taxa.

- 1 Plants with most all hairs attached in the center, both ends free
- 2 Wing petals distally dilated and deeply bilobed *A. calycosus* var. *scaposus*
- 2 Wing petals not as above
- 3 Plants strongly caulescent, stems generally longer than the longest leaves
- 4 Plants diffusely spreading
- 5 Leaves sessile *A. humistratus* var. *humivagans*
- 5 Leaves with the lower with evident petioles *A. arizonicus*
- 4 Plants tufted, not forming mats *A. flavus*
- 3 Plants with the longer leaves longer than the stems when these developed *A. amphioxys*
- 1 Hair base fixed, may be some incipiently dolabriform hairs
- 6 Plants annual or weak perennials flowering first season
- 7 Keel 10-15 mm long *A. lentiginosus*
- 7 Keel 3.7-6.8 mm long
- 8 Flowers in heads, the pod not much longer than the calyx *A. didymocarpus*
- 8 Flowers and pods other wise
- 9 Herbage appearing short shaggy, not densely so *A. sabulonum*
- 9 Herbage with hairs $\pm$ appressed
- 10 Pod linear-oblong or narrowly ellipsoid, not inflated, closely investing the seeds
- 11 Peduncles much longer than the subtending leaves; pedicels twisted so the bottom of the fruit is facing up *A. acutirostris*
- 11 Peduncles as long as or shorter than the subtending leaves; pedicels not twisted
- 12 Banner 7-11 mm long; plants of extreme nw part of the county *A. emoryanus*
- 12 Banner 4-7.5 mm long; plants wide spread *A. nuttallianus* var. *imperfectus*
- 9 Pods $\pm$ globose; bladderly inflated, not closely investing the seeds
- 12 Calyx teeth 1.6-3.5 mm long; pod unilocular
- 13 Petals most often whitish, sometimes tinged with pink or lavender, or pale, to vivid reddish-lilac; basal leaves with the number of leaflets the same as the upper cauline; leaflets dark margined in age; pod rounded at apex *A. wootonii*

- 13 Petals pink or reddish-purple, drying violet; basal leaves with leaflets 5-9, cauline with some 9-13; pod with an obvious beak at apex *A. allochrous*
 - 12 Calyx teeth 0.7-1.5 mm long; pod semibilocular *A. geyeri*
 - 6 Plants biennial or perennial, usually not flowering the first season
 - 14 End leaflet continuous with the leaf rachis
 - 15 Banner 11-20 mm long
 - 16 Plants not selenium-scented; pods deflexed, not persistent on the plants; banner 11-14.5 mm long *A. episcopus*
 - 16 Plants strongly selenium-scented; pods erect, staying on the plants, often through the summer; banner generally longer than 14 mm long *A. toanus* var. *scidulus*
 - 15 Banner 7.3-8.5 mm long *A. titanophilus*
 - 14 End leaflet jointed to the leaf rachis
 - 17 Stems arise from buds on cord-like rhizomes *A. layneae*
 - 17 Stems arise from a central root, this often branched, either from well below to just at ground surface
 - 18 Plants stemless or the stems very short with the internodes less than 1 cm long or shorter than the leaves or the inflorescence
 - 19 Pods bilocular below the beak
 - 20 Plants stemless; wing petals 3-4 mm shorter than the banner; ovary and pod glabrous *A. holmgreniorum*
 - 20 Plants short stemmed; wing petals about the same length as the banner; ovary and pod hairy *A. eurylobus*
 - 19 Pods unilocular
 - 21 Pods surface obscured by dense woolly hair *A. newberryi*
 - 21 Pods surface observable. *A. tephrodes*
 - a Peduncles 5-15 cm long, usually among the leaves; fruiting axis 2-8 cm long; above 4500 ft. var. *brachylobus*
 - a Peduncles very stout, 13-40 cm long, partly overtopping the leaves; fruiting axis 7-20 cm long; 3000-4500 ft. var. *chlordae*
 - 18 Plants with most of the internodes over 1 cm long, or cauline axis longer than the longest leaf or inflorescence
 - 22 Pod bearing a stipe or gynophore, exerted or included within the calyx
 - 23 Calyx tube 4-10 mm long
 - 24 The branching caudex buried well below the surface of the ground *A. ampullarius*
 - 24 The branching caudex just below or at the surface of the ground
 - 25 Pod on a stipe-like gynophore and strongly inflated (balloon-like) *A. oophorus* var. *caulescens*
 - 25 Pod on a true stipe and not much inflated
 - 26 Plants selenium-scented; pod inflated but firm *A. preussii* var. *preussii*
 - 26 Plants not selenium-scented; pod not inflated
 - 27 Stipe of pod 5-20 mm long; plants ascending; fruit erect *A. eremiticus*
 - 27 Stipe of pod 1-2 mm long; plants diffuse or humifuse; fruit spreading to pendulous *A. ensiformis*
 - 23 Calyx tube 2-3.3 mm long *A. straturensis*
 - 22 Pod lacking a well developed stipe or gynophore
 - 28 Calyx tube 2.4-3.5 mm long
 - 29 Root crown buried; pod brightly mottled *A. subcinereus*
 - 29 Root crown not buried; pod not as above
 - 30 Pod with a well developed beak; racemes often over 10-flowered; flowers commonly purple *A. allochrous*
 - 30 Pod with no beak; racemes often less than 10-flowered; flowers more commonly whitish *A. wootonii*
- 28 Calyx tube 4 mm or longer
 - 31 Plants selenium-scented
 - 32 Petals purple; pod unilocular, valves stiffly chartaceous *A. preussii* var. *laxiflorus*
 - 32 Petals ochroleucous with purple keel-tip or white; pod fleshy, becoming ligneous *A. praelongus*
 - 31 Plants not selenium-scented
 - 33 Pod unilocular, becoming strongly 4-angled in drying *A. tetrapterus*
 - 33 Pod bilocular, not becoming strongly angled
 - 34 Pod not or scarcely inflated, narrow 3-7.5 mm wide
 - 35 Fruit ascending at either wide or narrow angle; seeds falling while pod on plant *A. mokiensis*
 - 35 Fruit declined; seeds discharging while pod is on the ground *A. lentiginosus* var. *palans*
 - 34 Pod inflated, wider than 8 mm *A. lentiginosus*

***Astragalus acutirostris* S. Wats.**

BEAKED MILKVETCH. .

***Astragalus allochrous* A. Gray**

HALF MOON MILKVETCH. North Fork Knight Creek 12 0277 450E 38 90 781N Clifton 39879, Knight Creek 12 0276 676E 38 89 478N Clifton 41414.

***Astragalus amphioxys* A. Gray**

- a Flowers on the large side, calyx 9.5-14 mm long, the banner 16.5-28 mm long
 - b The calyx extending almost to the beginning of the upturned banner var. ***amphioxys***
 - b The calyx extending $\pm$ half way to the beginning of the upturned banner var. ***vespertinus***
- a Flowers on the small side, calyx 6-9.5 mm long, the banner mostly 11-16 mm long
 - c Calyx tube 5.5-8.5 mm long; keel 11-15 mm long, 2-3 mm shorter than the banner var. ***modestus***
 - c Calyx tube 3.4-4.8 mm long; keel 8-11.5, 0.5-1.5 mm shorter than the banner var. ***musimonum***

var. ***amphioxys***

CRESCENT MILKVETCH. Valley floors, dry slopes, below 6000 ft. April-June.

var. ***modestus*** Barneby

MODEST CRESCENT MILKVETCH. Sawmill Canyon 12 0230 390E 38 94 784, Highway 93 12 0256 312E 38 72 685N Clifton 39288, Tom Brown Road 12 0262 087E 38 64 795N Clifton 38953.

var. ***musimonum*** (Barneby) Barneby

SHEEP MOUNTAINS CRESCENT MILKVETCH. The calyx tube on some of these plants is just a little over 3 mm long but the banner is 2-3 mm beyond the keel. Mt. Trumbull Loop Road 12 0270 317E 40 80 364N Clifton 42270.

var. ***vespertinus*** (Sheldon) M. E. Jones

GRAND JUNCTION CRESCENT MILKVETCH. Main Street Valley 12 0285 826E 40 50 977N Clifton 42305.

***Astragalus ampullarius* S. Wats.**

GUMBO MILKVETCH. Purple or mottled gumbo clay knolls and gullied hills. May-early June.

***Astragalus arizonicus* A. Gray**

ARIZONA MILKVETCH. Six Mile Crossing Road 12 0279 188E 38 32 464N Clifton 39491.

Astragalus calycosus* S. Wats.**var. ***scaposus (A. Gray) M. E. Jones

TORREY'S MILKVETCH. Dry, exposed, rocky places. The type came from Mokiak Pass. April-May. Truxton Wash 12 0272 344E 39 29 500N Clifton 39733, Mt. Trumbull Loop Road 12 0271 809E 40 77 515N Clifton 42284, Wolf Hole Pass 12 0273 110E 40 69 000N Clifton 42293

Astragalus didymocarpus* H. & A.**var. ***dispermus (A. Gray) Jeps.

DESERT DWARF WHITE MILKVETCH. Six Mile Crossing 12 0284 307E 38 26 860N Clifton 39460.

***Astragalus emoryanus* (Rydb.) Cory**

EMORY'S MILKVETCH.

***Astragalus ensiformis* M. E. Jones**

PAGUMPA MILKVETCH. Flats, gullied bluffs, and gravelly clay hillsides, below 5400 ft. The type came from Pagumpa Springs. April-early June. Mt. Trumbull Loop Road 12 0271 809E 40 77 515N Clifton 42281

***Astragalus episcopus* S. Wats.**

- a Calyx 5-8.5 mm long, banner 11-14.5 mm long, keel 7.5-12 mm long; ovules 16-26 var. ***episcopus***
- a Calyx 3.8-5.5 mm long, banner 9-11.5 mm long, keel 7-9 mm long; ovules 10-16 var. ***lancearius***

var. ***episcopus***

BISHOP'S MILKVETCH.

var. ***lancearius*** (A. Gray) Isely

VIRGIN RIVER MILKVETCH. The type came from near Beaver Dam. May-June.

***Astragalus eremiticus* Sheldon**

HERMIT MILKVETCH. Six Mile Crossing Road 12 0275 393E 38 33 100N Clifton 39494, Mt. Trumbull Loop Road 12 0270 285E 40 80 566N Clifton 42263.

***Astragalus eurylobus* (Barneby) Barneby**

NEEDLE MOUNTAIN MILKVETCH. sw of Fredonia

Astragalus flavus* T. & G.**SHORT-KEELED YELLOW MILKVETCH. Valley floors, gullied bluffs slopes, and washes, throughout. Late April-July. [var. *candicans* A. Gray].Astragalus geyeri* A. Gray**var. ***triquetrus*** (A. Gray) M. E. Jones

Sandy soil, about 2000 ft. Beaver Dam area. April-May.

***Astragalus holmgreniorum* Barneby**

PARADOX MILKVETCH. The type came from Mokiah Wash. April-May.

Astragalus humistratus A. Gray

var. ***humivagans*** (Rydb.) Barneby

GROUND WANDERING MILKVETCH. Truxton Wash 12 0272 344E 39 29 500N Clifton 39732, Wolf Hole 12 0272 248E 40 71 970N Clifton 42289.

Astragalus kentrophyta A. Gray

var. ***elatus*** (S. Wats.) Barneby

SPINY MILKVETCH, THISTLE MILKVETCH. Cedar Ridge 12 0331 837E 40 82 944N Clifton 13590, 41690.

Astragalus layneae E. Greene

LAYNE'S or COLONIAL MILKVETCH. Temple Bar Road 11 0722 568E 39 68 954N Clifton 39678.

Astragalus lentiginosus Hook.

- a Pod not or scarcely inflated, narrow 3-7.5 mm wide; fruit declined on the ground.....var. ***palans***
- a Pod inflated, wider than 8 mm
- b Herbage silvery- or satiny-pubescent; pod silvery-canescens var. ***borreganus***
- b Herbage green or yellowish-green; pod not as above
- c Banner 11-12 mm long
- d Pod with hairs incurved, curly; plants of extreme northern part of the county var. ***stramineus***
- d Pod with hairs lacking or sparsely strigose..... var. ***yuccanus***
- c Banner 13.2-17 mm long
- e Stems generally coarse; herbage yellow-green; flowers white, ochroleucous to pale blue var. ***yuccanus***
- e Stems not coarse; herbage dark to light green; flowers purple, lilac, or pink-purple
- f Plants north of the river, decumbent with ascending stems.....var. ***vitreus***
- f Plants south of the river, erect.....var. ***ambiguus***

var. ***ambiguus*** Barneby

VAGUE FRECKLED MILKVETCH. The type came from Peach Springs. Mid Mar-May. Truxton Wash 12 0272 375E 39 28 308N Clifton 39754.

var. ***borreganus*** M. E. Jones

BORREGO FRECKLED MILKVETCH. May not be found in this county.

var. ***palans*** (M. E. Jones) M. E. Jones

STRAGGLING FRECKLED MILKVETCH. Canyon slopes, and terraces, washes, mostly on sandstone, below 6200 ft. Late April-June.

var. ***stramineus*** (Rydb.) Barneby

THREE CORNERS FRECKLED MILKVETCH. Extreme nw. corner Beaver Dam 12 0237 474E 40 88 380N Clifton 42214

var. ***vitreus*** Barneby

LEED'S FRECKLED MILKVETCH. ne. corner

var. ***yuccanus*** M. E. Jones

YUCCA FRECKLED MILKVETCH. The type came from Yucca Highway 93 12 0256 312E 38 72 685N Clifton 39287, Yucca 11 0760 770E 38 61 546N. McConnico 11 0764 188E 38 91 683N Clifton 38858.

Astragalus mokiaceus A. Gray

MOKIAK MILKVETCH. Open stony hillsides, washes and gravelly outwash fans. April-June.

Astragalus newberryi A. Gray

- a Leaves generally simple var. ***aquarii***
- a Leaves pinnate
- b The largest leaves usually with 3 or 5 leaflets var. ***newberryi***
- b The largest leaves usually with 7, 9 or 11 leaflets
- c Calyx mostly 12-20 mm long, banner mostly 21-32 mm long; mostly in the pinyon-juniper belt var. ***castoreus***
- c Calyx mostly 8-11.5, banner 14-21 mm long; mostly at or just above creosote-bush desert var. ***blyae***

var. ***aquarii*** Isely

AQUARIUS MILKVETCH. Grows on slopes in deposits of Bacon Agate. This area which is within the Sonoran Desert, lacks the typical plants that usually dominate this area, 2400-2600 ft. Mid Feb.-Mid Apr. Six Mile Crossing Road 12 0283 210E 38 28 339N Clifton 39440.

var. ***blyae*** (Rydb.) Barneby

BLY'S MILKVETCH. The type came from Kingman. Jan-May. Cook Canyon 11 0764 865E 38 99 329N Clifton 38938.

var. ***castoreus*** M. E. Jones

CASTOR MILKVETCH. Hualapai Mountain Road 12 0233 030E 38 92 488N Clifton 38565, Cerbat Mountains 11 0757 505E

39 26 203N Clifton 42184.

var. **newberryi**

NEWBERRY'S MILKVETCH. Rocky slopes, openings in pinyon-juniper. Limited to the extreme nw corner. April-June (Nov.-Dec.) Little Tanks 12 0286 188E 40 47 000N Clifton 42307

Astragalus nuttallianus A. DC.

This taxon has a number of named varieties. However, there are many local variations within Mohave County which don't fit. The plants that grow on the limestone plains near Truxton are strictly prostrate-radiating. Many of our plants have a strongly curved pod which is more like var. *micranthiformis* from ne Arizona

a The leaves all alike var. **imperfectus**

a The leaves at the base smaller, retuse, the upper are longer and acute..... var. **cedrosensis**

var. **cedrosensis** M. E. Jones

CEDRO ISLAND SMALL-FLOWERED MILKVETCH. Warm Springs Wash 743 290E 38 55 977N Clifton 43369

var. **imperfectus** (Rydb.) Barneby

SMALL-FLOWERED MILKVETCH. On slopes and flats, mostly desert or grass land, below 4800 ft. Mid Jan-June (fall).

Alamo Road 11 0771 504E 38 54 741N Clifton 38709, Clack Canyon 11 0767 301E 38 99 370N Clifton 38886, Cane Spring Wash 12 0259 967E 38 66 431N, Clack Canyon 11 0767 233E 38 99 356N Clifton 39240, Truxton Wash 12 0272 344E 39 29 500N Clifton 39736, Aubrey Hills 11 0756 243E 38 09 646N Clifton 39274.

Astragalus nuttallianus A. DC. var. **erectus**

Chicken Spring Road 12 0257 444E 38 42 404N Clifton 39292, Kaiser Spring Wash 12 0271 657E 38 28 799N Clifton 39306.

Astragalus oophorus S. Wats. var. **caulescens** (M. E. Jones) M. E. Jones

EGG MILKVETCH. Canyons, knolls, bluffs, and slopes in sandy or gravelly soil, above 4500 ft. May-July. Mount Dellenbaugh Road 12 0266 975E 40 29 815N Clifton 42316

Astragalus praelongus Sheldon

STINKING MILKVETCH. 3000-6500 ft. May-July

Astragalus preussii A. Gray var. **laxiflorus** A. Gray

LAX-FLOWERED DESERT MILKVETCH. The type came from Beaver Dam.

Astragalus preussii A. Gray

DESERT MILKVETCH.

Astragalus sabulonum A. Gray.

GRAVEL MILKVETCH. April-June. Temple Bar Road 11 0721 540E 39 66 743N Clifton 39671, Detrital Valley 11 0727 740E 39 78 560N Clifton 39697.

Astragalus straturensis M. E. Jones

PINE VALLEY MILKVETCH. The plants on Mt. Trumbull were misidentified as *A. rusbyi* which differ from this taxon in the flower color and pods.

Astragalus subcinereus A. Gray

SILER'S MILKVETCH. Open places on slopes and flats, Shivwits Plateau. May-July. Wolf Hole 12 0272 248E 40 71 970N Clifton 42288

Astragalus tephrodes A. Gray var. **brachylobus** (A. Gray) Barneby

SHORTLEAF GRAY-LIKE MILKVETCH. Cerbat Canyon 11 0762 774E 39 10 743N Clifton 39326.

Astragalus tephrodes A. Gray var. **chloridae** (M. E. Jones) Barneby

CHLORIDE MILKVETCH. The type came from Chloride. Cerbat Canyon 11 0762 774E 39 10 743N Clifton 39327.

Astragalus tetrapterus A. Gray

FOUR-WINGED MILKVETCH. In the northern part of its range it has under ground rhizomes. They are so deep that they are not collected, as there is no mention of this in any description. Bonelli Landing.

Astragalus titanophilus Barneby

LIMESTONE MILKVETCH.

Astragalus toanus M. E. Jones var. **scidulus** S. Welsh

DIAMOND BUTTE TOANA MILKVETCH. Grows on slopes in seleniferous soil, 4900-5000 ft. Limited to the upper end of Hurricane Valley. May-Jun.

Astragalus wootonii Sheld.

WOOTON'S MILKVETCH. If the plants had more water as they do in roadside ditches they would all be long lived perennials, but because of the desert habitat they die the first year. D-W Ranch Road 12 0236 577E 38 94 484N Clifton 38605 & 39244. [*A. allochrous* A. Gray var. *playanus* (M. E. Jones) Isely].

Astragalus sp. Red Lake 11 0761 147E 39 52 062N Clifton 39716, Windy Point Campground 11 0758 009E 39 25 191N Clifton 39657.

CAESALPINIA

Caesalpinia gilliesii (Hook.) D. Dietr.

BIRD-OF-PARADISE. Clack Canyon 11 0767 412E 38 99 336 N Clifton 42174.

CALLIANDRA

- 1 Stems woody above ground, usually over 30 cm tall ***C. eriophylla***
 1 Stems herbaceous, usually less than 30 cm tall..... ***C. humilis***

Calliandra eriophylla Benth.

FAIRY-DUSTER. Rocky slopes, below 5000 ft. Feb-May. Kane Springs Wash 12 0259 768E 38 66 602N Clifton 39289,
 Boriana Canyon 12 0230 797E 38 67 305N, Blake Ranch Road 12 0244 690E 38 77 056N.

Calliandra humilis Benth

DWARF STICK PEA. Camp Levi 12 0235 449E 38 86 907N Clifton 40737.

CERCIS Redbud

Cercis occidentalis Torr.

WESTERN REDBUD, JUDAS TREE. Fairly frequent, below 3000 ft.; open or brushy slopes. Our plants are often treated as a variety of the wide spread *C. canadensis* which is probably the correct classification as there are a few minor differences. March-April. Pagumpa Springs

DALEA

- 1 Stamens 5..... ***D. searlsiae***
 1 Stamens usually 9 or 10
 2 Calyx tube glabrous ***D. lanata*** var. ***terminalis***
 2 Calyx tube hairy
 3 Flowers on evident pedicels
 4 The stipule-like gland at the base of the pedicel not inflated; setae of the calyx lobes elongating before flowering;
 leaves entire ***D. mollis***
 4 The stipule-like gland at the base of the pedicel inflated; setae of the calyx elongating after flowering; leaves
 shallow lobed or wavy ***D. mollissima***
 3 Flowers sessile
 5 Flowers white; perennial..... ***D. albiflora***
 5 Flowers blue or yellow; annual
 6 Flowers blue; lobes of calyx not much longer than the tube; leaflets longer than rachis ***D. filiformis***
 6 Flowers yellow; lobes of calyx twice as long as the tube; leaflets shorter than the rachis except the terminal
 ***D. brachystachya***

Dalea albiflora A. Gray

WHITE-FLOWERED PRAIRIE-CLOVER. Flag Mine Road 35 04 44.3 113 52 42.2 Clifton 37100, Flag Mine Road 12 0237 472E 38 85 364N Clifton 41296.

Dalea filiformis A. Gray

SONORAN PRAIRIE-CLOVER. Hualapai Mountain County Park 12 0235 660E 38 87 100N Clifton 41391.

Dalea lanata Spreng. var. ***terminalis*** (M. E. Jones) Barneby

WOOLLY PRAIRIE-CLOVER.

Dalea brachystachya A. Gray

FORT BOWIE PRAIRIE-CLOVER. These plants are well out of their normal distribution. The flowers are yellow, the calyx lobes are almost twice as long as the tube, and the bracts are long acuminate. Old Highway 66 12 0283 000E 39 36 397N Clifton 41356.

Dalea mollis Benth.

HAIRY PRAIRIE-CLOVER. Griffith Road 11 0761 764E 38 80 512N Clifton 38669, McCracken Mine Road 12 0247 670E 38 16 129N Clifton 38817, Alamo Road 11 0762 996E 38 59 803N Clifton 38859, Aubrey Hills 11 0756 452E 38 08 706N Clifton 39273.

Dalea mollissima (Rydb.) Munz

SOFT PRAIRIE-CLOVER. Alamo Road 11 0762 996E 38 59 803N Clifton 38860, Aubrey Hills 11 0756 452E 38 08 706N

Clifton 39272.

Dalea searlsiae (A. Gray) Barneby

SEARLS' PRAIRIE-CLOVER. Mt. Trumbull Loop Road 12 0271 925E 40 77 428N Clifton 42286

DESMODIUM

Desmodium procumbens (Mill.) A. S. Hitchc. var. ***exiguum*** (A. Gray) Schub.

WESTERN TRAILING TICK-TREFOIL. Branch of Knights Creek 12 0277 277E 38 90 603N Clifton 37944

HOFFMANSEGGIA

1 Inflorescence conspicuously glandular ***H. glauca***

1 Inflorescence not glandular.....***H. drepanocarpa***

Hoffmanseggia drepanocarpa A. Gray

SICKLE-POD HOLDBACK. [*Caesalpina d.* (A. Gray) Fisher].

Hoffmanseggia glauca (Ort.) Eifort

CAMOTE-DE-RATON, WAXY RUSH-PEA. Dick's Camp Road 12 0257 914E 39 09 306N Clifton 8229. [*H. densiflora* Benth.].

LATHYRUS

Lathyrus eucosmus Butters & St. John

SEEMLY VETCHLING. East Branch Tuckayou Wash 12 0281 597E 39 05 812N Clifton 39874.

LOTUS

1 Plants annual

2 Flowers generally subtended by a leaf like bract on the end of a well developed peduncle

3 Flowers white with a pink banner ***L. purshiana***

3 Flowers yellow..... ***L. tomentellus***

2 Flowers generally either sessile or if pedunculate, than not subtended by a leaf-like bract

4 Corolla yellow, often drying reddish

5 Leaves very lightly strigulose, green, often with a red margin..... ***L. salsuginosus*** var. ***brevivexillus***

5 Leaves tomentose, appearing grayish..... ***L. humistratus***

4 Corolla pale cream, may be slightly tinged with pink in some small area

1 Plants perennial

6 Peduncles much longer than the leaves

7 Herbage silvery; plants decumbent to prostrate ***L. mearnsii***

7 Herbage greenish to ± gray; plants erect to ascending

8 Internodes of stem 5-10 times longer than the leaves; pods erect; plants rush-like ***L. rigidus***

8 Internodes of stem most often less than 5 times leaf length; pods pendent..... ***L. utahensis***

6 Peduncles shorter to only slightly longer than the leaves ***L. wrightii***

Lotus humistratus E. Greene

SHORT-PODDED LOTUS. open or brushy slopes. Late Jan-May: Johnston Canyon 11 0767 034E 39 01 060N Clifton 38777. [*Hosackia brachycarpa* Benth.].

Lotus denticulatus (Drew) E. Greene

CREAM-FLOWERED LOTUS. Volcanic clay, among rocks on flats in pinyon-juniper woodland. These plants have been called river-bar lotus, however in a good many places they are not found near these habitats. The area in which these were found looks just like the habitat that they are found in Modoc County, California. May-June. Mount Dellenbaugh Road 269 009E 40 04 027N Clifton 42324

Lotus purshianus (Benth.) Clem. & Clem.

SPANISH CLOVER. open grassy places, road edges, and other disturbed places. May-Oct.: [*Hosackia americana* (Nutt.) Piper].

Lotus mearnsii Britt.

MEARNS' LOTUS. Hualapai Mountain Road 12 0234 744E 38 90 131N Clifton 39360.

Lotus rigidus (Benth.) E. Greene

DESERT LOTUS. Rocky slopes, below 5000 ft.. Nov.-May. McCracken Mine Road 12 0247 670E 38 16 129N Clifton 38745,

Sawmill Canyon 11 0767 868E 38 95 091N Clifton 38656.

Lotus salsuginosus E. Greene var. ***brevivexillus*** Ottley

HUMBLE BIRD'S-FOOT-TRIFOIL. Lake Havasu City 11 0753 560E 38 15 445N Clifton 38903. [*Hosackia humilis* (E. Greene) Abrams].

Lotus tomentellus E. Greene

DESERT BIRD'S-FOOT-TRIFOIL. These plants have often been made a variety of or submersed into *L. strigosa* but since the seeds are completely different as well as other characters, it seems to this author that some basic understanding of plants are being sacrificed. Alamo Road 12 0228 720E 38 48 213N Clifton 38711, Cane Spring Wash 12 0259 967E 38 66 431N, Grand Wash Cliffs 12 0239 740E 39 42 007N. *L. strigosa* (Nutt.) E. Greene var. *t.* (E. Greene) Isley].

Lotus utahensis Ottley

UTAH LOTUS. Blake Ranch Road 12 0246 096E 38 76 689N Clifton 39814.

Lotus wrightii (A. Gray) E. Greene

WRIGHT'S LOTUS. East Branch Tuckayou Wash 12 0282 077E 39 04 778N Clifton 39873.

Lotus sp. McCracken Mine Road 12 0247 670E 38 16 129N. Clifton 38819, 38851, Mt. Trumbull 12 0308 817E 40 29 918N.

LUPINUS Lupine

- 1 Plants annual
 - 2 Plant glabrescent when young to nearly glabrous in age ***L. odoratus***
 - 2 Plants quite hairy
 - 3 Leaves obviously hairy on the upper surface
 - 4 Plants caulescent, stems generally over of 3 cm long ***L. concinnus*** var. ***orcuttii***
 - 4 Plants acaulescent or subacaulescent, stems not over 3 cm long ***L. brevicaulis***
 - 3 Leaves essentially glabrous on the upper surface, may be hairy on the margins
 - 5 Keel generally ciliate on lower margin next to the claws
 - 6 Flowers vivid blue (lilac, white); leaflets 1.5-5 mm wide ***L. sparsiflorus***
 - 6 Flowers dark pink to magenta; leaflets 5-10 mm wide ***L. arizonicus***
 - 5 Keel glabrous
 - 7 Upper lip of calyx more than half as long as the lower ***L. shockleyi***
 - 7 Upper lip of calyx less than half as long as the lower ***L. pusillus***
 - 1 Plants perennial
 - 8 Upper margins of keel hairy from claws to crook of the acumen; upper surface of leaflets glabrous ***L. latifolius*** var. ***columbianus***
 - 8 Upper margins either glabrous or hairy on the acumen ***L. argenteus***

Lupinus argenteus Pursh

- a Stem hairs upwardly appressed; acumen margin hairy ***L. argenteus*** var. ***argenteus***
- a Stem hairs spreading with the smaller hairs pointing downward; acumen margin glabrous ***L. argenteus*** var. ***palmeri***

var. ***argenteus***

SILKY LUPINE. Cerbat Mountains 11 0757 901E 39 25 292N Clifton 39664.

var. ***palmeri*** (S. Wats.) Barneby

PALMER'S LUPINE. Generally this taxon has hairs on the upper margin of the acumen, but a good share of ours don't. June-July. Camp Levi 12 0235 532E 38 87 124N Clifton 40738, Flag Mine 12 0237 248E 38 85 124N Clifton 37904.

Lupinus arizonicus (S. Wats) S. Wats.

ARIZONA LUPINE. Warm Springs Wash 11 0730 806E 38 48 613N Clifton 38761.

Lupinus brevicaulis S. Wats.

SAND LUPINE. Hualapai Mountain Road 12 0231 115E 38 94 305 Clifton 39355

Lupinus concinnus Agardh

var. ***orcuttii*** (S. Wats.) C.P. Small

ORCUTT'S LUPINE. The other variety is in California. Late Jan-Mar. Johnston Canyon 11 0767 034E 39 01 060N Clifton 38778, Grand Wash Cliffs 12 0239 740E 39 42 007N.

Lupinus flavoculatus A. Heller

YELLOW-EYED LUPINE. Six Mile Crossing 12 0284 307E 38 26 860N Clifton 39459

Lupinus latifolius J. Agardh

var. ***parishii*** C. P. Sm.

PARISH'S BROAD-LEAVED LUPINE. Limited, 6900-7500 ft.; moist canyons and along streams. The flowers are bluish. The variety *leucanthus* has whitish or ochroleucous flowers and is found in the Williams and Prescott areas. May-June. Flag Mine 12 0237 046E 38 85 070N Clifton 40701.

Lupinus odoratus A. Heller

Lupinus pusillus Pursh

SMALL RUSTY LUPINE. Lizard Wash 12 0268 940E 40 91 700N Clifton 42252 [ssp. *rebens* (Rydb.) Dunn].

Lupinus shockleyi S. Wats.

PURPLE DESERT LUPINE. Red Lake 11 0761 147E 39 52 062N Clifton 39715, Mount Dellenbaugh Road 12 0266 975E 40 29 815N Clifton 42318, Mount Dellenbaugh Road 12 0269 028E 40 04 094N Clifton 42327.

Lupinus sparsiflorus Benth.

SPARSE-FLOWERED LUPINE. Road banks, slopes; in sand or gravel. Our plants have been call var. *mohavensis* (Dziekanowski & D. Dunn) Welsh. This variety is based on flower size, but flower size in Lupines often don't mean anything. Jan-May. McCracken Mine Road 12 0247 670E 38 16 129N Clifton 38740, Cane Spring Wash 12 0259 967E 38 66 431N, Grand Wash Cliffs 12 0239 740E 39 42 007N.

MARINA

Marina parryi (T. & G.) Barneby

PARRY'S FALSE PRAIRIE-CLOVER. Mid Feb-May, Sept.-Nov. Griffith Road 11 0761 764E 38 80 512N Clifton 38668, Cane Spring Wash 12 0259 967E 38 66 431N Clifton 38948.

MEDICAGO

1 Plants annuals, mostly prostrate to decumbent; flowers yellow

2 Fruit lacking hooked bristles; flowers 2-3 mm long *M. lupulina*

2 Fruit bearing hooked bristles; flowers 3-5 mm long *M. minima*

1 Plants perennial, erect; flowers blue *M. sativa*

Medicago lupulina L.

BLACK MEDIC, YELLOW TREFOIL. Fairly frequent; moist or dry waste places, receding lake margins; introduced from Europe. April-Nov.

Medicago minima (L.) Bartal.

BURCLOVER. Infrequent, below 4500 ft.; waste places, canyon close to moist places; introduced from Mediterranean. Apr-May. Johnston Spring 11 0766 377E 39 02 407N Clifton 42168, McLellan Reservoir 12 0383 166E 38 97 660N Clifton 40771.

Medicago sativa L.

ALFALFA, LUCERNE. Infrequent; along roads, old fields; introduced from Old World. May-Oct. Highway 95 11 0719 614E 38 62 129N Clifton 39956.

MELILOTUS Sweet-Clover

Melilotus alba Medikus

WHITE SWEET-CLOVER. Bullhead 11 0721 541E 38 94 513N Clifton 39948, Old Highway 66 12 0282 934E 39 36 290.

Melilotus indica (L.) All

INDIAN MELILOT, SOURCLOVER. waste places, sometimes in riparian. Mar-June. Meadow Creek 11 0748 427E 38 79 536N Clifton 39177.

Melilotus officinalis (L.) Pallas

YELLOW SWEET-CLOVER. New Years Cabin Spring 12 0238 460E 38 83 800N Clifton 40748.

MIMOSA

Mimosa biuncifera Benth.

WAIT-A-MINUTE BUSH.

OLNEYA

Olneya tesota A. Gray

DESERT IRONWOOD.

PARKINSONIA

- 1 Leaflets alternate, well over 30, rachis wand-like *P. aculeata*
- 1 Leaflets opposite, 8 or less pairs
 - 2 Leaf appearing pinnate; secondary leaflets 4-8 pairs; fruit narrowed between seeds *P. microphylla*
 - 2 Leaf appearing bipinnate; secondary leaflets 1-3 pairs; fruit not or slightly narrowed between seeds *P. florida*

***Parkinsonia aculeata* L.**

MEXICAN PALO VERDE, HORSE BEAN. Along roads; introduced in the area of this flora.

***Parkinsonia florida* (Benth.) S. Wats.**

- 1 Inflorescence open; anthers red when young, drying dark, plants not bearing many spines var. *florida*
- 1 Inflorescence dense along the branches; anthers yellow when young, drying yellow; plants evidently bearing spines
 - var. not described

var. ***florida***

BLUE PALO-VERDE. Gem Acres Road 11 0760 027E 38 53 556N Clifton 39759.39761. [*Cercidium* f. Benth.].

var. not described

DENSE-FLOWERED BLUE PALO-VERDE. Gem Acres Road 11 0760 027E 38 53 556N Clifton 39762.

***Parkinsonia microphylla* Torr.**

LITTLE-LEAF PALO-VERDE. Aubrey Hills 11 0756 765E 38 08 460N Clifton 39268, Gem Acres Road 11 0760 027E 38 53 556N Clifton 39761. [*Cercidium* m. (Torr.) Rose & I. Johnst.].

PEDIOMELUM

- 1 Pedicels lacking or up to 2.5 mm long *P. castoreum*
- 1 Pedicels 3 mm or longer
 - 2 Calyx 13-20 mm long; flowers 16-20 mm long *P. megalanthum*
 - 2 Calyx 5-12 mm long; flowers 8-13 mm long
 - 3 Calyx 5-7 mm long, gland-dotted; peduncle almost lacking *P. aromaticum*
 - 3 Calyx 10-12 mm long; not obviously gland-dotted; peduncle long *P. mephiticum*

***Pediomelum aromaticum* (Payson) W. Weber**

AROMATIC INDIAN-BREADROOT. Clay outcrops, decomposing sandstone, rocky places. May-June.

***Pediomelum castoreum* (S. Wats.) Rydb.**

BEAVER DAM INDIAN-BREADROOT. In sand or sandy-gravel in open places, roadcuts, 2000-4000 ft. The type most likely came from Beaver Dam. April-May. [*Psoralea* c. S. Wats.].

***Pediomelum megalanthum* (Woot. & Standl.) Rydb.**

- 3 Flowers purple; wing petals acute 1 mm beyond keel; herbage green, hairs not glistening var. *retrorsum*
- 3 Flowers pale with maculate keel; wing petals broadly rounded 2 mm beyond keel; herbage yellow-green, hairs glistening
 - var. *mohavensis*

var. ***mohavensis*** G. Clifton Var. nov.

MOHAVE COUNTY INDIAN-BREADROOT. Rocky slopes on low hills. Late Apr-May. Blake Ranch Road 12 0255 070E 38 71 558N Clifton 39817.

var. ***retrorsum*** (Rydb.) Grimes

LARGE-FLOWERED INDIAN-BREADROOT. Rocky outcrops, decomposing clay, sandstone hills 3000-5500 ft. The type came from Peach Springs. Apr-Jun. North Fork Knight Creek 12 0277 387E 38 90 266N Clifton 39888. [*Psoralea mephitica* S. Wats. var. *r.* (Rydb.) Kearney & Peebles].

***Pediomelum mephiticum* (S. Wats.) Rydb.**

ILL-SCENTED INDIAN-BREADROOT. Slopes and flats 3000-5500 ft. The type may have come from Beaver Dam. April-June. Mt. Trumbull Loop Road 12 0271 809E 40 77 515N Clifton 42278. [*Psoralea* m. S. Wats.].

PETERIA

***Peteria thompsoniae* S. Wats.**

THOMPSON PETERIA. Clay flats, dry washes, sandy flats and talus, below 6400 ft. May-June (Aug.) Highway 389 12 0339
880E 40 80 460N Clifton 41176.

PHASEOLUS

- 1 Flowers reddish; the terminal leaflet faced the same as the two adjacent leaflets *P. angustissimus*
1 Flowers yellow; the terminal leaflet faced opposite from the adjacent two leaflets *P. aureus*

Phaseolus angustissimus A. Gray

NARROW-LEAF BEAN. Willows Ranch Road 12 0278 557E 38 97 119N Clifton 39862.

Phaseolus aureus G. Clifton sp. nov.

YELLOW-FLOWERED BEAN. Branch of Knight Creek 12 0277 332E 38 90 684N Clifton 18506.

PROSOPIS

- 1 Petals fused; fruit tightly coiled *P. pubescens*
1 Petals free; fruit not coiled *P. glandulosa* var. *torreyi*

Prosopis glandulosa Torr. var. *torreyana* (L. Benson) M. Johnst.

TORREY'S HONEY MESQUITE. Lake Havasu 11 0739 797E 38 26 315N Clifton 39768, Colorado River 11 0721 522E 38 94 619N Clifton 41291.

Prosopis pubescens Benth.

SCREW BEAN, TORNILLO Colorado River 11 0704 076E 39 86 342N Clifton 39208.

PSORALIDIUM

Psoraleidium tenuiflorum (Pursh) Rydb

SLENDER-FLOWERED SCURF-PEA. Hualapai Mountain Road 12 0233 916E 38 91 925N Clifton 40739. [*Psoralea t.* Pursh, var. *bigelovii* (Rydb.) J. F. Macbr.].

PSOROTHAMNUS

Note: The differences that separate *P. arborescens* and *P. fremontii* are often hard to see. Mature fruit is very much needed.

- 1 Plants a large shrub to tree-like, usually appearing leafless, if leaves present, they are generally simple *P. spinosus*
1 Plants small shrubs, usually leafy at flowering, pinnate
2 Leaves often not much longer than wide *P. arborescens* var. *minutifolius*
2 Leaves generally much longer than wide *P. fremontii*

Psorothamnus arborescens (Torr.) Barneby var. *minutifolius* (Parish) Barneby

SMALL-LEAVED MOJAVE SMOKE-BUSH.

Psorothamnus fremontii (T. & G.) Barneby

- 1 Leaflets $\pm$ linear; plants south of the Colorado River var. *attenuatus*
1 Leaflets lanceolate to rhombic-ovate; plants north of the river var. *fremontii*

var. *attenuatus* Barneby

NARROW-LEAVED SMOKE-BUSH. Gem Acres Road 11 0760 027E 38 53 556N Clifton 39759, Detrital Valley 11 0727 240E 39 78 669N Clifton 39689.

var. *fremontii*

FREMONT'S SMOKE-BUSH.

Psorothamnus spinosus (A. Gray) Barneby

SMOKETHORN. Warm Springs Wash 11 0730 806E 38 48 613N Clifton 38759.

ROBINIA Locust

Robinia neomexicana A. Gray

NEW MEXICO LOCUST. Hayden Peak 12 0235 305E 38 85 686N Clifton 40722, Mt. Trumbull 12 0309 013E 40 30 059N.

SENNA

- 1 Leaf rachis weakly spinescent; plants leafless most of the year; stems, leaves $\pm$ glabrous *S. armata*
- 1 Leaf rachis not as above; plants usually leafy; stems, leaves hairy
 - 2 Plants a woody shrub; leaves narrowly linear, strongly revolute, rachis ending with 2 leaflets *S. artemisioides*
 - 2 Plants not woody; leaves not as above
 - 3 Leaflets 1 pair; flowers all axillary *S. bauhinoides*
 - 3 Leaflets 2 or more pairs; flowers in terminal, leafy panicles as well as in axillary clusters *S. covesii*

Senna armata (S. Wats.) H. Irwin & Barneby

SPINY SENNA, DESERT SENNA. [*Cassia a.* S. Wats.]

Senna artemisioides (DC.) Randell

SAGEBRUSH SENNA. White Cliff Trails Park 11 0768 748E 38 99 104N Clifton 39258.

Senna bauhinoides (A. Gray) Irwin & Barneby

SHRUBBY WILD SENSITIVE-PLANT.

Senna covesii (A. Gray) Irwin & Barneby

COUES' SENNA. Dry rocky slopes and mesas, along roads, 1000-4200 ft. April-Dec. Oatman Road 11 0746 661E 38 79 030N Clifton 38683, D-W Ranch Road 12 0235 252E 38 98 283N.

SESBANIA

Sesbania exaltata (Raf.) Cory

COFFEE WEED, COLORADO RIVER HEMP.

SOPHORA

- 1 Plants shrubby; leaves evergreen *S. arizonica*
- 1 Plants herbaceous; leaves not evergreen *S. nuttalliana*

Sophora arizonica S. Wats.

SHAMROCK. Blake Ranch Road 12 0243 367E 38 88 778N Clifton 39401.

Sophora nuttalliana B. Turner

SILKY NACELACEPOD.

TRIFOLIUM Clover

- 1 Involucre present; flowers white *T. repens*
- 1 Involucre present; flower red with some white *T. wormskioldii*

Trifolium repens L.

WHITE CLOVER, DUTCH CLOVER. Frequent, below 8500 ft.; moist places. May-Aug.

Trifolium wormskioldii Lehm.

var. *wormskioldii*

COW CLOVER. meadows, wet pastures, streams and other moist places. This taxon is variable. Other varieties from the southwest. May-Oct.

VICIA Vetch

Vicia ludoviciana Nutt.

LOUISIANA or DEER-PEA VETCH. On dry hillsides and boulder-strewn washes, below 5600 ft. Mid Feb-May. Box Canyon 12 0266 368E 38 32 216N Clifton 38956, Mt. Trumbull Loop Road 12 0270 556E 40 79 460N.

FAGACEAE Oak Family**QUERCUS** Oak

- 1 Leaves entire
 - 2 Leaves shiny above, tips rounded at the apex *Q. oblongifolia*
 - 2 Leaves olive green above, tips acute to acuminate *Q. chrysolepis*
- 1 Leaves entire to coarsely dentate, tips of each dentation bearing a spine
 - 3 Leaves all coarsely dentate, wavy margined, 1-3 cm long
 - 4 Upper surface of leaf dull, gray-green, lower with both appressed-stellate and glandular hairs, shrub *Q. turbinella*
 - 4 Upper surface of leaf ± shiny, olive-green, lower densely glandular-pubescent when young *Q. palmeri*
 - 3 Leaves with some coarsely dentate and some entire *Q. chrysolepis*
- 1 Leaves fairly deeply lobed, or if coarsely dentate, not bearing a spine tip of each dentation
 - 5 Leaves ± coarsely dentate, evergreen or not, often not knowing rather to droop leaves or keep them *Q. X pauciloba*
 - 5 Leaves most often fairly deeply lobed, always drooping leaves in fall *Q. gambelii*

Quercus chrysolepis Liebm.

CANYON LIVE OAK. Wash 12 0237 778E 38 85 538N Clifton 40695.

Quercus gambelii Nee

GAMBLE OAK. Hualapai Mountain Road 12 0235 221E 38 89 557N Clifton 40684.

Quercus oblongifolia Torr.

MEXICAN BLUE OAK.

Quercus palmeri Engelm.

PALMER'S OAK. Flag Mine 12 0237 207E 38 85 102N Clifton 40706. [*Q. dunnii* Kell.].

Quercus Xpauciloba Rydb.

Scattered, rocky slopes: . [*Q. gambelii* X *Q. turbinella*].

Quercus turbinella E. Greene

SHRUB LIVE OAK. Highway 93 11 0764 923E 38 99 348N Clifton 39224, Packsaddle Campground 11 0756 950E 39 26 719N Clifton 42182.

FORESTIERACEAE Sweet-flower Family

Note: This author believes that this family is monotypic. Some floras call the fruiting stalks pedicels, which is not true because you can not have pedicels within a flower. Not one flora mentions the bracts that are petaloid and enclose the flowers.

FORESTIERA

Forestiera pubescens Nutt.

DESERT-SWEET, ELBOWBUSH. These plants have a outer row of short, ciliate bracts that are not petaloid, an inner row much longer, ± cup-shaped, petaloid bracts. The bracts enclose the flowers. The staminate plant has the pistillate flowers repressed, generally sterile. The flowers stalk very short making the sterile ovary sessile. Rarely does the staminate flowers produce long petaloid appendages that are attached at the base of the flower stalks, making it look like it has petals. The pistillate plants have the same bract system. The flower-stalks elongate, these simple or branched. Rarely do these have a short petaloid appendage attached at the base of the flowering- stalk. Sometime very short calyx-like appendages are attached just below the ovary, along with several sterile stamens. The plants that have part or all glabrous herbage seldom have branched flower stalks. Whereas the totally pubescent phase seems to have a majority of them forked. Blake Ranch Road 12 0243 905E 38 87 229N Clifton 39401, Blake Ranch Road 12 0243 964E 38 90 785N Clifton 39402, Cerbat Canyon 11 0762 552E 39 10 932N Clifton 39328, Blake Ranch Road 12 0244 750E 38 94 453N Clifton 39793. [*F. neomexicana* A. Gray].

FOUQUIERIACEAE Ocotillo Family

FOUQUIERIA

Fouquieria splendens Engelm.

OCOTILLO, CANDLEWOOD, BOOJUM. Dry rocky or coarse gravel, below 2600 ft. Blooms when ever there is sufficient rain. Oatman Road 11 0748 084E 38 79 195N Clifton 38684.

FRAXINACEAE Ash Family

FRAXINUS

- 1 Corolla 10-15 mm long, greenish *F. cuspidata*
- 1 Corolla lacking
 - 2 Twigs evidently 4-angled; wings of the fruit extending nearly or quite to the base of the thin, strongly compressed body; flowers perfect or pistillate *F. anomala*
 - 2 Twigs terete or rounded- quadrangular; wings of the fruit subterminal, not extending nearly to the base of the body; flowers dioecious; can be a large tree *F. velutina*

Fraxinus anomala Torr.

- a Plants generally shrubs; leaves 1- or 3- foliolate, the single or terminal leaflet generally entire to crenate var. *anomala*
- a Plants generally small trees; leaves 3-, 5-, or 7- foliolate, the terminal leaflet generally crenate-serrate var. *lowellii*

var. ***anomala***

SINGLE-LEAF ASH.

var. ***lowellii*** (Sarg.) Little

LOWELL'S ASH. Cerbat Canyon 11 0762 191E 39 10 932N Clifton 39329, Branch of Truxton Wash 12 0277 912E 39 16 288N Clifton 39751.

Fraxinus cuspidata Torr.

FRAGRANT ASH.

Fraxinus velutina Torr.

VELVET ASH. Some of these are very big trees. Mar-Apr. Six Mile Crossing 12 0284 223E 38 26 817N Clifton 39470, Knight Creek 12 0276 558E 38 89 296N Clifton 39904.

FUMARIACEAE Fumitory Family

CORYDALIS

- 1 The racemes elevated above the leaves; flowers with some dark color; fruits erect and incurved *C. curvisiliqua*
- 1 The racemes among the leaves; flowers generally all yellow; fruit spreading to pendent, ± straight *C. aurea*

Corydalis aurea Willd.

YELLOW CORYDALIS. Late Feb- Big Sandy River 12 0263 595E 38 38 696N Clifton 39000,

Corydalis curvisiliqua Engelm.

var. ***occidentalis*** (Engelm.) G. Clifton Comb nov.

WESTERN CURVE-POD FUMEWORT. There are other varieties to the east. March-April. Clay Springs Road 12 0241 354E 39 57 309N Clifton 39379.

GARRYACEAE Silk-Tassel Family

GARRYA Silk-tassel

- 1 Leaves entire, lower surface densely sericeous-tomentose; bracts of inflorescence not leaf-like *G. flavescens*
- 1 Leaves ± callus -denticulate, lower surface (when mature) glabrous or sparsely appressed pubescent with straight hairs *G. wrightii*

Garrya flavescens S. Wats.

ASHY SILK-TASSEL BUSH. Windy Point Campground 11 0758 016E 39 25 132N Clifton 39660.

Garrya wrightii Torr.

WRIGHT'S SILK-TASSEL.

GENTIANACEAE Gentian Family

- 1 Corolla 2-4.5 cm long *Eustoma*
- 1 Corolla less than 2 cm long
 - 2 Flowers pink *Centaurium*

- 2 Flowers not pink *Frasera*

CENTAURIUM

Centaurium arizonicum (A. Gray) A. Heller

ARIZONA CENTAURY. Moist places, below 7000 ft. July-Oct. Six Mile Crossing 12 0284 156E 38 26 734N Clifton 27159.

EUSTOMA

Eustoma exaltatum (L.) Griseb.

CATCHFLY PRAIRIE-GENTIAN. Along ditches and in stream beds. June-Sept. Colorado River 11 0721 522E 38 94 619N Clifton 41293.

FRASERA

Note: These plants belong in *Frasera* they are quite different in many ways from the genus *Swertia* and appear to comprise a natural, monophyletic group. Other plants have been put in separate genera for lesser reasons.

- 1 Leaves pubescent, lacking white margins *F. speciosa*
 1 Leaves glabrous, white-margined
 2 Leaves in whorls of 4; glands 2-lobed at apex *F. albomarginata*
 2 Leaves opposite; glands lobed at the base *F. paniculata*

Frasera albomarginata S. Wats.

DESERT or WHITE-MARGINED ELKWEED. Dry slopes, above 4800 ft. Another variety is found to the west and is often not recognized, but differs in that the inflorescence is glandular-pubescent and the fovea not distinctly 2-lobed. May-early July. [*Swertia a.* (S. Wats.) Kuntze].

Frasera paniculata Torr.

TUFTED ELKWEED.

Frasera speciosa Griseb.

Giant FRASERA, DEER TONGUE, ELKWEED. Usually above 5000 ft.; open forested slopes and meadows. July-Aug. Hayden Peak 12 0235 129E 38 86 240N Clifton 40724. [*Swertia radiata* (Kell.) Kuntze].

GERANIACEAE Geranium Family

- 1 Annuals; leaves pinnate; petals small *Erodium*
 1 Perennial; leaves palmate; petals large *Geranium*

ERODIUM Filaree

- 1 Lower leaves pinnately dissected *E. cicutarium*
 1 Lower leaves simple *E. texanum*

Erodium cicutarium (L.) L'Hér.

RED-STEMMED FILAREE. Frequent, throughout; waste places, along road, old fields, and etc.; introduced from Europe. March-June. Oatman Road 11 0747 279E 38 79 118N Clifton 38658, Cane Spring Wash 12 0259 967E 38 66 431N.

Erodium texanum A. Gray

TEXAS FILAREE. Highway 95 11 0759 610E 38 09 947N Clifton 38996.

GERANIUM

Geranium caespitosum E. James

JAMES CRAN'S-BILL. There are some named varieties for this taxon, but they don't seem to be naming real taxa, as some plants have two varieties on the same plant. Hayden Peak 12 0235 213 38 85 694 Clifton 40719. [*G. eremophilum* Woot. & Standl.].

GROSSULARIACEAE Gooseberry

RIBES Gooseberry, Currant

- 1 Stems lacking nodal spines ***R. cereum***
 1 Stems bearing nodal spines ***R. velutinum***

Ribes cereum Dougl..

WHITE SQUAW CURRANT. Lookout Wash 12 0278 166E 38 97 318N Clifton 39865, Mt. Trumbull 12 0309 464E 40 28 057N Clifton 41740.

Ribes velutinum E. Greene

DESERT GOOSEBERRY. Cerbat Mountains 11 0757 902E 39 25 652N Clifton 39665.

HALORAGACEAE Water Milfoil Family**Myriophyllum*****Myriophyllum aquaticum*** (Vell.) Verdc.

PARROT'S FEATHER, WATER FEATHER. Colorado River 11 0716 351E 38 75 237N Clifton 41287.

HELLEBORACEAE Larkspur Family

- 1 Flowers irregular, sepals spurred; petals not spurred ***Delphinium***
 1 Flowers regular, sepals not spurred; petals spurred ***Aquilegia***

AQUILEGIA Columbine

- 1 Flowers red ***A. formosa***
 1 Flowers cream or yellow
 2 Petals $\pm$ 2 cm long (not counting spur); inflorescence leaves essentially lacking; inflorescence branches glandular pubescent; spurs rather robust ***A. chrysantha***
 2 Petals under 1 cm long (not counting the spur); inflorescence leaves linear; inflorescence branches viscid-villous (insects and other thing stick); spurs thin and wispy ***A. hualapaiensis***

Aquilegia chrysantha A. Gray

GOLDEN COLUMBINE.

Aquilegia formosa Fisch. ex DC.

CRIMSON COLUMBINE. Warm Springs 746 272E 38 64 564N

Aquilegia hualapaiensis G. Clifton sp. nov.

HUALAPAI MOUNTAINS COLUMBINE. This taxon differs from all other in that the flowers are cream, they are small and the spurs are thin and wispy. Wheeler Wash 12 0238 884E 38 86 351N Clifton 40927.

DELPHINIUM Larkspur

- 1 2 petals various shades of dark blue; the unexpanded filaments bluish; lobes of leaves broad ***D. scaposum***
 1 2 petals sky blue; the unexpanded filaments pinkish; lobes of leaves narrow ***D. parishii***

Delphinium parishii A. Gray

var. ***parishii***

PALE-FLOWERED PARISH'S LARKSPUR. Detrital Valley 728 474E 39 79 570N Clifton 43453

Delphinium scaposum E. Greene

NAKED-STEMMED LARKSPUR. Fairly frequent, below 5000ft.; rocky canyons, rocky slopes. There are differences between the ones that grow on the lower desert from the ones that grow in the pinyon-juniper woodland. The ones that grow in the desert have the spur short and quite fat, the connective at the base of the calyx essentially glabrous. The ones in pinyon-juniper woodland have the spur long and slender, the connective at the base of the calyx generally with long glandular hairs. Mid Mar-June. North Fork Knight Creek 12 0277 379E 38 90 789N Clifton 39880, Main Street Valley 12 0285 826E 40 50 977N Clifton 42304, Bill Williams Mountains 11 0764 983E 38 15 277N Clifton 39780, Kaiser Spring Wash 12 0272 021E 38 28 855,

Clifton 39311.

HYDRANGEACEAE Hydrangea Family

- 1 Stamens more than 20, filaments circular in cross section, subulate ***Philadelphus***
- 1 Stamens 8-10, filaments flattened, broad
 - 2 Petals 2.2-4 mm long; filaments of the stamens abruptly acuminate at apex ***Fendlera***
 - 2 Petals 5-21 mm long; filaments broad at apex with two linear lobes on the back extending well above the anthers ***Fendlerella***

FENDLEREA

Fendlera rupicola A. Gray
CLIFF FENDLER-BUSH.

FENDLERELLA

Fendlerella utahensis (S. Wats.) A. Heller
YERBA DESIERTO. Crevices, above 4800 ft. Late April-Sept. Blake Ranch Road 12 0243 361E 38 85 317N Clifton 39802.

PHILADELPHUS

Philadelphus microphyllus A. Gray
LITTLELEAF or DESERT MOCK-ORANGE. Dry, gravelly or rocky places in canyon, in crevices, throughout. (Feb-April) May-Sept.

HYDROPHYLLACEAE Waterleaf Family

- 1 Plants shrubs ***Eriodictyon***
- 1 Plants herbaceous
 - 2 Calyx lobes with the outer 3 cordate (expanding in fruit), the inner linear ***Tricardia***
 - 2 Calyx lobes about the same
 - 3 Auricles present between the calyx lobes
 - 4 Stem angled, angles prickly ***Pholistoma***
 - 4 Stems not as above ***Nemophila***
 - 3 Auricles lacking
 - 5 Styles 2 ***Nama***
 - 5 Styles 1, simple or lobed, one is almost lobed to base
 - 6 Flowers all pale yellow, pendent ***Emmenanthe***
 - 6 Flowers may have a yellow tube, but not completely yellow, spreading to erect
 - 7 Upper cauline leaves sessile and clasping ***Eucrypta***
 - 7 Upper cauline leaves not clasping ***Phacelia***

EMMENANTHE

Emmenanthe penduliflora Benth.
YELLOW WHISPERING BELLS. Gravelly to rocky slopes, often under shrubs, below 4000 ft. Jan-June. McCracken Mine Road 12 0247 670E 38 16 129N Clifton 38743, Boriana Canyon 12 0230 797E 38 67 305N.

ERIODICTYON Yerba Santa

Eriodictyon angustifolium Nutt.
NARROW-LEAVED YERBA SANTA. Cerbat Canyon 11 0761 506E 39 10 860N Clifton 39330.

EUCRYPTA

- 1 Leaves 2-3 pinnate; inflorescence branched fairly dense with soft hispid hairs and short glandular hair.....*E. chrysanthemifolia*
- 1 Leaves simple pinnate; inflorescence branches not as above
- 2 Glandular hairs of the inflorescence white, flowers light purple above; herbage lighter green; seed only slightly curved*E. micrantha*
- 2 Glandular hairs of the inflorescence mostly black; flowers white; herbage darker green; seeds strongly lunate*E. albiflora*

Eucrypta albiflora Clifton & Andre sp. nov.

WHITE-FLOWERED EUCRYPTA. This taxon has long been included in *E. micrantha*, but it often grows by itself and often on almost barren soil in full sun. Detrital Valley 728 355E 39 79 515N Clifton 43451, Petroglyph Wash 721 059E 39 93 362N Clifton 43454

Eucrypta chrysanthemifolia (Benth.) E. Greene

var. ***bipinnatifida*** (Torr.) Const.

SMALL-FLOWERED EUCRYPTA. Type came from Sitgreaves Pass, Black Mountains. Alamo Crossing Road 12 0226 224E 38 51 199N Clifton 38793, Mackenzie Creek 12 0231 211E 38 67 041N Clifton 39342.

Eucrypta micrantha (Torr.) A. Heller

DESERT EUCRYPTA. Jan-May. Highway 93 11 0704 996E. 39 86 851N Clifton 38688, McCracken Mine Road 12 0247 670E 38 16 129N. Clifton 38816, Boriana Canyon 12 0230 797E 38 67 305N.

NAMA Purple Mat

- 1 Plants perennial *N. rothrockii*
- 1 Plants annual
- 2 Herbage glandular pubescent and short hispid on leaves and sepals *N. dichotomum*
- 2 Herbage not combing the above
- 3 Corolla 7-15 mm long, exerted well beyond the calyx
- 4 Leaves not coarsely veined on the lower surface; leaves toward the tips of the branches *N. demissum*
- 4 Leaves coarsely veined on the lower surface; leaves along the stems..... *N. hispidum*
- 3 Corolla 3-5, scarcely exerted beyond the calyx *N. pusillum*

Nama demissum A. Gray

PURPLE MAT. Grows on sand that is either quite fine to fairly coarse. Feb- Signal Road 12 0255 282E 38 18 063N Clifton 38840, Alamo Road 12 0257 063E 37 98 762N Clifton 38873, Cane Spring Wash 12 0259 967E 38 66 431N.

Nama dichotomum Ruiz & Pavon

SPREADING NAMA. Branch of Knight Creek 12 0277 084E 38 90 530N Clifton 41399, Blye Wash 12 0285 611E 39 22 998N.

Nama hispidum A. Gray

SANDBELLS. Feb- Alamo Road 12 0246 406E 38 27 212N Clifton 38806.

Nama pusillum A. Gray

EGG-LEAF FIDDLELEAF. The type came from Fort Mohave.

Nama rothrockii A. Gray

ROTHROCK'S FIDDLELEAF.

NEMOPHILA

Nemophila menziesii H. & A. var. ***integrifolia*** Parish

BABY BLUE-EYES.

PHACELIA

- 1 Corolla 15-30 mm long; style 20 mm or longer..... *P. campanularia*
- 1 Corolla less than 15 mm long, if 15 mm long, than style less than 20 mm long
- 2 Leaves with the leaflets not sessile *P. pedicellata*
- 2 Leaves simple or pinnatifid, leaflets when present, sessile
- 3 Leaves or leaflets generally entire, rarely on any given plant one or two leaves may have several teeth or small lobes
- 4 Plants mostly perennial..... *P. magellanica*
- 4 Plants small annuals
- 5 Corolla evidently exerted, 6-15 mm long *P. pulchella*

- 5 Corolla only slightly exserted, 3-5 mm long
 - 6 Leaf blade 5-7 mm long on a petiole about as long *P. saxicola*
 - 6 Leaf blade 10-30 mm long on a petiole about as long *P. curvipes*
- 3 Leaves or leaflets with margins various
 - 7 Leaves simple, not deeply lobed or if some of the basal fairly deeply lobed, than cauline not so
 - 8 Blade of leaves not much longer than wide
 - 9 Plants evidently perennial; some of the hairs softly-spreading *P. laxiflora*
 - 9 Plants annual; lacking softly spreading hairs, either all glandular or glandular with some, short stiff hairs
 - 10 Stems thick; leaves fleshy
 - 11 Flowers cream-white; leaves $\pm$ basal *P. neglecta*
 - 11 Flowers purple; leaves will up the stem *P. pachyphylla*
 - 10 Stems slender; leaves not fleshy
 - 12 Corolla small and inconspicuous, tube included in the calyx *P. rotundifolia*
 - 12 Corolla larger and exserted well beyond the calyx
 - 13 Pedicels up to 6 in flower and 9 mm in fruit *P. pulchella*
 - 13 Pedicels 6-10 in flower and 10-15 in fruit *P. glechomifolia*
 - 8 Blade of leaves longer than wide
 - 14 Plants small; stamens and style included; plants annual *P. lemmonii*
 - 14 Plants large; stamens and style exserted; plants biennial
 - 15 Anthers cream; seeds brown with margins incurved and strongly corrugated and the ventral ridge corrugated along one side *P. mokaacensis*
 - 15 Anthers light lavender to gray; seeds brown to almost black, margins entire, ventral ridge narrowly to broadly rounded, sometimes indistinctly corrugated on one side
 - 16 Middle cauline leaves usually 1-4 times as long as wide
 - 17 Inflorescence leaves not evidently petiolate, generally longer than wide; generally single stemmed *P. palmeri*
 - 17 Inflorescence leaves evidently petiolate, about as long as wide; generally the whole plants is inflorescence *P. gypsicola*
 - 16 Middle cauline leaves usually 4-8 times longer than wide; pollen white? *P. constancei*
 - 7 Leaves deeply lobed to pinnatifid
 - 18 Outer surface of the petals hairy *P. vallis-mortae*
 - 18 Outer surface of the petals generally glabrous
 - 19 Filaments of the stamens exserted beyond the corolla lobes when pressed, if not than style exserted
 - 20 Leaflets almost twice as long as wide
 - 21 Plants perennial; some of the hairs of the stem stiff, bulb-based *P. ramosissima*
 - 21 Plants annual; hairs on the stem no bulb-based *P. distans*
 - 20 Leaflets not much longer than wide or rachis winged
 - 22 The flowers $\pm$ 4 mm long; glands of the inflorescence yellow-green *P. minutiflora*
 - 22 The flowers over 5 mm long; glands of the inflorescence honey-colored
 - 23 The larger yellow anthers contrasting with dark blue-violet of the petals; leaves with the lobes salient toothed *P. ambigua*
 - 23 The smaller anthers not contrasting with the petals; leaves with the teeth broader *P. crenulata*
 - 19 Filaments of the stamens included, not reaching the top of the corolla lobes when pressed
 - 24 Corolla tube exserted beyond the calyx *P. fremontii*
 - 24 Corolla tube not exserted beyond the calyx
 - 25 Corolla lobes quite widely spreading *P. cryptantha*
 - 25 Corolla lobes not widely spreading or corolla quite small
 - 26 Leaves with some of the lobes distinct to rachis *P. coerulea*
 - 26 Leaves with lobes all confluent
 - 27 Inflorescence exserted well above the leafy part; corolla often quite a bit shorter than the calyx *P. affinis*
 - 27 Inflorescence generally with in the leaves; corolla often at or slightly exserted from the calyx *P. ivesiana*

Phacelia affinis A. Gray

PURPLE-BELL SCORPION-WEED. Blake Ranch Road 12 0244 255E 38 88 335N Clifton 39797.

Phacelia ambigua M.E. Jones

UNCERTAIN SCORPION-WEED. Frequent, below 5000 ft; sandy or gravelly soil, rocky slopes and cliffs. The inflorescence has honey colored glandular hairs. Late Jan-May. Topock Marsh 11 0727 170E 38 58 887N Clifton 38764, Willow Beach Road 11 0715 185E 39 71 327N Clifton 38772, McCracken Mine Road 12 0247 670E 38 16 129N. Clifton 38818, Cane Spring Wash 12 0259 967E 38 66 431N. [*P. crenulata* Torr. var. *a.* (M.E. Jones) J. F. Macbr.].

Phacelia campanularia A. Grayvar. ***vasiformis*** Gillett

DESERT BLUEBELLS. Limited below 600 ft.; road margins. These plants may have been introduced. Highway 95 11 0767 558E 37 99 332N Clifton 38980.

Phacelia coerulea E. Greene

SKY-BLUE SCORPION-WEED. Frees Wash 12 0236 563E 38 93 487N Clifton 39248, Clack Canyon 11 0767 233E 38 99 356N Clifton 39238.

Phacelia constancei Atwood

MOENKOPI SCORPION-WEED.

Phacelia crenulata Torr.

CRENULATE-LEAVED SCORPION-WEED.

Phacelia cryptantha E. Greene

LIMESTONE SCORPION-WEED. In sand, under trees or close to boulders, below 4000 ft. Mid Feb.-June. Alamo Road 12 0248 781E 38 13 246N Clifton 38866, Packsaddle Campground 11 0756 941E 39 26 761N Clifton 39668.

Phacelia curvipes S. Wats.

WASHOE SCORPION-WEED. Windy Point Campground 11 0758 016E 39 25 132N Clifton 39659.

Phacelia distans Benth.

DISTANT SCORPION-WEED. Frequent, below 5000 ft.; mostly along washes and on slopes under shrubs. Late Jan-May. Alamo Road 11 0771 169E 38 54 940N Clifton 38791, Cane Spring Wash 12 0259 967E 38 66 431N, Meadow Creek 11 0748 427E 38 79 536N Clifton 39174.

Phacelia fremontii Torr.

FREMONT'S SCORPION-WEED. Gravelly slopes, washes, 2000-5000 ft. Feb-June. Cook Canyon 11 0764 969E 38 99 327N Clifton 38943, Oatman Road 11 0743 047E 38 80 116N Clifton 38887, Frees Wash 12 0236 563E 38 93 487N Clifton 39249, Grapevine Canyon 12 0233 746E 39 75 700N.

Phacelia glechomifolia A. Gray

PENNY-ROYAL SCORPION-WEED. The type came from between Peach Spring and the Grand Canyon. Mid Mar.-Mid Apr. Gilbert Canyon 717 634E 39 96 898N Clifton 43462

Phacelia gypsicola G. Clifton

DINGY SCORPION-WEED. Detrital Valley 727 543E 39 78 396N Clifton 42348

Phacelia ivesiana Torr.

IVES'S SCORPION-WEED. Fairly frequent, below 7000 ft.; gravelly or sandy open places. April-May. Kaiser Spring Wash 12 0271 746E 38 28 800N Clifton 39017, Clay Springs Road 12 0241 354E 39 57 309N Clifton 39380.

Phacelia laxiflora J. Howell

LAX-FLOWERED SCORPION-WEED. The type came from near Toroweap Point.

Phacelia lemmonii A. Gray

LEMMON'S SCORPION-WEED. The type came from Mineral Park

Phacelia magellanica (Lam.) Cov. "complex"SOUTHERN SCORPION-WEED. The plants from Mt. Trumbull don't look like the typical *P. hastata* that is to the north and it is in no way like *P. heterophylla*. Some have tried to call plants from Arizona *P. egeana*, but they don't look like the plants that are called that in California. So these plants are going to be left as part of the "*magellanica*" group. These plants have an elongated, waned-like inflorescence, and the sepals are veiny. Mt. Trumbull 12 0308 783E 40 30 200N Clifton 41748.***Phacelia minutiflora*** Voss

SMALL-FLOWERED SCORPION-WEED Lake Havasu State Park 750 400E 38 13 172N Clifton 43363

Phacelia mokaacensis G. Clifton sp. nov.

MOKAAC SCORPION-WEED Local, 3200-3500 ft.; barren gypsum or rocky slopes. April-May. Mt. Trumbull Loop Road 12 0271 9659E 40 87 054N Clifton 42257

Phacelia neglecta M. E. Jones

NEGLECTED SCORPION-WEED. Warm Springs Wash 733 068E 38 49 828 Clifton 43370

Phacelia pachyphylla A. Grayvar. ***tache-flava*** G. Clifton var. nov.

YELLOW TACK SCORPION-WEED. Limited, below 600 ft.; sandstone-conglomerate slopes and ledges. This taxon is different from all the others in this group in that the glands are yellow and well formed tack-shaped. Late Jan-Feb. Lake Havasu State Park 750 123E 38 12 950N Clifton 43364

Phacelia palmeri Torr.

PALMER'S SCORPION-WEED. Beaver Dam Mountains 12 0250 764E 40 95 790N Clifton 42238

Phacelia parishii A. Gray

PARISH'S SCORPION-WEED.

Phacelia pedicellata A. Gray

PEDICELLATE SCORPION-WEED. Alamo Road 12 0228 798E 38 48 241N Clifton 38963.

Phacelia petrosa

TALUS SCORPION-WEED

Phacelia pulchella A. Gray

a Leaves or leaflets generally entire, rarely on any given plant one or two leaves may have several teeth or small lobes var. ***pulchella***

a Leaves or leaflets with margins various var. ***gooddingii***

var. ***gooddingii*** (Brand) J. Howell

GOODDING'S BEAUTIFUL SCORPION-WEED. Mostly on barren gypseous clay, below 6000 ft. April-May. Detrital Valley
11 0727 400E 39 78 292N Clifton 39692, Beaver Dam Mountains 12 0250 764E 40 95 790N Clifton 42235.

var. ***pulchella*** A. Gray

BEAUTIFUL SCORPION-WEED

Phacelia ramosissima Lehm.

var. ***latifolia*** (Torr.) Cronq.

BROAD-LEAVED BRANCHING PHACELIA. Dry slopes, openings in pinyon-juniper, below 4000 ft. June-July. Black
Mountains.

Phacelia rotundifolia A. Gray

ROUND-LEAF PHACELIA. Shaffer Spring 11 0741 229E 38 80 339N Clifton 39181, Hualapai Mountain Road 12 0231 115E
38 94 305 Clifton 39353, Kaiser Spring Wash 12 0271 820E 38 28 784N Clifton 39826.

Phacelia saxicola A. Gray

STONECROP SCORPION-WEED. The type came from Kingman. North Fork Knight Creek 12 0277 450E 38 90 781N Clifton
39877.

Phacelia vallis-mortae J. Voss

DEATH VALLEY PHACELIA. Mid Feb-May. Lake Havasu City 11 0753 560E 38 15 445N Clifton 38904

PHOLISTOMA

1 Flowers blue ***P. auritum***

1 Flowers white ***P. membranaceum***

Pholistoma auritum (Lindl.) Lilja

var. ***arizonicum*** (M. E. Jones) Constance

ARIZONA BLUE FIESTA-FLOWER. Mesic slopes among bushes and on cliffs. The type came from Yucca. Mid Jan-Apr.
McCracken Mine Road 12 0247 670E 38 16 129N Clifton 38734, Warm Springs 746 272E 38 64 564N.

Pholistoma membranaceum (Benth.) Const.

WHITE FIESTA-FLOWER. Petroglyph Wash 721 059E 39 93 362N Clifton 43456

TRICARDIA

Tricardia watsonii S. Wats.

THREE HEARTS.

JUGLANDACEAE Walnut Family

JUGLANS Walnut

Juglans major (Torr.) A. Heller

ARIZONA BLACK WALNUT. Knight Creek 12 0276 558E 38 89 296N Clifton 39903.

KRAMERIACEAE Rhatany Family

1 Upper three petals not fan-shaped; filaments of stamens red-purple; fruit spines barbed at apex only..... ***K. grayi***

1 Upper three petals fan-shaped; filaments of stamens yellow; fruit spines smooth or barbed along the sides ***K. erecta***

Krameria erecta Schultes

PIMA RHATANY, PURPLE HEATHER. Oatman Road 11 0737 498E 38 76 484N Clifton 39951, Temple Bar Road 11 0722 568E 39 68 954N Clifton 39677. [*K. parvifolia* Benth., *K. glandulosa* Rose & Painter].

Krameria grayi Rose & Painter

WHITE RHATANY. Highway 95 11 0763 000E 38 03 270N Clifton 38987, Bill Williams Mountains 11 0764 983E 38 15 277N Clifton 39781.

LAMIACEAE Mint Family

- 1 Plants a small to large shrub
 - 2 Plants $\pm$ thorny; leaves inconspicuous; calyces inflated when mature ***Salazaria***
 - 2 Plants not thorny; leaves conspicuous; calyces not inflated
 - 3 Herbage densely stellate ***Hyptis***
 - 3 Herbage not stellate
 - 4 Stamens 4 ***Monardella***
 - 4 Stamens with two functional ***Salvia***
- 1 Plants herbaceous
 - 5 Stamens 4
 - 6 Plants white woolly; calyx teeth 10, hooked at apex ***Marrubium***
 - 6 Plants $\pm$ green, variously pubescent; calyx teeth 5 or fewer
 - 7 Each branch normally with a single head at the end ***Monardella***
 - 7 Each branch with whorls of flower
 - 8 Lower leaves palmately lobed, lobes again toothed ***Leonurus***
 - 8 Lower leaves otherwise
 - 9 Calyx teeth with the upper much wider than the lower; bracts holly-like ***Dracocephalum***
 - 9 Calyx teeth similar; bracts not holly-like
 - 10 Filaments of the stamens tight together, curved and long exserted; upper lip cleft to the base ***Trichostema***
 - 10 Filaments of the stamens spreading, may be exserted but not much curved; upper lip not cleft to the base
 - 11 Lower lip much larger than the others ***Teucrium***
 - 11 Lower lip, if obvious not much bigger than the others
 - 12 Corolla almost regular ***Mentha***
 - 12 Corolla strongly 2-lipped
 - 13 Plants annual ***Lamium***
 - 13 Plants perennial ***Stachys***
 - 2 Stamens with 2 functional
 - 14 Filaments of the stamens bearing a joint ***Salvia***
 - 14 Filaments of the stamens not jointed ***Hedeoma***

DRACOCEPHALUM***Dracocephalum parviflorum*** Nutt.

AMERICAN DRAGONHEAD. below 7,700 ft. June-Aug. Willows Ranch Road 12 0278 265E 38 96 508N Clifton 39859, Mount Dellenbaugh Road 12 0269 028E 40 04 094N. [*Moldavica p.* (Nutt.) Britt.].

HEDEOMA False Pennyroyal

- 1 The two lower calyx teeth quite a bit longer than the upper 3, the upper not broadly triangular
 - 2 The hairs on the stem in the inflorescence long, spreading or some slightly curved downward ***H. oblongifolium***
 - 2 The hairs on the stem in the inflorescence short and strongly curled downward ***H. drummondii***
- 1 The two lower calyx teeth scarcely longer than the upper, if they are somewhat longer than the upper triangular ***H. nanum***

Hedeoma drummondii Benth.

DRUMMOND'S FALSE PENNYROYAL. Open slopes, often rocky, below 7000 ft. May-Aug. Bulrush Canyon 12 0348 622E 40 71 965N Clifton 41171.

Hedeoma nanum (Torr.) Briq.

- a Calyx tube 3.5-4 mm long; basal leaves more than 1 cm long var. ***macrocalyx***

- a Calyx tube 2.5-3 (4) mm long; basal leaves 5-10 mm long
 b The flowers shorter than the calyx, not opening var. *cleistogamum*
 b The flowers well developed
 c Stems closely tufted, sparsely covered with retrorse pubescence above, glabrous below; leaves about 5 mm long.....var. *californicum*
 c Stems loose, fairly densely covered with downward-curling hairs; leaves 5-10 mm long..... var. *nanum*

var. *californicum* (W. Stewart) G. Clifton Comb. nov.

CALIFORNIA DWARF FALSE PENNYROYAL. May-Aug. Toroweap Valley Beaver Dam Mountains 12 0251 037E 40 94 980N Clifton 42241.[ssp. c. W. Stewart].

var. *cleistogamum* G. Clifton var. nov.

SELFING DWARF FALSE PENNYROYAL. Branch of Truxton Wash 12 0277 194E 39 18 054N Clifton 39746

var. *macrocalyx* (W. Stewart) G. Clifton Comb. nov.

LARGE CALYX DWARF FALSE PENNYROYAL.

var. *nanum*

DWARF FALSE PENNYROYAL. Kaiser Springs Wash 12 0272 357E 38 29 235N Clifton 39830, Spanish Ranch Road 759 458E 38 54 045N Clifton 42165.

Hedeoma oblongifolia (A. Gray) A. Heller

OBLONG-LEAVED FALSE PENNYROYAL. New Years Cabin Spring 12 0238 460E 38 83 800N Clifton 40746, Tom Brown Road 12 0273 967E 38 62 437N Clifton 41313, Branch of Knight Creek 12 0277 332E 38 90 684N Clifton 13904.

HYPTIS

Hyptis emoryi Torr.

DESERT-LAVENDER. Blooming ± throughout the year. Alamo Road 12 0228 720E 38 48 213N Clifton 38712.

LAMIUM Dead Nettle

Lamium amplexicaule L.

COMMON HENBIT. waste places, old fields, and old orchards; introduced from Europe. Mid Jan-Apr. Parkview Ave. 11 0767 563E 38 98 018N Clifton 38784.

LEONURUS

Leonurus cardiaca L.

MOTHERWORT. Growing under New Mexico Locust in pumice, at about 7560 ft. Jul-Oct. Mt. Trumbull 12 0309 013E 40 30 059N Clifton 41743.

MARRUBIUM Horehound

Marrubium vulgare L.

COMMON HOARHOUND. Waste places; introduced from Europe. May-July: Knight Creek Spring 12 0275 984E 38 89 527N Clifton 39910.

MENTHA

Mentha spicata L.

SPEARMINT. Beale Spring 11 0765 565E 38 99 352N Clifton 40674.

MONARDELLA Wild Mint

1 Bracts narrowly ovate, not forming a cup

2 Bracts spreading to deflexed; herbage with dense gland-tipped hairs under the dense longer none glandular*M. arizonica*

2 Bracts ± erect; herbage lacking gland-tipped hairs *M. suffruticosa*

1 Bracts ovate to rotund forming a cup..... *M. glauca*

Monardella arizonica Epling

ARIZONA WILD MINT. Kaiser Spring Wash 12 0272 074E 38 29 024N Clifton 39316.

Monardella glauca E. Greene

MOUNTAIN WILD MINT. [*M. parvifolia* E. Greene, *M. odoratissima* Benth. var. *parvifolia* Jeps.]

Monardella suffruticosa G. Clifton

BLACK MOUNTAINS WILD MINT. Sitgreaves Pass 11 0740 532E 38 81 504N Clifton 39183.

SALAZARIA***Salazaria mexicana*** Torr.

BLADDER SAGE. D-W Ranch Road 12 0235 481E 38 98 350N Clifton 38609.

SALVIA Sage

- 1 Corolla red; lower leaves simple pinnate, upper simple *S. davidsonii*
- 1 Corolla not red; leaves otherwise
 - 2 Plants herbs, annual
 - 3 Leaves pinnatifid *S. columbariae*
 - 3 Leaves simple *S. subincisa*
 - 2 Plants a shrub
 - 4 Inflorescence normally 1 cluster; leaves small-toothed *S. mohavensis*
 - 4 Inflorescence more than 1 cluster; leaves $\pm$ entire
 - 5 Stamens long exserted; corolla tube 13-23 mm long *S. pachyphylla*
 - 5 Stamens with one shortly exserted; corolla tube 6-13 mm long *S. dorrii* var. *dorrii*

Salvia columbariae Benth.

CHIA. The plants at Box Canyon have very small light flowers. (Jan) March-May. Alamo Road 12 0241 952E 38 32 750N Clifton 38720, Cane Spring Wash 12 0259 967E 38 66 431N, Frees Wash 12 0236 563E 38 93 487N Clifton 39251, Grand Wash Cliffs 12 0239 740E 39 42 007N, Box Canyon 12 0266 600E 38 32 054N Clifton 39825.

Salvia davidsonii Greenm.

DAVIDSON'S SAGE. Kaiser Spring Wash 12 0271 976E 38 28 788N Clifton 39309.

Salvia dorrii (Kell.) Abrams

GRAY BALL SAGE. White Hills 11 0739 633E 39 64 631N Clifton 39702, Mt. Trumbull Loop Road 12 0271 809E 40 77 515N Clifton 42287.

Salvia mohavensis E. Greene

MOHAVE SAGE. (Late Jan) Apr-July. Alamo Road 12 0226 224E 38 51 199N Clifton 38796

Salvia subincisa Benth.

SAW-TOOTHED SAGE Branch of Knights Creek 12 0277 277E 38 90 603N Clifton 18097, Old 66 12 0285 250E 39 36 800N.

STACHYS Hedge Nettle***Stachys rothrockii*** A. Gray

WHITE STACHYS.

TEUCRIUM***Teucrium glandulosum*** Kell.

BEARDED GERMANDER.

TRICHOSTEMA***Trichostema micranthum*** A. Gray

SMALL-FLOWERED BLUECURLS.

LINACEAE Flax Family**LINUM** Flax

- 1 Flowers blue
- 2 Plants perennial (annual); styles 4-9 mm long *L. lewisii* var. *lewisii*
- 2 Plants annual; styles 1-3 mm long *L. pratense*

- 1 Flowers yellow
 - 3 Styles free to base; sepals entire or with very few glandular teeth *L. neomexicanum*
 - 3 Styles fused, only free near apex; sepals with numerous glandular teeth
 - 4 Stems and leaves densely pubescent *L. puberulum*
 - 4 Stems and leaves ± glabrous
 - 5 Leaves serrulate; inner sepals distinctly dentate *L. australe*
 - 5 Leaves entire; inner sepals ± entire *L. aristatum*

Linum aristatum Engelm.

BRISTLE FLAX.

Linum australe A. Heller

SMALL YELLOW FLAX. Highway 389 12 0361 776E 40 88 757N Clifton 41150. [*L. aristatum* Engelm. var. *a.* (A. Heller) Kearney Peebles].

Linum lewisii Pursh

WESTERN BLUE FLAX. Truxton 12 0269 780E 39 29 790N Clifton 39726.

Linum neomexicanum E. Greene

NEW MEXICO FLAX.

Linum pratense (Nort.) Small

ANNUAL BLUE-FLOWERED FLAX. Open dry, grassy slopes, about 4500 ft. Mar-Apr. Hualapai Mountain Road 12 0230 946E 38 94 542N Clifton 39350, Truxton 12 0269 780E 39 29 790N Clifton 39727, Lizard Point 268 384E 40 91 796N

Linum puberulum (Engelm.) A. Heller

RED-EYE FLAX. Truxton 12 0269 780E 39 29 790N Clifton 39723, Blake Ranch Road 12 0244 757E 38 94 453, Mt. Trumbull Loop Road 12 0271 809E 40 77 515N Clifton 42282

LOASACEAE Loasa Family

- 1 Stamens 5; stigma 1 *Petalonyx*
- 1 Stamens many; stigma lobes 3 or 5
 - 2 Stigma lobes 3; petals free *Mentzelia*
 - 2 Stigma lobes 5; petals fused to each other or the filament tube *Eucnide*

EUCNIDE

Eucnide urens Parry

DESERT STINGBUSH. Colorado River 11 0704 359E 39 86 544N Clifton 39211.

MENTZELIA Blazing-star, Stick-leaf

Note: The floras and other information is so full of crap that it is almost impossible to put names on a lot of plants. They often zero in on what they think are the dominate characters that they often over look the one key character that really separate the taxa. Often this one character is not even address in the plants description. Every population seems to be a different species. Most say that the plants having petaloid staminodia are biennial to perennial, not so at all, a number are annual.

- 1 Petal satiny white to cream; stamens toothed with thread-like anther stalk between them
 - 2 The bracts not over lapping and hiding the calyx
 - 3 The teeth of the filaments longer than the anther stalk *M. tricuspis*
 - 3 The teeth of the filaments just a little shorter than the anther stalk *M. tridentata*
 - 2 The bracts with a large white patch and hiding the calyx *M. involucreta*
- 1 Petals yellow; filaments not toothed
 - 4 Petals appearing 10, five inner are petaloid staminodia
 - 5 Stems and inflorescence branches essentially glabrous
 - 6 Outer row of stamens with the filaments 2 mm wide; larger cauline leaves about 3 times longer than wide *M. multiflora*
 - 6 Outer row of stamens with the filaments about 1 mm wide; larger cauline leaves about 6 times longer than wide *M. pseudo-multiflora*
 - 5 Lower part of the stems quite hairy
 - 7 Plants annual, rarely overwintering; plants of gypsum soils
 - 8 Outer row of stamens only slightly different from the inner; petals 2-3 mm wide; pustulate bases greenish *M. gypsicola*
 - 8 Outer row of stamens strongly different from the inner; petals 4-8 mm wide; pustulate bases honey-colored

- *M. pterosperma*
- 7 Plants biennial or perennial; plants of other types of habitats
- 9 Larger leaves about 2 times longer than wide *M. oreophila*
- 9 Larger leaves about 6 times longer than wide *M. pumila*
- 4 Petals 5, lacking petaloid staminodia
- 10 Floral bracts entire or with 1 or so teeth at the base
- 11 Petals usually less than 8 mm long
- 12 Seed angles grooved *M. affinis*
- 12 Seed angles sharp or rounded, not grooved
- 13 Seed angles acute, surface pointed-papillate *M. albicaulis*
- 13 Seed angles rounded, surface rounded-papillate *M. obscura*
- 11 Petals generally over 8 mm long
- 14 Seed angles grooved *M. sp.*
- 14 Seed angles lacking grooves
- 15 Seeds not folded at 1 end, angles acute, surface pointed-papillate *M. jonesii*
- 15 Seeds with flap-like folded at one end, angles rounded, surface rounded-papillate *M. nitens*
- 9 Floral bracts toothed *M. veatchiana*

Mentzelia affinis E. Greene

YELLOW-COMET. Red Lake 11 0761 147E 39 52 062N Clifton 39720, Box Canyon 12 0266 600E 38 32 054N Clifton 39824.

Mentzelia albicaulis Hook.

WHITE-STEMMED STICK-LEAF. open sandy slopes and flats especially on burns Jan--June..McCracken Mine Road 12 0247 670E 38 16 129N Clifton 38748, Jumbo Wash 11 0711 864E 39 70 162N Clifton 38787, Oatman Road 11 0734 039E 38 61 610N Clifton 39192, Hualapai Mountain Road 12 0231 115E 38 94 305 Clifton 39354, Detrital Wash 11 0725 894E 39 78 862N Clifton 39699, North Fork Knight Creek 12 0277 387E 38 90 266N Clifton 39891.

Mentzelia involucreata

Mentzelia jonesii (Hrbn & Gilg) H. J. Thompson & Roberts

JONES' STICK-LEAF. Six Mile Crossing Road 12 0283 138E 38 28 525N Clifton 39457.

Mentzelia multiflora (Nutt.) A. Gray

- a Leaves remotely dentate or shortly lobed, or some of them entire; Virgin River area var. *integra*
- a Leaves fairly deep dentate; plants not of the Virgin River area var. *multiflora*

var. *integra* M. E. Jones

ENTIRE-LEAVED MANY-FLOWERED STICK-LEAF.

var. *multiflora*

MANY-FLOWERED STICK-LEAF. There are no leaves on the ground for next year plants. Lake Havasu 11 0739 935E 38 26 957N Clifton 39766.

Mentzelia nitens E. Greene

SHINING STICK-LEAF. There are 3 look alike species that are apparently only separable base on seed shape, which may not mean anything. McCracken Mine Road 12 0247 670E 38 16 129N. Clifton 38821, Signal Road 12 0259 786E 38 19 143N Clifton 38846, Tom Brown Road 12 0262 087E 38 64 760N, Kaiser Spring Wash 12 0271 657E 38 28 799N Clifton 39303, Box Canyon 12 0266 600E 38 32 054N Clifton 39823.

Mentzelia obscura H. J. Thompson & Joyce Roberts

OBSCURE STICK-LEAF Aubrey Hills 11 0762 397E 38 04 477N Clifton 38995.

Mentzelia oreophila Darl

ARGUS STICK-LEAF. [*M. puberula* J. Darl.].

Mentzelia pterosperma Eastw.

WING-SEEDED STICK-LEAF. Locally frequent, gypsum-clay soils. Plants often annual. Mt. Trumbull Loop Road 272 329E 40 88 910N Clifton 42254

Mentzelia pumila (Nutt.) T. & G.

GOLDEN STICK-LEAF. Wheeler Wash 12 0237 778E 38 85 538N Clifton 40691

Mentzelia tricuspis A. Gray

SPINY-HAIR STICK-LEAF. Willow Beach Road 11 0715 185E 39 71 327N Clifton 38773, Big Sandy River 12 0260 652E 38 64 878N.

Mentzelia veatchiana Kell.

VEATCH'S STICK-LEAF. open sandy slopes. May-July: Alamo Road 12 0250 724E 38 06 479N Clifton 39165, Highway 93

11 0765 276E 38 99 098N Clifton 39236.

Mentzelia sp. .

KAISER SPRING WASH STICK-LEAF. Kaiser Spring Wash 12 0271 820E 38 28 784N Clifton 39827.

PETALONYX Sandpaper Plant

- 1 Leaves short petiolate
- 2 Petals 7-8 mm long; plants not woody above ***P. nitidus***
- 2 Petals $\pm$ 10 mm long; plants woody $\pm$ throughout ***P. parryi***
- 1 Leaves sessile..... ***P. thurberi***

Petalonyx nitidus S. Wats.

SHINING SANDPAPER PLANT. Spanish Ranch Road 759 458E 38 54 045N Clifton 42164.

Petalonyx parryi A. Gray

PARRY'S SANDPAPER PLANT.

Petalonyx thurberi A. Gray

THURBER'S SANDPAPER PLANT. Temple Wash 739 766E 39 88 913N Clifton 42347

LYTHRACEAE Loosestrife Family

LYTHRUM Loosestrife

Lythrum californicum T. & G.

CALIFORNIA LOOSESTRIFE. Six Mile Crossing 12 0284 156E 38 26 734N Clifton 35037.

MALPIGHIACEAE Malpighia Family

JANUSIA

Janusia gracilis A. Gray

SLENDER JANUSIA. Mid Feb- Cane Spring Wash 12 0259 967E 38 66 431N Clifton 38949, Sawmill Canyon 11 0768 746E 38 94 954N Clifton 41317.

MALVACEAE Mallow Family

- 1 Involucellate bractlets lacking
- 2 Herbage stellate-lepidote with silvery scales throughout..... ***Malvella***
- 2 Herbage not as above
- 3 Petals rose-purple; plants found in wet meadows or along streams ***Sidalcea***
- 3 Petals orange-yellow, yellow or pink to red; plants found in dry places
- 4 Herbage lacking glandular hairs
- 5 Fruit segments inflated, walls papery-thin ***Herissantia***
- 5 Fruit with the segments not inflated, walls firm
- 6 Herbage yellowish ***Horsfordia***
- 6 Herbage green or grayish ***Abutilon***
- 4 Herbage bearing some glandular hairs..... ***Sida***
- 1 Involucellate bractlets 1 or more
- 7 Petals white with a little infusion of lavender, base generally purple; fruit a capsule..... ***Hibiscus***
- 7 Petals not as above; fruit not a capsule
- 8 Stigmas linear; plants generally along road, about towns ***Malva***
- 8 Stigmas capitate or obliquely squared
- 9 Plants perennial ***Sphaeralcea***
- 9 Plants annual or biannual..... ***Eremalche***

ABUTILON

- 1 Petals pink to red; herbage greenish *A. parvulum*
 1 Petals yellow to orange; herbage whitish..... *A. incanum*

Abutilon incanum (Link) Sweet

PELOTAZO. Six Mile Crossing Road 12 0283 140E 38 28 633E Clifton 39455,.

Abutilon parvulum A. Gray

DWARF ABUTILON. White Cliff Wagon Trail Park 11 0768 317E 38 99 253N Clifton 39786, Interstate 40 12 0246 786E 38 95 209N Clifton 26207.

EREMALCHE

- 1 Petals rose-purple with a crimson spot near the base..... *E. rotundifolia*
 1 Petals white, rose to rose-purple, lacking a crimson spot *E. exilis*

Eremalche exilis (A. Gray) E. Greene

WHITE MALLOW.

Eremalche rotundifolia (A. Gray) E. Greene

DESERT FIVE-SPOT. Highway 93 11 0705 668E 38 85 756N Clifton 39217.

HERISSANTIA

Herissantia crispa (L.) Briz.

BLADDER-MALLOW, CURLY ABUTILON. Rocky slopes, below 4000 ft. May flower any time of the year. Mackenzie Creek 12 0231 211E 38 67 041N Clifton 39341. [*Gayoides* c. (L.) Small].

HIBISCUS

Hibiscus denudatus Benth

PALE FACE. Several plants grow close to the Bill Williams Bridge

HORSFORDIA

Horsfordia newberryi (S. Wats.) A. Gray

NEWBERRY'S VELVET-MALLOW. Kaiser Springs Wash 12 0272 077E 38 29 052N Clifton 39829.

MALVA Mallow

- 1 Petals 8-13mm long, about twice as long as calyx..... *M. neglecta*
 1 Petals 4-5 mm long, scarcely longer than the calyx *M. parviflora*

Malva neglecta Wallr.

WEEDY MALLOW. waste places; introduced from Eurasia. May-Sep. Toroweap Valley 12 0315 682E 40 29 808N Clifton 41727.

Malva parviflora L.

CHEESEWEED, LITTLE MALLOW. Baker Well 12 0248 115E 38 11 486N Clifton 38831, Clack Canyon.

MALVELLA

- 1 Leaves sagittate, margin not wavy *M. sagittifolia*
 1 Leaves reniform, round, or triangular, margin wavy..... *M. Leprosa*

Malvella leprosa (Ort.) Krapov.

ALKALI MALLOW. Highway 95 11 0719 614E 38 62 129N Clifton 39954.

Malvella sagittifolia (A. Gray) Fryxell

ARROW-LEAF MALLOW. Dick's Camp Road 12 0257 914E 39 09 306N Clifton 8228, Northern Ave. 772 860E 39 05 093N Clifton 43312. [*Sida lepidota* A. Gray var. s. A. Gray].

SIDALCEA Checkerbloom, Checker Mallow

Sidalcea neomexicana A. Gray

SUBALKALI MEADOW CHECKERBLOOM. Infrequent, below 6800 ft.; subalkali meadows, along streams that are associated with subalkali meadows. Mid June-July .

Sida***Sida abutilifolia*** P. Mill.

SPREADING FANPETALS. Infrequent, 3000-4000 ft.; rocky slopes. Borianna Canyon 12 0231 211E 38 67 041N Clifton 39340.

SPHAERALCEA Desert-mallow

Note: These plants are extremely variable and unless you have very mature fruit you will never be able to tell them apart. Most likely even if you have good fruit, this author believes that there is really no one who knows these plants. Most of the garbage methods used to tell them apart are not functionally useful.

- 1 Leaves deeply pedately divided, almost compound ***S. grossulariifolia***
- 1 Leaves not deeply divided
 - 2 Leaves considerably longer than wide
 - 3

Sphaeralcea ambigua A. Gray var. ***ambigua***

APRICOT GLOBE-MELLOW. Along roads, dry, rocky slopes. April-Dec. D-W Ranch Road 12 2342 314E 38 92 574N Clifton 38558, Alamo Crossing Road 12 0241 952E 38 32 750N Clifton 38725, Cane Spring Wash 12 0259 967E 38 66 431N Clifton 38950, Colorado River 11 0704 076E 39 86 342N Clifton 39209, Hualapai Mountain Road 12 0231 099E 38 94 445N Clifton 39352, Wheeler Wash 12 0237 778E 38 85 538N Clifton 40697.

Sphaeralcea emoryi Torr.

TORREY'S GLOBE-MELLOW.

Sphaeralcea grossulariifolia (H. & A.) Rydb.

var. ***pedata*** (Torr. ex A. Gray) Kearney

GREEN CURRENT-LEAF GLOBE-MELLOW. Willows Ranch Road 12 0278 190E 38 96 433N Clifton 39861, Beaver Dam Mountains 12 0248 782E 40 96 646N Clifton 42223.

Sphaeralcea hastulata A. Gray

SPEAR-LEAF GLOBE-MELLOW. Red Lake 11 0761 147E 39 52 062N Clifton 39711. [*S. subhastata* Coult.]

Sphaeralcea parvifolia A. Nels.

SMALL-LEAVED GLOBE-MELLOW. North Fork Knight Creek 12 0277 387E 38 90 266N Clifton 39890, Fort Rock Exit 12 0284 685E 38 96 409N Clifton 40756, Highway 389 12 0361 776E 40 88 757N Clifton 41162.

Sphaeralcea rusbyi A. Gray

RUSBY'S GLOBE-MELLOW. Fort Rock Exit 12 0284 739E 38 96 454N Clifton 41214.

Sphaeralcea sp.

Clay Springs Road 12 0240 279E 39 56 907N Clifton 39369.

Sphaeralcea sp.

These plants have dense yellow-pubescent stems and thinner gray pubescent on yellow-green leaves. The carpels are about half as wide as long. Blake Ranch Road 12 0255 070E 38 71 558N Clifton 39818.

Sphaeralcea sp. Highway 389 12 0361 776E 40 88 757N Clifton 41162.

MARTYNIACEAE Unicorn-plant Family

- 1 Flowers yellow to orangish; perennial ***P. althaeifolia***
- 1 Flowers white to pinkish; annual, coming up after late summer rains ***P. parviflora***

Proboscidea althaeifolia (Benth.) Decne.

DESERT UNICORN PLANT.

Proboscidea parviflora (Woot.) Woot. & Standl.

SMALL-FLOWERED DEVILS-CLAW. Highway 93 12 0257 027E 38 83 062N Clifton 41308, Old Highway 93 12 0247 473E 38 92 715N Clifton 28244.

MENODORACEAE

(Oleaceae in part)

MENODORA

- 1 Plants spiny; petals white, lobes shorter than the tube.....*M. spinescens*
- 1 Plants lacking spines; petals yellow, lobes longer than the tube
 - 2 Upper leaves reduced to scales *M. scoparia*
 - 2 Upper leaves with well developed blades *M. scabra*

Menodora scabra A. Gray

ROUGH-TWINBERRY. The plants east of Peach Springs are short with the inflorescence among the leaves, some of the leaves are quite broad, and the corolla tube is longer and narrower than the typical. Kaiser Spring Wash 12 0272 294E 38 29 368N Clifton 39833, Fort Rock Exit 12 0284 685E 38 96 409N Clifton 40751, Old 66 12 0285 250E 39 36 800N Clifton 41239.

Menodora scoparia A. Gray

BROOM-TWINBERRY.

Menodora spinescens A. Gray

SPINY-TWINBERRY Detrital Valley

MOLLUGINACEAE Carpet-weed Family**MOLLUGO*****Mollugo cerviana*** (L.) Ser.

THREAD-STEM CARPET-WEED. Highway 93 12 0257 027E 38 83 062N Clifton 41310

MORACEAE Mulberry Family**MORUS**

- 1 Leaves glabrous or hairy on the major veins on the lower surface *M. alba*
- 1 Leaves hairy on both surfaces..... *M. microphylla*

Morus alba L.

WHITE MULBERRY. Introduced from China. Bullhead 11 0721 541E 38 94 513N Clifton 39950.

Morus microphylla Buckl.

TAXES MULBERRY. Knight Creek 12 0276 797E 38 89 465N Clifton 39893, Lookout Wash 12 0278 176E 38 97 320N.

NYCTAGINACEAE Four-o'clock Family

- 1 Floral tube long and narrow; perianth limb flat *Abronia*
- 1 Floral tube short, if longer, than broad; perianth limb not flat
 - 2 Floral bracts $\pm$ united into a calyx-like involucre, often enlarging in age; petaloide sepals showy, if they develop
 - 3 The involucre has three flowers that form what looks like a single complete flower..... *Allionia*
 - 3 The involucre has each flower forming a separate flower or flowers not forming petaloide sepals..... *Mirabilis*
 - 2 Floral bracts distinct, remaining small; petaloide sepals very small
 - 4 Plants annual; stamens $\pm$ included *Boerhavia*
 - 4 Plants perennial; stamens long exserted..... *Anulocaulis*

ABRONIA

- 1 Leaves essentially all basal *V. nana*
- 1 Leaves along the stem
 - 2 Flowers bright magenta *A. villosa*
 - 2 Flowers white, greenish, to rose of purple *A. fragrans*

Abronia fragrans Nutt.

FRAGRANT SAND-VERBENA, HEART'S DELIGHT. Highway 389 12 0361 776E 40 88 757N Clifton 41154.

Abronia nana S. Wats.

LOW SAND-VERBENA. Toroweap Valley 12 0318 830E 40 41 257N Clifton 41725.

Abronia villosa S. Wats.

DESERT SAND-VERBENA. Highway 95 11 0730 433E 38 46 957N Clifton 38681.

ALLIONIA***Allionia inepus*** G. Clifton sp. nov.

ABSURD WINDMILLS. This taxon is named for the clumsiness of plant taxonomist, who never spend anytime in the field. The perianth only gets up to 6 mm long, is pale pink, the filaments of the stamens are very short and are hide under the anthers, and the wings of the dorsal side of the fruit are uniform in their serrations. The next taxon has the perianth well over 6 mm long, is rose-magenta (rarely white), the filaments of the stamens are very obvious, not hide under the anthers, and the wings of the fruit are very irregular (some of the serrations are fused on most of the fruit). In a large part of the Mohave Desert this is the only species present. In Arizona there are large areas where the next is only found. In a few places, as in Grapevine Canyon they are found growing together. It is said that they are a winter annual. This is not true. They grow in response to the late summer rains only. Grapevine Canyon 12 0233 685E 39 75 633N Clifton 41338, Grapevine Canyon 234 350E 39 76 436N Clifton 42342.

Allionia incarnata L.

PERENNIAL WINDMILLS. Old Trails Road 11 0767 962E 38 95 613E Clifton 38648, McCracken Mine Road 12 0247 670E 38 16 129N. Clifton 38809, Grapevine Canyon 12 0233 685E 39 75 633N Clifton 41339.

ANULOCAULIS***Anulocaulis leiosolenus*** (Torr.) Standl.

SOUTHWESTERN RINGSTEM.

BOERHAVIA Spiderling

- 1 Plants perennial; flowers dark red-violet ***B. coccinea***
- 1 Plants annual; flowers pale pink or white
- 2 Fruit winged on the 5 angles..... ***B. megaptera***
- 2 Fruit round on the 4 or 5 angles
- 3 Flowers in the leaf axiles umbellate
- 4 The terminal part of the inflorescence with none or 1 appressed side branch in the last 2 cm..... ***B. intermedia***
- 4 The terminal part of the inflorescence with more than 1 appressed side branch in the last 2 cm..... ***B. triquetra***
- 3 Inflorescence in a racemose-like spike, peduncles short
- 5 Stems puberulent; bracts deciduous much shorter than the fruit..... ***B. coulteri***
- 5 Stems glandular-hairy; bracts $\pm$ persistent, $\pm$ equal to the fruit..... ***B. wrightii***

Boerhavia coccinea Mill.

SCARLET SPIDERLING. Mar-June, Aug-Sep. Alamo Road 12 0250 724E 38 06 479N Clifton 39164, Lake Havasu 11 0760 441E 38 04 500N Clifton 39770, Truxton 12 0268 038E 39 29 900N Clifton 41246.

Boerhavia coulteri (Hook.) S. Wats.

COULTER'S SPIDERLING. Blake Ranch Road 12 0245 741E 38 95 872N Clifton 41301.

Boerhavia intermedia M. E. Jones

FIVE-WINGED SPIDERLING. Grapevine Wash 770 068E 39 74 983N Clifton 41333

Boerhavia megaptera Standl.

TUCSON MOUNTAIN SPIDERLING. Branch of Knight Creek 12 0277 292E 38 90 810N Clifton 6571, Kingman 227 943E 39 03 447N Clifton 43311.

Boerhavia triquetra S. Wats.

SLENDER SPIDERLING. West Spring St. 11 0767 404E 38 98 151N Clifton 41325.

Boerhavia wrightii A. Gray

WRIGHT'S SPIDERLING. Hualapai Mountain Road 12 0230 906E 38 94 433N Clifton 38622, Blake Ranch Road 12 0245 741E 38 95 872N Clifton 41299.

MIRABILIS

- 1 Leaves linear, at least 5 times longer than wide
- 2 Calyx scarlet *M. coccineus*
- 2 Calyx pink or purple *M. linearis*
- 1 Leaves much broader
- 3 Perianth mostly green, never opening, 1 or 2 per plant opening a little, bearing pinkish scarious margins; leaves often violet on the lower surface *M. hualapaiensis*
- 3 Perianth colored and opening; leaves not violet on the lower surface
- 4 Perianth 2-6 cm long, trumpet-shaped *M. multiflora*
- 4 Perianth 8-12 mm long, broadly funnel-shaped
- 5 Involucre bearing a single flower *M. bigelovii*
- 5 Involucre bearing 3-5 flowers
- 6 Perianth 10-12 mm long; stems erect, branching near top *M. comata*
- 6 Perianth 7-10 mm long; stems trailing to ascending
- 7 Leaves cuneate to obtuse at base; fruit having five ribs *M. pumila*
- 7 Leaves truncate to cordate; fruit smooth to only slightly ribbed *M. oxybaphoides*

Mirabilis bigelovii A. Gray

- a Fruit almost round in outline, $\pm$ 10-veined, smooth; most hairs glandular and spreading var. *bigelovii*
- a Fruit more pointed at the ends, lacking veins, surface $\pm$ bumpy; some none glandular hair sloped downward var. *retrorsa*

var. ***bigelovii***

DESERT FOUR O'CLOCK. Alamo Road 11 0761 204E 38 59 909N Clifton 39170.

var. ***retrorsa*** (A. Heller) Munz

SLOPED-HAIR DESERT FOUR O'CLOCK. Clack Canyon 11 0767 083E 38 99 335N Clifton 38853, Clack Canyon 11 0767 233E 38 99 356N Clifton 39237.

Mirabilis coccinea (Torr.) Benth. & Hook.

SCARLET FOUR O'CLOCK. Wheeler Wash 12 0237 792E 38 85 470N Clifton 40689

Mirabilis comata (Small) Standl.

HAIRY-TUFT FOUR O'CLOCK. Bly Canyon 280 519E 39 27 750N Clifton 41611.

Mirabilis hualapaiensis G. Clifton sp. nov.

HUALAPAI MOUNTAINS FOUR O'CLOCK Camp Levi Levi Road 12 0235 246E 38 87 370N Clifton 41228, Flag Mine Road 12 0238 315E 38 84 525N Clifton 26216.

Mirabilis linearis (Pursh) Heimerl var. ***linearis***

NARROW-LEAF UMBRELLAWORT. Fort Rock Exit 12 0284 600E 38 96 492N Clifton 40757.

Mirabilis multiflora (Torr.) A. Gray

- 1 Herbage glabrous var. *glabrata*
- 1 Herbage pubescent var. *pubescens*

var. ***glabrata*** (Standl.) G. Clifton Comb. nov.

HAIRLESS COLORADO FOUR-O'CLOCK. Other authors say that the pubescent ones become glabrous, which is absolutely untrue. The glabrous form doesn't grow with the pubescent form. White Hills 11 0739 633E 39 64 631N Clifton 39703, Blake Ranch Road 12 0244 757E 38 94 453.

var. ***pubescens*** S. Wats.

COLORADO FOUR-O'CLOCK. Big Wash Road 11 0755 962E 39 27 976N Clifton 39653.

Mirabilis oxybaphoides (A. Gray) A. Gray

SMOOTH SPREADING FOUR-O'CLOCK. Grapevine Canyon 234 350E 39 76 436N Clifton 41341

Mirabilis pumila (Standl.) Standl.

LITTLE FOUR-O'CLOCK.. [*Oxybaphus pumilus* Standl.].

SELINOCARPUS

Selinocarpus nevadensis Fowler & B. Turner

NEVADA MOONPOD. Temple Bar Road 11 0722 568E 39 68 954N Clifton 39683, Lizard Wash 270 265E 40 91 490N.

TRIPTEROCALYX

Tripterocalyx micranthus (Torr.) Hook.
SMALL-FLOWERED SANDPUFFS.

OLEACEAE

(See Forestieraceae, Fraxinaceae, and Menodoraceae)

ONAGRACEAE Evening Primrose Family

- 1 Flowers red and tubular ***Zauschneria***
- 1 Flowers not as above
 - 2 Plants with flowers numerous in an elongate, narrow spike; flowers white, soon turning pink; fruit a woody capsule ***Gaura***
 - 2 Plants not combining the above characters
 - 3 Plants found in moist to wet places; flowers small and pinkish or a little darker ***Epilobium***
 - 3 Plants in dry places or if in moist to wet places, than flowers large and yellow
 - 4 Stigma evidently 4-cleft, the slender lobes stigmatic all around ***Oenothera***
 - 4 Stigma polsterform to hemispheric or globular..... ***Camissonia***

CAMISSONIA Sun Cup

- 1 Fertile stamens 4; petals 1-1.5 mm long; style $\pm$ 1.5 mm long..... ***C. exilis***
- 1 Fertile stamens generally 8; petals 1.5-20 mm long; styles 2.2 mm long or longer
 - 2 Fruit sessile or nearly so
 - 3 Flowers white, rarely pale yellow, or very soon turning pinkish-red to red
 - 4 Stigmas well elevated above the anthers
 - 5 Petals soon turning pinkish-red to red ***C. utahense***
 - 5 Petals not turning
 - 5 Fruit thicker at the base, tapering to the apex ***C. boothii***
 - 5 Fruit about the same thickness throughout ***C. refracta***
 - 4 Stigmas surround by the anthers at flowering..... ***C. chamaenerioides***
 - 3 Flowers yellow
 - 6 Leaves subentire to minutely dentate; fruit coiled to $\pm$ straight, not reflexed
 - 7 Hairs all strigose (ours have not glandular hairs in the inflorescence); fruit strigose; sepals strigose ***C. pallida***
 - 7 Hairs strigose with a few longer spreading hairs; fruit glandular; sepals glandular with a few long hairs..... ***C. confusa***
 - 6 Leaves runcinate; fruit reflexed ***C. californica***
 - 2 Fruit on well developed pedicels, in one they are almost as wide as the fruit and often quite short
 - 8 Hypanthium 18-40 mm long..... ***C. arenaria***
 - 8 Hypanthium 1-8 mm long
 - 9 At flowering, stigma surrounded by one or both rows of anthers; petals yellowish
 - 10 Leaves entire distributed well up the stem; seeds winged and covered with dense papillate hairs ***C. pterosperma***
 - 10 Leaves pinnate or often bipinnate, mostly in a basal rosette; seeds not as above..... ***C. specuicola***
 - 9 At flowering, stigma elevated well above the anthers, not always in *C. claviformis*
 - 11 Flowers white..... ***C. claviformis***
 - 11 Flowers usually bright yellow
 - 12 Pedicels obviously long
 - 13 Anthers 0.9-1.2 mm long; capsule 4-10 mm long; leaves appearing simple..... ***C. parryi***
 - 13 Anthers 1.5-4 mm long; capsule 10-50 mm long..... ***C. multijuga***
 - 12 Pedicels not real obvious
 - 14 Sepals villous or strigose, 5-9 mm long; stamens subequal ***C. brevipes***
 - 14 Sepals glandular, 9-12 mm long ***C. confertiflora***

Camissonia arenaria (A. Nels.) Raven

FORTUNA RANGE PRIMROSE Crevices in $\pm$ vertical walls, below 3400 ft. Mar-May. Kaiser Spring Wash 12 0271 657E 38 28 799N Clifton 39308, Interstate 40 11 0767 020E 38 97 224N Clifton 39435.

Camissonia boothii (Dougl.) Raven

var. ***condensata*** (Munz) Cronq.

TIGHT-FLOWERED PRIMROSE. (Mid Jan) Alamo Crossing Road 11 0771 504E 38 54 741N Clifton 38708, Topock Marsh 11 0727 170E 38 58 887N Clifton 38763, Lizard Wash 268 384E 40 91 796N Clifton 42250. [ssp. c. (Munz) Raven].

***Camissonia brevipes* (A. Gray) Raven**

- a Stems and petioles glabrous var. ***glabrata***
- a Stems and petioles hairy
 - b Stems usually not branched above, villous; sepals villous var. ***brevipes***
 - b Stems usually branched above, strigose; sepals strigose..... var. ***pallidula***

var. *brevipes*

DESERT PRIMROSE. Jan-May. The plant from Topock Marsh have the hairs on the sepals long villose to short and a lot of them glandular, which make several of the varieties suspect Plants from Alamo Road has some of them just glandular pubescent. Topock Marsh 11 0727 170E 38 58 887N Clifton 38762, Willow Beach Road 11 0715 423E 39 71 649N Clifton 38770, McCracken Mine Road 12 0247 670E 38 16 129N. Clifton 38823, Alamo Road 12 0257 063E 37 98 762N Clifton 38874, Lizard Wash 268 384E 40 91 796N.

var. *glabrata* G. Clifton var. nov.

GLABROUS-STEMMED DESERT PRIMROSE. Fivemile Wash 11 0731 105E 38 54 265N Clifton 39196, Lake Havasu 11 0739 808E 38 27 170N.

var. *pallidula* (Munz) G. Clifton Comb. nov.

PALE DESERT PRIMROSE. Aubrey Hills 11 0761 428E 38 04 646N Clifton 38931.

***Camissonia californica* (T. & G) Raven**

CALIFORNIA PRIMROSE. Gravel-sand among desert shrubs, rocky slopes, below 4500 ft. Feb-Jun. McCracken Mine Road 12 0247 670E 38 16 129N. Clifton 38810, Cane Spring Wash 12 0259 967E 38 66 431N, Grand Wash Cliffs 12 0239 740E 39 42 007N, Borianna Canyon 12 0230 797E 38 67 305N.

***Camissonia chamaenerioides* (A. Gray) Raven**

WILLOW-HERB PRIMROSE. Frees Wash 12 0236 563E 38 93 487N Clifton 39250.

Camissonia claviformis* (Torr. & Frém.) Raven*var. *aurantiaca* (S. Wats.) Cronq.**

HAIRY CLAVATE-FRUITED PRIMROSE. The lectotype came from Fort Mojave. Jan-Apr. Signal Road 12 0255 282E 38 18 063N Clifton 38841, Signal Road 12 0258 680E 38 17 847N Clifton 38962, Cane Spring Wash 12 0259 967E 38 66 431N . [ssp. *a.* (S. Wats.) Raven].

***Camissonia confertiflora* (Raven) Raven**

GRAND CANYON PRIMROSE The type came from Vulcan's Throne, Toroweap Valley

***Camissonia confusa* Raven**

SAN BERNARDINO SUNCUP. Borianna Canyon 12 0230 797E 38 67 305N Clifton 39343, Six Mile Crossing 12 0284 168E 38 26 800N Clifton 39469, Blake Ranch Road 12 0243 361E 38 85 317N . [*Oenothera micrantha* Hornem., *Sphaerostigma pallidum* Abrams, all misapplied].

***Camissonia exilis* (Raven) Raven**

COTTONWOOD SPRINGS PRIMROSE. Found in calcareous sand and on gypseous clay flats, 3000-4000 ft. The type came from Cottonwood Springs, east base of Virgin Mountains. May-June.

***Camissonia multijuga* (S. Wats.) Raven**

FROST-STEM PRIMROSE. Beaver Dam Mountains 12 0250 764E 40 95 790N Clifton 42237.

***Camissonia pallida* (Abrams) Raven**

PALLID PRIMROSE. Found in sand or gravelly places, below 3500 ft. Jan-May. Alamo Road 12 0241 952E 38 32 750N Clifton 38719, Cook Canyon 11 0764 691E 38 98 322N Clifton 39234, Grand Wash Cliffs 12 0239 740E 39 42 007N, Borianna Canyon 12 0231 373E 38 66 921N Clifton 39348. [*Sphaerostigma pallidum* Abrams].

***Camissonia parryi* (S. Wats.) Raven**

PARRY'S PRIMROSE. Red clay and sand slopes weathered from red sandstone cliffs, gypsum barrens, 2700-4000 ft. The plants that grow in the fall are somewhat different the ones that grow in the spring. May-June (-Sept.). Beaver Dam Mountains 12 0250 760E 40 95 798N Clifton 41674, Quail Canyon 12 0270 519E 40 79 611N, Mt. Trumbull Loop Road 272 329E 40 88 910N Clifton 42255.

***Camissonia pterosperma* (S. Wats.) Raven**

WING-FRUITED PRIMROSE. Limited to northern part of the county.

***Camissonia refracta* (S. Wats.) Raven**

DEFLEXED-FRUITED PRIMROSE. Mid Jan- Willow Beach Road 11 0715 423E 39 71 649N Clifton 38769.

Camissonia specuicola* (Raven) Raven*var. *hesperia* (Raven) Raven**

COLORADO RIVER PRIMROSE. Washes and dry streambeds, often on limestone, 2300-3500 ft. April-June. Separation

Canyon to Spencer Canyon.

Camissonia utahense (Small) G. Clifton comb. nov.

BRIGHT-FLOWEDED PRIMROSE. The plants that represent this taxon are so markedly different from the *boothii* complex that this author is ranking them on the species level. The flowers very early turn reddish. These plants were apparently very confusing to Raven when he worked with this group of plants. He made them conspecific with subspecies *alyssoides* of the *boothii* complex. The early name for this taxon was *Oenothera boothii* var. *villosa* S. Wats. , however just what plants from where represents this taxon seems to be a matter of opinion. So this author choose to use one that seem to be more valid then the original, indifference to the rules as set for by academia. The fruit is larger than other parts of its range. Mt. Trumbull 12 0309 464E 40 28 057N Clifton 41738.

EPILOBIUM Willow-herb

Epilobium ciliatum Raf.

CILIATE or NORTHERN WILLOW-HERB. Seeps, streambanks, and meadows. These plants are extremely variable as to hairiness. July-Oct. Knight Creek Spring 12 0276 097E 38 89 514N Clifton 41408.

GAURA

- 1 Petals no more than 3 mm long; plants with a long single stem, inflorescence generally branched ***G. mollis***
- 1 Petals 4-6 mm long
 - 2 Stems, erect; lower leaves ± entire; fruit not transversely wrinkled below ***G. coccinea***
 - 2 Stems widely spreading from the base; lower leaves sinuate-dentate; fruit transversely wrinkled below ***G. gracilis***

Gaura coccinea Pursh

- 1 Anthers 4-5 mm long, the dominate part of the flower; style pubescent at base densely hairy..... var. ***arizonica***
- 1 Anthers 3-4 mm long, not the dominate part of the flower; style glabrous at base; petals soon becoming very pale scarlet; plants only slightly hairy var. ***coccinea***

var. ***arizonica*** Munz

ARIZONA SCARLET GAURA. Dry, open places, below 5700 ft. The flowers are white drying scarlet. Apr-Jul. Cook Canyon 11 0766 764E 38 97 172N Clifton 39436.

var. ***coccinea***

PALE GAURA. White Hills 11 0746 684E 39 62 390N Clifton 39707, D-W Ranch Road 12 0235 287E 38 98 266N Clifton 39792.

var. ***epilobioides*** (Kunth) Munz

Wolf Hole Valley 12 0272 500E 40 70 480N Clifton 42291

Gaura gracilis Woot. & Standl.

HARLEQUIN-BUSH. Fort Rock Exit 12 0284 685E 38 96 409N Clifton 40750. [*G. hexandra* Ortega ssp. *g.* (Woot. & Standl.) Raven].

Gaura mollis James

VELVET WEED. Fort Rock Exit 12 0285 673E 38 96 588N Clifton 40760. [*G. parviflora* Dougl.].

OENOTHERA Evening Primrose

Note: The group of plants that are composed of *O. californica*, *O. deltooides*, and *O. pallida* are a very diverse group, often with the characters that separate them are sometimes found on the same plant. There are trends throughout there range, but often many of them don't fit any of the named taxa.

- 1 Flowers white, fading pink
 - 2 Plants acaulescent; fruit and flowers clustered in the basal leaves; fruit with tuberculate ridges
 - 3 Petals 2-5 cm long; leaves not red dotted; plants perennial; stye above the anthers, pollinated at night ***O. caespitosa***
 - 3 Petals 1-2 cm long; leaves red dotted; plants annual; style among the anthers ***O. cavernae***
 - 2 Plants caulescent, if sometimes appearing acaulescent, than fruit lacking ridges of tubercles
 - 4 Floral tube white-beared at the mouth ***O. coronopifolia***
 - 4 Floral tube not white-beared

- 5 Sepals with 2 kinds of hair, short and appressed, long and spreading *O. californica*
- 5 Sepals generally with one kind of hair or glabrous
 - 6 Mature fruit $\pm$ erect, not ever curled; 2 rows of seed in each locule; stems not exfoliating *O. albicaulis*
 - 6 Mature fruit spreading may be curved upward; 1 row of seed in each locule; stems eventually exfoliating
 - 7 Plants tap-rooted, not colonial; fruit straight to slightly curved *O. deltoides*
 - 7 Plants rhizomatous, colonial; fruit generally contorted *O. pallida*
- 1 Flowers yellow
 - 8 Plants tall 4-30 dm tall
 - 9 Floral tub 2.5-5 cm long *O. elata*
 - 9 Floral tub 6-13 cm long *O. longissima*
 - 8 Plants acaulescent or up to 3 dm tall *O. primiveris*

Oenothera albicaulis Pursh

WHITE-STEMMED EVENING-PRIMROSE. Truxton 12 0269 780E 39 29 790N Clifton 39724, Cedar Wash 12 0244 470E 38 77 739N.

Oenothera caespitosa Nutt.

- a Floral tube generally 7-14 or more mm long; petals turning pink in age (seldom darker) var. *marginata*
- a Floral tube generally 3.5-7 mm long; petals turning very dark in age var. *crinita*

var. *crinita* (Rydb.) Munz

SMALL FLOWERED FRAGRANT EVENING PRIMROSE. Wolf Hole Pass 12 0273 110E 40 69 000N Clifton 42295

var. *marginata* (H. & A.) Cronq.

FRAGRANT EVENING PRIMROSE. Openings in brush in sand, along roads, above 3300 ft. This is a very polymorphic group of plants with a number of named varieties. Some plants don't fit any of the named varieties. Some of the plants from Big Wash Road approach variety *macroglottis* (Rydb.) Cronq. which don't come this far west. Mid Feb-July. Clack Canyon 11 0767 369E 38 99 398N Clifton 38854, Big Wash Road 11 0755 962E 39 27 976N Clifton 39655, Mt. Trumbull Loop Road 12 0270 556E 40 79 460N. [ssp. *m.* (H. & A.) Munz].

Oenothera californica (S. Wats.) S. Wats.

CALIFORNIA EVENING PRIMROSE. Route 66 12 0239 057E 39 16 697N Clifton 39259

Oenothera cavernae Munz

RED-SPOTTED EVENING-PRIMROSE. Detrital Valley 728 355E 39 79 515N Clifton 43449

Oenothera coronopifolia T. & G.

HAIRY-THROATED EVENING-PRIMROSE. Little Tanks 12 0285 990E 40 46 059N Clifton 42314.

Oenothera deltoides Torr. & Frém.

- a Sepals appressed lly glabrous, except the calyx is merely strigose var. *decumbens*
- a Sepals very hairy var. *deltoides*

var. *arizonica* Munz

ARIZONA EVENING-PRIMROSE. Oatman Road 11 0734 039E 38 61 610N Clifton 39189, Cerbat Mountains 11 0758 586E 39 23 050N Clifton 39663. [*O. a.* (Munz) W. L. Wagner].

var. *decumbens* (S. Wats.) Munz

DEVIL'S LANTERN. These plants are extremely variable and incorporate the description of the species and variety *decumbens*. They even have the calyx and some of the lower leaves glabrous, which is not in the description of this taxon. Mar-Apr. Lake Havasu 11 0740 464E 38 27 009N Clifton 39281. [var. *decumbens* (S. Wats.) Munz].

Oenothera elata Kunth

var. *hirsutissima* (S. Wats.) Cronq.

HAIRY EVENING-PRIMROSE. moist places, roadside ditches. June-Oct. Branch of Knight Creek 12 0277 332E 38 90 684N Clifton 18833. [*O. hookeri* T. & G. ssp. *angustifolia* (Gates) Munz,

Oenothera flava (A. Nels.) Garrett

LONG TUBED EVENING-PRIMROSE. Wolf Hole Valley 12 0272 500E 40 70 480N Clifton 42290

Oenothera longissima Rydb.

LONG-TUBBED EVENING-PRIMROSE.

Oenothera pallida Lindl.

- a Leaves glabrous or appearing so var. *pallida*
- a Leaves $\pm$ densely strigose or strigose-puberulent var. *runcinata*

var. ***pallida***

PALLID EVENING-PRIMROSE. Sandy places. Highway 389 12 0361 776E 40 88 757N Clifton 41160.

var. ***runcinata*** (Engelm.) Cronq.

RYDBERG'S EVENING-PRIMROSE.

Oenothera primiveris A. Gray

a Petals 6-25 mm long; style below the anthers; plants generally acaulescent var. ***primiveris***

a Petals 29-40 mm long; style above the anthers; plants often with a stem up to 3 dm tall var. ***bufonis***

var. ***bufonis*** (M. E. Jones) Cronq.

WESTERN YELLOW-FLOWERED DESERT EVENING-PRIMROSE.

var. ***primiveris*** A. Gray

YELLOW-FLOWERED DESERT EVENING-PRIMROSE. Alamo Road 11 0771 504E 38 54 741N Clifton 38710, Cane Spring Wash 12 0259 967E 38 66 431N.

ZAUSCHNERIA nom. conserv. Fuchsia***Zauschneria californica*** Presl.var. ***latifolia*** (Hook.) G. Clifton

BROAD-LEAVED FUCHSIA. Rocky slopes. This has been made a part of the genus *Epilobium* but is a very disconcerting feature in that genus. Aug.-Sept. [*Epilobium canum* (E. Greene) Raven ssp. *l.* (Hook.) Raven].

OROBANCHACEAE Broomrape Family**OROBANCHE** Broom-rape

Note: A number of species in this group of plants is in an absolute mess. Workers have played around for years and it is still a mess. There are plants in North Dakota that are said to be *O. ludoviciana* which don't even begin to look like the plants that grow in ne California. The ones in ne California look like the real plants. However the plants in ne California fit the description of *O. parishii*, which doesn't even get close to that area. One worker has made *O. multicaulis* a var. of *O. ludoviciana*, which is doubtful.

- 1 Flowers with each subtended by a pair of bracts; pedicels short
 - 2 Lobes of the flowers dark purple at least on inner surface, generally of the desert ***O. cooperi***
 - 2 Lobes of the flowers light purple, generally well above the desert ***O. ludoviciana***
- 1 Flowers not subtended by a pair of bracts; pedicels long
 - 3 Pedicels usually more than 3, longest usually shorter than the longest part of the stem; stems usually over 4 mm thick ***O. fasciculata***
 - 3 Pedicels simple or if more, than stems short and less than 4 mm thick; longest pedicel much longer than the stem ***O. uniflora***

Orobanche cooperi (A. Gray) A. Heller

COOPER'S BROOM-RAPE. The flowers on the plants from Beaver Dam area have the bottom lobes narrow and curved and narrower when pressed. Feb-May. Aubrey Hills 11 0762 507E 38 05 171N Clifton 38926, Beaver Dam Mountains 12 0241 676E 40 94 241N Clifton 42219.

Orobanche ludoviciana Nutt.

MIXED-UP BROOM-RAPE. July-Sept.

Orobanche fasciculata Nutt.

CLUSTERED BROOM-RAPE. April-July. Cerbat Mountains 11 0757 350E 39 26 207N Clifton 42188.

Orobanche uniflora L.

NAKED BROOM-RAPE.

PAPAVERACEAE Poppy Family

- 1 Plants spiny..... *Argemone*
- 1 Plants lacking spines
 - 2 Hairs 5-15 mm long.....*Arctomecon*
 - 2 Hairs, if present, shorter than 5 mm
 - 3 Flowers irregular..... *Corydalis*
 - 3 Flower regular
 - 4 Leaves entire..... *Platystemon*
 - 4 Leaves dissected *Eschscholzia*

ARCTOMECON

- 1 Petals 6, yellow.....*A. californica*
- 1 Petals 4, white..... *A. humilis*

Arctomecon californica Torr. & Frém.

LAS VEGAS BEAR-POPPY. Mostly on barren (gypseous) clay, Detrital Valley 11 0727 400E 39 78 292N Clifton 39691.

Arctomecon humilis Cov.

DWARF BEAR-POPPY.

ARGEMONE Prickly Poppy

- 1 Spines on the upper stem, thin, more numerous, none of the filaments of the stamens winged*A. munita*
- 1 Spines on the upper stem coarse, less numerous, some of the filament of the stamens winged.....*A. pleiacantha*

Argemone corymbosa E. Greene

Argemone munita Dur. & Hilg.

var. *argentea* (G. Ownbey) Shinn.

SILVERY PRICKLY POPPY. Highway 95 11 0763 339E 38 03 158N Clifton 38989.

var. *rotundata* (Rydb.) Shinn.

PRICKLY-HORNED PRICKLY POPPY. , dry rocky or sandy slopes or flats. Mid Feb-July-Sept. Flag Mine Road 12 0238 200E 38 84 533N Clifton 40942.

Argemone pleiacantha E. Greene

WHITE PRICKLY-POPPY. Hackberry 12 0252 457E 38 18 168N Clifton 39756, Cedar Wash 12 0244 470E 38 77 739N.

ESCHSCHOLZIA Poppy

- 1 Receptacle with 2 distinct rims, the inner erect and hyaline, the outer spreading, it 0.5 or longer.....*E. californica*
- 1 Receptacle with a single rim, it up to 0.03 mm
 - 2 Leaves usually basal *E. glyptosperma*
 - 2 Leaves basal and cauline..... *E. minutiflora*

Eschscholzia californica Cham.

CALIFORNIA POPPY. Grassy to rocky open places, road banks. Our plants are annual with entire cotyledons and have been called *E. mexicana* E. Greene. Feb-July. McCracken Mine Road 12 0247 670E 38 16 129N. Clifton 38808, Cedar Wash 12 0244 470E 38 77 739N Clifton 39811.

Eschscholzia glyptosperma E. Greene

MOJAVE POPPY. Late Dec-Mar. Willow Beach Road 11 0715 423E 39 71 649N Clifton 38768, Oatman Road 723 554E 38 72 328N.

Eschscholzia minutiflora S. Wats.

PYGMY POPPY. Late Jan-May. Groom Spring Wash 12 0259 396E 38 19 143N Clifton 38843, Grand Wash Cliffs 12 0239 740E 39 42 007N.

PLATYSTEMON

Platystemon californicus Benth.
CREAM CUPS.

PHRYMACEAE Lopseed Family

Note: They are putting these plants into this family, however the fruit of the Lopseed Family is not like the fruit of these plants.
Most likely these plants belong in there own family.

MIMETANTHE

Mimetanthe pilosus (Benth.) E. Greene

DOWNY MIMETANTHE. Camp Levi 10 0235 515E 38 86 619N Clifton 40731. [*Mimulus p.* (Benth.) S. Wats.]

MIMULUS Monkeyflower

- 1 Corolla over 30 mm long ***M. cardinalis***
- 1 Corolla under 30 mm long
 - 2 Corolla slightly exserted beyond the calyx
 - 3 The leaves shorter than the internodes and the pedicels; calyx lobes ciliate ***M. rubellus***
 - 3 The leaves most often longer than the internodes and the pedicels; calyx lobes eciliate ***M. suksdorfii***
 - 2 Corolla quite a bit longer than the calyx
 - 4 Pedicels longer than the calyx
 - 5 Plants perennial, corolla very large ***M. guttatus***
 - 5 Plants annual, corolla small ***M. nasutus***
 - 4 Pedicels shorter than the calyx
 - 6 Corolla usually yellow; stigma lips usually not ciliate ***M. parryi***
 - 6 Corolla usually magenta to violet; stigma lips usually ciliate ***M. bigelovii***

Mimulus bigelovii A. Gray

YELLOW-THROATED MONKEY-FLOWER. Signal Road 12 0259 786E 38 19 143N Clifton 38845.

Mimulus cardinalis Benth.

SCARLET MONKEY-FLOWER. stream banks and seeps. Late Feb-Oct. Shaffer Spring 11 0741 229E 38 80 339N Clifton 39182.

Mimulus guttatus DC.

COMMON MONKEY-FLOWER. April-Aug. Old Trails Road 11 0767 917E 38 95 755N Clifton 38643, Knight Creek 12 0276 558E 38 89 296N.

Mimulus nasutus E. Greene

SMALL-FLOWERED COMMON MONKEY-FLOWER. Shaffer Spring 11 0741 229E 38 80 339N Clifton 39180.

Mimulus parryi A. Gray

ANNUAL REDSPOT MONKEY-FLOWER. Limited to the Virgin River area. Mt. Trumbull Loop Road 12 0270 317E 40 80 364N Clifton 42269

Mimulus rubellus A. Gray

CILIOLATE-TOOTHED or LITTLE RED-STEMMED MONKEY-FLOWER. Early March-early July. Hualapai Mountain Road 12 0233 963E 38 91 870N Clifton 39362, Packsaddle Campground 11 0756 941E 39 26 761N Clifton 39667, Camp Levi 10 0235 515E 38 86 619N Clifton 40730.

Mimulus spissus A. L. Grant

COMPACT MONKEY-FLOWER. Apr-Jun, Sep-Oct. Mt. Trumbull 12 0309 464E 40 28 057N Clifton 41737.

Mimulus suksdorfii A. Gray

SUKSDORF'S or MINIATURE MONKEY-FLOWER. North of Beaver Dam. May-Aug.

PLANTAGINACEAE Plantain Family

PLANTAGO Plantain

- 2 Bracts linear, some visible in the inflorescence ***P. patagonica***
- 2 Bracts ovate, hidden in the inflorescence ***P. ovata***

***Plantago lanceolata* L.**

ENGLISH PLANTAIN. Kingman 11 0770 479E 39 00 899N Clifton 26228.

***Plantago major* L.**

COMMON PLANTAIN. waste places and native habitats that are moist; introduced from Europe. May-Sept. Knight Creek Spring 12 0275 984E 38 89 527N Clifton 39907.

***Plantago ovata* Forsskal**

MEDITERRANEAN PLANTAIN. At one time our plants were thought to be native; early introduction from the Mediterranean? Sometimes these plants are very woolly. Mid Dec-Mar. Warm Springs Wash 11 0730 605E 38 47 811N Clifton 38758, Cane Spring Wash 12 0259 967E 38 66 431N, Temple Bar Road 11 0721 540E 39 66 743N Clifton 39672. [*P. insularis* Eastw. including var. *fastigiata* (Morris) Jeps.]

***Plantago patagonica* Jacq.**

SOUTHERN PLANTAIN. Mid Feb-May. Clack Canyon 11 0767 301E 38 99 370N Clifton 38885, Cane Spring Wash 12 0259 967E 38 66 431N. [*P. parishii* Roemer & Shultes var. *oblonga* (Morris) Shinn.]

PLATANACEAE Plane-tree Family**PLATANUS*****Platanus wrightii* S. Wats.**

ARIZONA SYCAMORE. Six Mile Crossing 12 0284 223E 38 26 817N Clifton 39471.

POLEMONIACEAE Polemonium or Phlox Family

- 1 Leaves bearing sparse, long bristles on margins and at apex of teeth
 - 2 Bristles all single; teeth of leaves very short; corolla somewhat irregular ***Loeseliastrium***
 - 2 Bristles branched on the lower margins and single on the coarsely dentate teeth above; corolla regular ***Langloisia***
- 1 Leaves not long bristly on the margins or teeth
 - 3 Leaves opposite
 - 4 Plants perennial ***Phlox***
 - 4 Plants annual ***Microsteris***
 - 3 Leaves mostly all alternate
 - 5 Flowers borne in dense, spiny-bracteate heads terminating the stem and branches ***Eriastrum***
 - 5 Flowers mostly cymose
 - 6 Plants annual
 - 7 Cauline leaves well developed, the terminal leaflet large than the lateral; sepal tips obtuse ***Allophyllum***
 - 7 Cauline leaves generally not well developed; sepal tips pointed ***Gilia***
 - 6 Plants biennial to short lived perennial ***Ipomopsis***

ALLOPHYLLUM***Allophyllum gilioides* (Benth.) A. & V. Grant**

DENSE-FLOWERED ALLOPHYLLUM. Borianna Canyon 12 0231 273E 38 67 484N Clifton 39346, Six Mile Crossing 12 0284 307E 38 26 860N Clifton 39458..

ERIASTRUM

- 1 The corolla somewhat irregular (ours light blue); filaments attached at bottom of throat or more down in the tube .. ***E. eremicum***
- 1 The corolla regular (ours white); filaments attached at top of throat ***E. diffusum***

***Eriastrum diffusum* (A. Gray) H. Mason**

DIFFUSE ERIASTRUM. Most of these plants have white petals and yellow throat. This and next sometimes growing together. Late Mar-May. Chicken Spring Road 12 0259 294E 38 42 566N Clifton 39295, Antler Mine 12 0228 566E 38 63 787N, Blake Ranch Road 12 0244 757E 38 94 453, Detrital Wash 11 0725 827E 39 78 841N Clifton 39686, Wolf Hole Pass 12 0274 576E 40 65 884N Clifton 42299.

***Eriastrum eremicum* (Jeps.) H. Mason**

DESERT ERIASTRUM. Mid Mar-June. Cook Canyon 11 0764 691E 38 98 322N Clifton 39233, Antler Mine 12 0228 566E 38

GILIA

Note: Many of these plants have not read the book to see what they are to look like. Most of these plants are self pollinated with many populations enough different to warrant names, if so inclined. Numerous plants will not fit present day names. One author lumped most of the *G. inconspicua* group into one species.

- 1 Plants bearing cobwebby hair, sometimes limited to leaf axils
- 2 Plants with cauline leaves clasping with an expanded base; lower stems glabrous and most often glaucous..... *G. sinuata*
- 2 Plants lacking the above combination
- 3 Calyx glabrous or cobwebby
- 4 Tube generally included..... *G. clokeyi*
- 4 Tube generally exerted
- 5 Calyx glabrous to slightly cobwebby; corolla-throat bright yellow*G. opthalmoides*
- 5 Calyx cobwebby; corolla-throat with the lower part pale yellow the upper part pale blue*G. flavocincta*
- 3 Calyx glandular
- 6 Lobes of basal leaves toothed on both sides
- 7 Corolla tube 2-4 times longer than the calyx, throat conic *G. cana* var. *speciformis*
- 7 Corolla tube less than 2 times longer than the calyx, throat cup-shaped..... *G. cana* var. *triceps*
- 6 Lobes of basal leaves linear, entire or toothed on one side
- 8 Leaf lobes less than 1 mm wide, ascending
- 9 Fruit 2 times longer than calyx; flower lobes lavender*G. minor*
- 9 Fruit about as long as calyx; flower lobes cream *G. pseudominor*
- 8 Leaf lobes 1-2 mm wide, spreading*G. transmontana*
- 1 Plants lacking cobwebby hairs, some have white bent hairs, some villose, sometimes almost cobwebby-like
- 10 Leaves linear; corolla yellow *G. filiformis*
- 10 Leaves broader or pinnatifid
- 11 The principal leaves sharp-toothed, holly-like..... *G. latifolia*
- 11 The principal leaves not sharp-toothed
- 12 Pollen white or yellow
- 13 Herbage below the inflorescence with white, sharply bent hairs*Gilia stellata*
- 13 Herbage below the inflorescence glandular-hairy
- 14 Leaves 1-2- pinnate, rachis linear*G. hutchinsifolia*
- 14 Leaves dentate to sinuate, nor truly pinnate
- 15 Corolla tube stout, only slightly exerted, if at all..... *G. subacaulis*
- 15 Corolla tube thread-like; well exerted
- 16 Corolla lobes ± single-toothed in center, throat broader than the tube *G. leptomeria*
- 16 Corolla lobes 3-toothed; throat narrower than the tube*G. triodon*
- 12 Pollen blue
- 17 Corolla tube long exerted *G. scopulorum*
- 17 Corolla tube not exerted..... *G. sp.*

Gilia aliquanta A. & V. Grant

var. ***breviloba*** (A. & V. Grant) G. Clifton Comb. nov.

LONG-TUBBED PUFF-CALYX GILIA. Oatman Road 12 0242 946E 39 21 375N Clifton 39263, Grapevine Spring Canyon
11 0764 907E 39 00 212N Clifton 39218.

Gilia cana (M. E. Jones) A. Heller

- a Corolla tube 2-4 times longer than the calyx, throat conic..... var. *speciformis*
a Corolla tube less than 2 times longer than the calyx, throat cup-shaped var. *triceps*

var. ***speciformis*** A. D. Grant & V. Grant
HANDSOME GILIA.

var. ***triceps*** (Brand) A. Grant & V. Grant
SAN BERNARDINO GILIA.

Gilia clokeyi H. Mason

CLOKEY'S GILIA. Limestone plains and slopes. Clay Springs Road 12 0237 916E 39 54 029N Clifton 39368, Branch of

Truxton Wash 12 0276 454E 39 21 109N Clifton 39740, Wolf Hole Valley 12 0274 576E 40 65 884N Clifton 42300.

Gilia filiformis A. Gray

THREAD-STEMMED GILIA. Petroglyph Wash 721 059E 39 93 362N Clifton 43455

Gilia flavocincta A. Nels.

var. ***australis*** (A. & V. Grant) G. Clifton Comb. nov.

LESSER YELLOW-THROATED GILIA. Kaiser Spring Wash 12 0271 746E 38 28 800N Clifton 39016, Alamo Road 12 0250 724E 38 06 479N Clifton 39166, Highway 93 12 0256 312E 38 72 685N Clifton 39285, Hualapai Mountain Road 12 0231 115E 38 94 305 Clifton 39356, Willows Ranch Road 12 0278 190E 38 96 433N Clifton 39858, Six Mile Crossing Road 12 0283 360E 38 28 493N Clifton 39449.

Gilia hutchinsifolia Rydb.

GREAT BASIN GILIA. Aubrey Hills 11 0762 507E 38 05 171N Clifton 38927.

Gilia latifolia S. Wats.

BROAD-LEAVED GILIA. Detrital Valley 728 355E 39 79 515N Clifton 43448

Gilia leptomeria A. Gray

GREAT BASIN GILIA. small sand dunes. May-June

Gilia minor A. & V. Grant

LITTLE GILIA. Grapevine Springs Wash 11 0765 036E 38 99 509N Clifton 38937.

Gilia ophthalmoides Brand

DESERT MOUNTAIN GILIA. Hualapai Mountain Road 12 0232 920E 38 92 666N Clifton 39365, Windy Point Campground 11 0758 016E 39 25 132N Clifton 39656, Truxton Wash 12 0272 344E 39 29 500N Clifton 39737, Cedar Wash 12 0244 470E 38 77 739N Clifton 39806.

Gilia pseudominor G. Clifton Sp. nov.

BOX CANYON GILIA. Box Canyon 12 0266 600E 38 32 054N Clifton 39819.

Gilia scopulorum M.E. Jones

ROCK GILIA. The plants that fit within this taxon are extremely polymorphic. Some plants have the glandular hair on the pedicels very short, while other have the hairs very long. Some plants have the corolla tube long and spindly, while others have it short. Some corollas have the throat broad, others narrow. Some have long corolla lobes, other short. Some have corolla lobe pale on the outer surface and bright on the inner surface, while others have inner and outer surface about the same pale color. Jumbo Wash 11 0711 823E 39 69 712N Clifton 38788, Aubrey Hills 11 0765 434E 38 01 112N Clifton 38913, White Hills 11 0746 684E 39 62 390N Clifton 39704.

Gilia sinuata Benth.

SINUATE GILIA. These plants are extremely variable as to leaf shape, not always with a well developed basal rosette. Alamo Road 11 0773 198E 38 50 541N Clifton 39157, Boriana Mine Road 11 0773 344E 38 62 240 Clifton 39334.

Gilia stellata A. Heller

STAR GILIA. McCracken Mine Road 12 0247 670E 38 16 129N. Clifton 38820, Grand Wash Cliffs 12 0239 740E 39 42 007N, Cedar Wash 12 0244 470E 38 77 739N Clifton 39807, Box Canyon 12 0266 600E 38 32 054N Clifton 39820.

Gilia subacaulis Rydb.

PINYON GILIA.

Gilia transmontana (H. Mason & A. Grant) A. & V. Grant

TRANSMONTANE GILIA. Blake Ranch Road 12 0253 735E 38 72 157N Clifton 39816.

Gilia triodon Eastw.

COYOTE GILIA. Mt. Trumbull Loop Road 12 0271 809E 40 77 515N Clifton 42275

Gilia sp. Aubrey Hills 11 0762 468E 38 04 744N Clifton 38993, Whole bunch of species on same sheet Box Canyon 12 0266 621E 38 31 961N Clifton 39297, Kaiser Spring Wash 12 0272 075E 38 29 067N Clifton 39317, Hualapai Mountain Road 12 0234 744E 38 90 131N Clifton 39361, Clack Canyon 11 0766 831E 38 99 353N Clifton 39403, Clack Canyon 11 0766 813E 38 99 433N Clifton 39404, 39405, Box Canyon 12 0266 600E 38 32 054N Clifton 39821 & 39822.

IPOMOPSIS

- 1 Plants annual..... ***I. polycladon***
- 1 Plants perennial
 - 2 Flowers blueish
 - 3 Tube and throat of corolla 10-15 mm long; plants divergent-branching from the base ***I. multiflora***
 - 3 Tube and throat of corolla 20-50 mm long; plant ascending-branching above..... ***I. longiflora***
 - 2 Flowers reddish
 - 4 Tube and throat of the corolla much longer than the lobes; styles and stamens exerted ***G. aggregata***
 - 4 Tube and throat of the corolla a hair longer than the lobes; styles and stamens included..... ***G. arizonica***

Ipomopsis aggregata (Pursh) V. Grant

There are a number of named varieties in this taxon as is the case with a number of species, no one seems to agree as to which is what.

var. ***formosissima*** (E. Greene) G. Clifton

SCARLET GILIA, SKY ROCKET. Nov. Hualapai Mountain Road 12 0234 721E 38 90 184N Clifton 38596. [*Gilia a.* (Pursh) V. Grant].

Ipomopsis arizonica (E. Greene) Wherry

ARIZONA SKY ROCKET. Mt. Trumbull Loop Road 12 0271 809E 40 77 515N Clifton 42279

Ipomopsis longiflora (Torr.) V. Grant

a Mature capsule longer than broad; petal limbs not more than 5 mm wide, apiculate at apex var. ***neomexicana***

a Mature capsule not much wider than long; petal limbs 7-9 mm wide, rounded at apex var. ***australis***

var. ***australis*** (Flecher & W. L. Wagner) G. Clifton Comb. nov.

NEW MEXICO IPOMOPSIS. Open sandy places, below 7000 ft. Mar-Aug. Mociac Ranch Cottam 4171, Highway 93 12 0256 312E 38 72 685N Clifton 39285, Blake Ranch Road 12 0244 757E 38 94 453.

var. ***neomexicana*** (Wilken) G. Clifton

NEW MEXICO IPOMOPSIS. Open sandy places, below 7000 ft. May-Oct. Highway 389 12 0361 776E 40 88 757N Clifton 41157.

Ipomopsis multiflora (Torr.) V. Grant

MANY-FLOWERED IPOMOPSIS. Camp Levi Levi Road 12 0235 570E 38 87 324N Clifton 41230. [*Gilia m.* Torr.].

Ipomopsis polycladon (Torr.) V. Grant

SPRAWLING IPOMOPSIS. Red Lake 11 0761 147E 39 52 062N Clifton 39717, Silver Springs Road 12 0267 069E 38 91 287N.

LANGLOISIA

1 Tube of flower narrow about 3 times longer than lobes, not spotted ***L. setosissima***

1 Tube of flower broad and about as long as the lobes; spotted ***L. punctata***

Langloisia punctata (Cov.) Goodd.

SPOTTED CALICO, LILAC SUNBONNET. This taxon has been made a subspecies of the next. However, in this area they are so different that in this treatment they are being left as distinct species. They grow close together in the NW. part of the county without any intergrading. Mid April-May. Lizard Point 268 384E 40 91 796N Clifton 42247

Langloisia setosissima (T. & G.) E. Greene

BRISTLY- CALICO. Mid Feb-May. Alamo Road 12 0230 086E 38 45 353N Clifton 38863, Beaver Dam Mountains 12 0250 764E 40 95 790N Clifton 42236.

LEPTODACTYLON***Leptodactylon pungens*** (Torr.) Nutt.

GRANITE PRICKLY PHLOX. Beaver Dam Mountains 12 0248 782E 40 96 646N Clifton 42225

LINANTHUS

1 Style exerted well beyond the anthers; corolla-tube with a ring of hairs on the inner and outer surface ***L. aureus***

1 Style below or only slightly exerted beyond the anthers

2 Corolla rolled up during the day, opening in evening and throughout the night

3 Corolla when rolled up not exerted much beyond the calyx ***L. bigelovii***

3 Corolla when rolled up long exerted beyond the calyx

4 Calyx slightly glandular; corolla after first pressed $\pm$ cream; stamens attached above middle of tube ***L. jonesii***

4 Calyx glabrous; corolla white; stamens attached below middle ***L. dichotomus***

2 Corolla open during the day ***L. demissus***

Linanthus aureus (Nutt.) E. Greene

a Corolla yellow var. ***aureus***

a Corolla cream-white, often with a dark throat, sometimes just yellow.....var. **decorus**

var. **aureus**

DESERT GOLD. Alamo Crossing Road 12 0246 406E 38 27 212N Clifton 38805, White Hills 11 0739 633E 39 64 631N.

var. **decorus** (A. Gray) Jeps.

MAROON-THROATED DESERT LINANTHUS. This author is not convinced that this is a variety of the preceding. Signal Road 12 0259 890E 38 19 979N Clifton 38957, Chicken Spring Road 12 0259 294E 38 42 566N Clifton 39296.

Linanthus bigelovii (A. Gray) E. Greene

BIGELOW'S LINANTHUS. Cook Canyon 11 0766 128E 38 97 270N Clifton 38976, Grapevine Canyon 12 0233 746E 39 75 700N, Clack Canyon 11 0766 813E 38 99 433N Clifton 39407.

Linanthus demissus (A. Gray) E. Greene

DESERT LINANTHUS. Signal Road 12 0259 890E 38 19 979N Clifton 38958, Oatman Road 11 0734 039E 38 61 610N Clifton 39187.

Linanthus dichotomous Benth.

EVENING SNOW. Alamo Road 11 0773 198E 38 50 541N Clifton 39158, Cook Canyon 11 0764 686E 38 98 402N Clifton 39232, Borianna Mine Road 11 0773 341E 38 62 366.

Linanthus jonesii (A. Gray) E. Greene

JONES'S LINANTHUS. Feb- Mar. Signal Road 12 0259 786E 38 19 143N Clifton 38844, Highway 95 11 0763 321E 38 03 543N Clifton 38985.

LOESELIASTRUM

Loeseliastrum schottii (Torr.) Timbrook

SCHOTT'S LOESELIASTRUM. These plants have regular or irregular corollas. Some have the style above the anthers and some have the style among the anthers. Aubrey Hills 11 0761 826E 38 04 893N Clifton 38921, Oatman Road 11 0734 039E 38 61 610N Clifton 39190, Alamo Road 11 0773 198E 38 50 541N Clifton 39156, Lake Havasu 11 0740 464E 38 27 009N Clifton 39280, Borianna Mine Road 11 0773 344E 38 62 240 Clifton 39333. [*Langloisia* s. Torr.) E. Greene]

MICROSTERIS

Microsteris gracilis (Hook.) E. Greene

FALSE PHLOX. Frequent, below 10100 ft.; dry, open places. There are trends in this taxon and in many areas it is quite consistent, but in many others it is not, so no varieties are recognized. Mid Feb-June. Clack Canyon 11 0767 373E 38 97 520N Clifton 38965.

PHLOX

- 1 Sepals and leaves ciliate only ***P. griseola***
- 1 Sepals and leaves not ciliate
 - 2 Calyx covered by dense cobwebby hairs ***P. hoodii***
 - 2 Calyx ± glabrous or glandular-hairy
 - 3 Calyx glandular-hairy; corolla bright pink, lobes ± notched at apex ***P. amabilis***
 - 3 Calyx ± glabrous; corolla lobes not notched
 - 4 Plants low growing, quite compact; internodes short; flowers ± sessile ***P. austromontana***
 - 4 Plants often taller, not compact; internodes long; flowers generally on pedicels
 - 5 Stem glandular; corolla tube 20-30 mm long; plants tufted ***P. stansburyi***
 - 5 Stems not glandular; corolla tube 10-18 mm long; plants more lax..... ***P. longifolia***

Phlox amabilis Brand

ARIZONA PHLOX. Truxton Wash 12 0272 344E 39 29 500N Clifton 39734.

Phlox austromontana Cov.

DESERT PHLOX. This taxon is quite variable as to flower size and the amount of pubescence. The named varieties are not consistent, numerous plants have characters of several of the named taxa. Branch of Truxton Wash 12 0277 253E 39 17 956N Clifton 39743, East Branch Tuckayou Wash 12 0280 857E 39 03 192N Clifton 39869, Mt. Trumbull Loop Road 12 0271 809E 40 77 515N Clifton 42274. [ssp. *vera* Wherry].

Phlox griseola Wherry

GRAY-LEAF PHLOX. Beaver Dam area

Phlox hoodii Richards

var. *canescens* (T. & G.) Peck

CANESCENT CARPET PHLOX. Dry, open places, above 4800 ft. April-June.

***Phlox longifolia* Nutt.**

LONG-LEAF PHLOX. The plants that are in the *longifolia* and *stansburyi* group often have overlapping characters depending on the area in which they are growing.

***Phlox stansburyi* (Torr.) A. Heller**

STANSBURY'S PHLOX. Dry, open, often rocky places, above 4400 ft. These plants don't look like the plants from the northern part of their range. They are not tufted and the corolla-tube is 40 mm long. Mid April-June. Clay Springs Road 12 0240 649E 39 57 282N Clifton 39376

POLYGALACEAE Milkwort Family

POLYGALA Milkwort

- 1 Plants a well developed shrub; flowers whitish or light yellowish-green with a purple-tipped keel.....***P. acanthoclada***
- 1 Plants suffrutescent; flowers light to darker purple with a yellow keel
 - 2 Plants weakly spinescent on young growth, becoming more so in age***P. subspinosa***
 - 2 Plants not spinescent.....***P. rusbyi***

***Polygala acanthoclada* A. Gray**

THORNY MILKWORT. Growing in Bacon Agate barrens, 2300-2700 ft. Apr-May. Six Mile Crossing Road 12 0282 515E 38 28 655N Clifton 39485.

***Polygala rusbyi* E. Greene**

RUSBY'S MILKWORT. Truxton 12 0269 780E 39 29 790N Clifton 39729,

***Polygala subspinosa* S. Wats.**

SPINY MILKWORT. Infrequent, below 6,000 ft.; desert scrub, gravelly openings in pinyon-juniper woodland. The plants at Wolf Hole have the flowers incorporating components of 3 species. On a single plant the keel petals are beaked to blunt and they all have thickened tissue on the end and bottom margins, but they are not notched. May-June. Wolf Hole 272 248E 40 71 969N Clifton 42289

POLYGONACEAE Buckwheat Family

- 1 Leaves without stipules; flowers subtended by an involucre
 - 2 Plants with flowers subtended by reddish foliaceous bracts, these enlarged in fruit; diffusely branched, sprawling, slender annual ***Pterostegia***
 - 2 Plants otherwise
 - 3 Inner surface of involucral bracts densely long woolly, these generally $\pm$ distinct ***Nemacaulis***
 - 3 Inner surface of involucral bracts not densely long woolly, these connate for some distance
 - 4 Involucre toothed or lobed, these not spine or bristle tipped ***Eriogonum***
 - 4 Involucre lobed, these either with spines or hooked or straight bristles
 - 5 Bracts fused around the nodes ***Oxytheca***
 - 5 Bracts when present not fused around the nodes
 - 6 Involucre lacking evident wing-like structures that are spine tipped ***Chorizanthe***
 - 6 Involucre with 3 wing-like structures that are spine tipped ***Centrostegia***
 - 1 Leaves with evident stipular sheaths; flowers lacking a subtending involucre
 - 7 Plants a twining herb with sagittate leaves (*Polygonum*) ***Fallopia***
 - 7 Plants not twining; leaves acute, tapered, truncate, or rounded at base
 - 8 The outer perianth segments spreading or reflexed, staying small, the inner usually erect and $\pm$ enlarging in fruit, not petal-like ***Rumex***
 - 8 The outer and inner perianth segments about the same, petal-like
 - 9 Leaves normally 5-35 cm long..... (*Polygonum*) ***Persicaria***
 - 9 Leaves normally under 5 cm long..... ***Polygonum***

CENTROSTEGIA

***Centrostegia thurberi* Benth.**

THURBER'S SPINE-FLOWER. Oatman Road 12 0239 057E 39 16 697N Clifton 39260, Box Canyon 12 0266 621E 38 31

961N Clifton 39298, Blake Ranch Road 12 0244 757E 38 94 453, D-W Ranch Road 12 0235 287E 38 98 266N. [*Chorizanthe* t. (Benth.) S. Wats.

CHORIZANTHE Spineflower

- 1 Flowers clustered in the axiles of long pedunculate leaves; leaves not reduced *C. rigida*
- 1 Flowers not clustered, leaves all basal, reduced up the stem
 - 2 Involucre below the lobes wrinkled *C. corrugata*
 - 2 Involucre below the lobes smooth
 - 3 Lobes of the involucre $\pm$ uniform in size *C. brevicornu* var. *brevicornu*
 - 3 Lobes of the involucre with one greatly enlarged *C. watsonii*

Chorizanthe brevicornu Torr.

BRITTLE SPINE-FLOWER. The involucre can be glabrous to quite hairy, sometimes on the same plant. Aubrey Hills 11 0765 434E 38 01 112N Clifton 38913, Grand Wash Cliffs 12 0239 740E 39 42 007N, Box Canyon 12 0266 621E 38 31 961N.

Chorizanthe corrugata (Torr.) T. & G.)

WRINKLED SPIN-FLOWER. Aubrey Hills 11 0756 837E 38 10 948.

Chorizanthe rigida (Torr.) T. & G.

RIGID SPINE-FLOWER. Aubrey Hills 11 0761 826E 38 04 893N Clifton 38920.

Chorizanthe watsonii T. & G.

WATSON'S SPINE-FLOWER. Infrequent; usually in the lower pinyon belt, openings in shrubs on gravel. D-W Ranch Road 12 0235 287E 38 98 266N Clifton 39791.

ERIOGONUM Buckwheat

- 1 Plants annual or weakly biennial
- 2 Stems bearing some well developed leaves
 - 3 Involucre sessile or subsessile
 - 4 Plants bearing leaves below the inflorescence; perianth glabrous *E. polycladon*
 - 4 Plants bearing leaves throughout; outer perianth segments inflated-like on each side of the center, hairy below and ciliate at the apex *E. darrovii*
 - 3 Involucre on long peduncles
 - 5 Outer perianth segments not pouched in age, glandular-puberulent *E. maculatum*
 - 5 Outer perianth segments pouched in age, glabrous *E. pharnaceoides*
- 2 Stems generally lacking well developed leaves
 - 6 Perianth hairy, glandular or not
 - 7 Outer perianth lobes appear inflated on the lower margins (saccate) *E. thomasii*
 - 7 Outer perianth lobes not inflated on the lower margins
 - 8 Perianth minutely or obviously glandular
 - 9 Involucre glabrous, may be ciliate *E. reniforme*
 - 9 Involucre glandular
 - 10 Perianth white to reddish, $\pm$ hair-tufted inside, outer segments fan-shaped *E. thurberi*
 - 10 Perianth yellow becoming $\pm$ reddish, lacking tufts of hair on the inside, outer segments not fan-shaped *E. pusillum*
 - 8 Perianth lacking glands
 - 11 Perianth 2-2.5 mm long; involucre 1-1.5 mm long, generally 5-lobed *E. inflatum*
 - 11 Perianth 1-1.5 mm long; involucre $\pm$ 1 mm long, generally 4-lobed *E. trichopes*
- 6 Perianth lacking hairs or glands
 - 12 Involucre cylindric or cylindric-turbinate, angled or ribbed, appressed to the inflorescence branches
 - 13 Involucre 3-5 mm long *E. davidsonii*
 - 13 Involucre 1-1.5 mm long
 - 14 Branches of inflorescence generally incurved in age, perianth yellow to red *E. nudularium*
 - 14 Branches of inflorescence generally out-curved, perianth white to pale pink or yellowish *E. palmerianum*
 - 12 Involucre campanulate to turbinate, not angled or ribbed, spreading
 - 15 Outer perianth segments contracted on each side, fiddle-shaped, crisped *E. cernuum*
 - 15 Outer perianth segments not as above
 - 16 Plants glandular pubescent except for the leaves and perianth segments *E. brachypodum*
 - 16 Plants glabrous, or with a few glandular hair in some or all the axils of the inflorescence
 - 17 Perianth yellow to reddish-yellow; involucre hemispheric *E. hookeri*

- 17 Perianth white; involucre turbinate
 - 18 Involucre deflexed *E. deflexum*
 - 18 Involucre erect *E. insigne*
- 1 Plants perennial
 - 19 Perianth hairy on the outer surface
 - 20 Perianth whitish to pinkish; shrub *E. fasciculatum*
 - 20 Perianth yellow; herbaceous
 - 21 Lower surface of leaves tomentose; involucre 4-7 mm long; perianth 4-6 mm long *E. jamesii*
 - 21 Lower surface hirsute to glabrous; involucre 1-1.5 mm long; perianth 2-2.5 mm long *E. inflatum*
 - 19 Perianth mostly glabrous on the outer surface
 - 22 Involucres on long capillary peduncles; leaves cordate *E. capillare*
 - 22 Involucres not on long capillary peduncles; leaves not cordate
 - 23 Inflorescence capitate at the end of an unbranched scape *E. ovalifolium*
 - 23 Inflorescence otherwise
 - 25 Inflorescence umbellate, umbel subtended by leaf-like bracts *E. umbellatum*
 - 25 Inflorescence otherwise
 - 26 Plants completely glabrous or leaves strigose on one or both surfaces
 - 27 Plants completely glabrous; a shrub *E. mortonianum*
 - 27 Plants with the leaves strigose on one or both surfaces; plants not shrubby *E. alatum*
 - 26 Plants with at least the lower surface of the leaves tomentose
 - 28 Lobes of the involucre winged-margined, these margins overlapping each other
 - 29 The leaves undulate crisped, only several times longer than wide, stems brown tomentose *E. corymbosum*
 - 29 The leaves not crisped, many times longer than wide; stems not brown tomentose
 - 30 Base of stem densely tomentose; perianth about 4 mm long, not constricted *E. brevicaulis*
 - 30 Base of stem glabrous; perianth about 3 mm long constricted causing the apex of the segments to curl out *E. confusum*
 - 28 Lobes of the involucre lacking wings
 - 31 Plants scapose (may have a few small leaves at some of the upper nodes), not real woody at base (if questionable follow both leads)
 - 32 Perianth red; stems swollen below the first branch of the inflorescence *E. zionis*
 - 32 Perianth white or yellow; stems not swollen
 - 33 Involucres racemose arranged *E. racemosum*
 - 33 Involucres cymose arranged
 - 34 Perianth generally white; inflorescence a compound cyme *E. jonesii*
 - 34 Perianth generally yellowish; inflorescence branches typically in three's *E. thomsoniae*
 - 31 Plants caulescent ($\pm$ subscapose in 2); woody $\pm$ throughout or only at the base
 - 35 Plants woody at the base, subscapose
 - 36 Perianth generally white; inflorescence a compound cyme *E. jonesii*
 - 36 Perianth generally yellowish; inflorescence branches typically in three's *E. thomsoniae*
 - 35 Plants otherwise
 - 37 Inflorescence branches angled or ribbed and $\pm$ grooved; inflorescence rigid, divaricate $\pm$ weakly spinescent *E. hermanii*
 - 37 Stems $\pm$ terete; inflorescence various
 - 38 Plants forming a narrow column because of the inter woven inflorescence branches; leaves well up the stem *E. plumatella*
 - 38 Plants otherwise
 - 39 Involucres in a raceme arranged; stems woody toward base only
 - 40 Involucres appressed to the branchlets, the teeth not scarious-margined *E. wrightii*
 - 40 Involucres divergent, the teeth narrowly scarious-margined *E. leptocladon*
 - 39 Involucres cymose
 - 41 Leaves oblong-lanceolate to broadly ovate, seldom less than 6 mm wide *E. corymbosum*
 - 41 Leaves linear to narrowly lanceolate, seldom more than 4 mm wide
 - 42 Involucre $\pm$ tomentose, epidermal cells quadrangular; anthers red; stems branching at the base with long leafy stems *E. microthecum*
 - 42 Involucre $\pm$ glabrous; epidermal cells linear; anthers yellow; stems with numerous flowering branches *E. ericifolium*

Note: The nomenclature of some of these species is in an absolute mess. They appear to cross with each other. There may be numerous local populations that are slightly different from other local populations. These should be named?

***Eriogonum alatum* Torr.**

WINGED BUCKWHEAT. Openings in brush, open woodland, above 3800 ft. Mount Dellenbaugh Road 12 0266 975E 40 29 815N.

***Eriogonum brachypodum* T. & G.**

SHORT-FLOWERED BUCKWHEAT. Lizard Wash 12 0268 940E 40 91 700N Clifton 42253

***Eriogonum brevicaulis* Nutt.**

SHORT-STEMMED WILD BUCKWHEAT. These plants key out to this taxon, however it is found well to the north in Utah Highway 389 12 0357 857E 40 85 125N Clifton 41697.

***Eriogonum capillare* Small**

var. ***cordatum*** G. Clifton var. nov.

BURRO CREEK BUCKWHEAT. Six Mile Crossing 12 0284 157E 38 26 528N Clifton 28272.

***Eriogonum cernuum* Nutt.**

NODDING BUCKWHEAT. above 4800 ft. Old 66 12 0285 250E 39 36 800N Clifton 41364, Mt. Trumbull 12 0309 013E 40 30 059N.

***Eriogonum confusum* G. Clifton sp. nov.**

CONFUSED WILD BUCKWHEAT. Highway 389 12 0358 846E 40 86 062N Clifton 41701.

***Eriogonum corymbosum* Benth.**

- a Perianth segments yellowish..... var. ***glutinosum***
- a Perianth segments pink or white
- b Stems branched from base only, brown tomentose; involucre lobes winged var. ***brunneus***
- b Stems highly branched, white tomentose; involucre lobes wingless..... var. ***corymbosum***

var. ***brunneus*** G. Clifton

BROWN-STEMMED CRISP-LEAF WILD BUCKWHEAT. Highway 389 12 0357 857E 40 85 125N Clifton 41694.

var. ***corymbosum***

WHITE-FLOWERED CRISP-LEAF WILD BUCKWHEAT. above 4600 ft. Twomile Wash 12 0351 874N 40 78 606N Clifton 41163.

var. ***glutinosum*** (M. E. Jones) M. E. Jones

YELLOW-FLOWERED CRISP LEAF WILD BUCKWHEAT. Truxton 12 0271 384E 39 29 620N Clifton 41242.

***Eriogonum darrovii* Kearney**

DARROW'S WILD BUCKWHEAT. Wolf Hole Pass 12 0274 576E 40 65 884N Clifton 42297.

***Eriogonum davidsonii* E. Greene**

DAVIDSON'S ANNUAL BUCKWHEAT. Blake Ranch Road 12 0244 255E 38 88 335N Clifton 39801, Hualapai Mountain Road 12 0235 221E 38 89 557N Clifton 40687.

***Eriogonum deflexum* Torr.**

var. ***deflexum***

FLAT-CROWNED BUCKWHEAT. There are numerous forms of this taxon. One has larger perianth segments that are dark red with a black median stripe and the seed is larger and black. D-W Road 12 0234 314E 38 92 574N Clifton 38554, Hualapai Mountain Road 12 0235 539N 38 89 055N Clifton 38554. One has smaller perianth segments that are white to pale pink with a green median stripe and the smaller seeds are whitish to pinkish. Hualapai Mountain Road 12 0229 591E 38 95 204N Clifton 38577. The two above types often have the filaments of the stamens straight and long exerted. One has a very small perianth and crinkly filaments than are not exerted. Beaver Dam Mountains. 12 0250 760E 40 95 798N Clifton 41675. One has a few glandular hairs in some or all the inflorescence axils. Aubrey Hills 11 0756 452E 38 08 706N Clifton 39271, Lake Havasu 11 0760 441E 38 04 500N Clifton 39773.

***Eriogonum ericifolium* T. & G.**

var. ***pulchrum*** (Eastw.) Rev.

BEAUTIFUL WILD BUCKWHEAT.

***Eriogonum fasciculatum* Benth. var. *polifolium* (DC.) T. & G.**

BROAD-LEAVED CALIFORNIA BUCKWHEAT. Along road, banks and dry slopes. March-June (Nov.-Dec.) Hualapai Mountain Road 12 0233 313E 38 92 540N Clifton 38566, Grand Wash Cliffs 12 0239 740E 39 42 007N, W. Spring St. 11 0767 400E 38 98 167N Clifton 40670.

***Eriogonum heermannii* Durand & Hilg.**

- a Inflorescence branches ribbed var. ***sulcatum***
- a Inflorescence branches terete or rounded-quadrangular, scabrous-papillate..... var. ***argense***

var. **argense** (M. E. Jones) Munz

ROUNDED HEERMANN'S WILD BUCKWHEAT. Sawmill Canyon 11 0768 768E 38 94 916 Clifton 41762.

var. **sulcatum** (S. Wats.) Munz & Rev.

GROOVED HEERMANN'S WILD BUCKWHEAT. Beaver Dam Mountains. 12 0248 766E 40 96 415N Clifton 41672.

Eriogonum hookeri S. Wats

HOOKE'S ANNUAL WILD BUCKWHEAT.

Eriogonum inflatum Torr. & Frém.

DESERT TRUMPET. Slopes and flats, below 4500 ft. Mar-Nov. Hualapai Mountain Road 12 0229 431E 38 95 286N Clifton 38580, Borianna Canyon 12 0230 797E 38 67 305N, Blake Ranch Road 12 0244 690E 38 77 056N.

Eriogonum insigne S. Wats.

LADDER ANNUAL WILD BUCKWHEAT. Red Lake 11 0760 990E 39 51 455N Clifton 41327, Temple Wash 739 766E 39 88 913N Clifton 42346.

Eriogonum jamesii Benth. var. **flavescens** S. Wats.

JAMES' WILD BUCKWHEAT. Pine Lake 12 0238 700E 38 86 524N Clifton 40934.

Eriogonum jonesii S. Wats.

JONES' WILD BUCKWHEAT. Limited to the Peach Spring area Old 66 12 0273 526E 39 32 975N Clifton 41236.

Eriogonum leptoclodon T. & G. var. **ramosissimum** (Eastw.) Rev.

SAND WILD BUCKWHEAT. extreme ne corner.

Eriogonum maculatum A. Heller

ANGLE-STEMMED ANNUAL BUCKWHEAT. Oatman Road 12 0239 057E 39 16 697N Clifton 39261.

Eriogonum microthecum Nutt.

var. **simpsonii** (Benth.) Rev.

LEAFY SLENDER WILD BUCKWHEAT. above 3700 ft. Branch of Truxton Wash 12 0276 830E 39 20 000N Clifton 41244, Bulrush Canyon 12 0348 622E 40 71 965N Clifton 41178,. [var. **foliosum** (T. & G.) Rev.].

Eriogonum mortonianum Rev.

a Inflorescence brittle, readily breaking at the nodes; flowers yellow..... var. **mortonianum**

a Inflorescence not brittle; flowers white or soon turning red

b Flowers reddish; leaf blades 2-3 times longer than wide.....var. **rubriflorus**

b Flowers white; leaf blades 6-8 times longer than wide var. **albiflorus**

var. **albiflorus** G. Clifton var. nov.

WHITE-FLOWERED MORTON'S WILD BUCKWHEAT. Highway 389 12 0358 400E 40 85 640N Clifton 41705.

var. **mortonianum**

MORTON'S WILD BUCKWHEAT. Fairly open red clay on slight slopes, about 4600 ft. The type came from along Highway 389. Aug-Mid Oct. Highway 389 12 0358 846E 40 86 062N Clifton 41702.

var. **rubriflorus** G. Clifton var. nov.

RED-FLOWERED MORTON'S WILD BUCKWHEAT. This taxon could be considered a hybrid, but it has only one parent which is *E. mortonianum*. The other parent is non existent. Late Aug-Oct. Highway 389 12 0358 400E 40 85 640N Clifton 41704.

Eriogonum nidularium Cov.

BIRD NEST BUCKWHEAT, WHISK-BROOM.

Eriogonum ovalifolium Nutt.

a Flowers yellow var. **ovalifolium**

a Flowers whitish var. **purpureum**

var. **ovalifolium**

YELLOW-FLOWERED CUSHION WILD BUCKWHEAT.

var. **purpureum** (A. Nels.) Durand

COMMON CUSHION WILD BUCKWHEAT. Mt. Trumbull Loop Road 12 0270 285E 40 80 566N Clifton 42268.

Eriogonum palmerianum Munz

PALMER'S ANNUAL BUCKWHEAT. 5400 ft. Mid Apr-May (Oct.-Nov). Hualapai Mountain Road 12 0234 721E 38 90 184N Clifton 38595, White Hills 11 0746 684E 39 62 390N Clifton 39706, Beaver Dam Mountains. 12 0248 766E 40 96 415N Clifton 41673.

Eriogonum pharnaceoides Torr.

var. *cervinum* Rev.

YELLOW-FLOWERED WIRE-STEMMED WILD BUCKWHEAT. Mt. Trumbull 12 0307 455E 40 28 731N Clifton 41754.

Eriogonum plumatella Durand & Hilg.

FLAT-TOPPED WILD BUCKWHEAT. Highway 93 12 0257 027E 38 83 062N Clifton 41307.

Eriogonum polycladon Benth.

LEAFY-STEMMED ANNUAL BUCKWHEAT. Along roads, slopes, washes, 2500-7200 ft. June-Nov. Hualapai Mountain Road 12 0235 539E 38 89 055N Clifton 38589.

Eriogonum pusillum T. & G.

PUNY WILD BUCKWHEAT. Gravelly slopes, 2000-5000 ft. The leaves have the margins glandular-red-dotted. Late Mar-Jun. Borianna Mine Road 11 0773 344E 38 62 240 Clifton 39333, Hualapai Valley 12 0236 374E 39 43 917N Clifton 39367, Kaiser Spring Wash 12 0272 342E 38 29 318N Clifton 39832.

Eriogonum racemosum Nutt.

RED-ROOT WILD BUCKWHEAT. Mt. Trumbull 12 0308 869E 40 30 200N Clifton 41746.

Eriogonum reniform Torr. & Frém.

KIDNEY-LEAVED WILD BUCKWHEAT. Sacramento Wash 11 0746 283E 38 46 062N Clifton 39198, Bill Williams River 11 0773 605E 37 94 900 Clifton 39777.

Eriogonum subreniforme S. Wats.

KIDNEY-SHAPE WILD BUCKWHEAT.

Eriogonum thomasi Torr.

THOMAS' WILD BUCKWHEAT. Rocky slopes, washes, dry sandy places, below 3500 ft. Mid Feb-May. Aubrey Hills 11 0761 826E 38 04 893N Clifton 38922, Highway 63 11 0705 095E 39 86 360N Clifton 39214, Grand Wash Cliffs 12 0239 740E 39 42 007N, McCracken Mine Road 12 0247 670E 38 16 129N Clifton 3874, Willow Beach Road 11 0711 717E 39 71 468N Clifton 38775.

Eriogonum thomsoniae S. Wats.

THOMPSON'S WILD BUCKWHEAT. Cedar Ridge 12 0331 750E 40 82 930N Clifton 41691.

Eriogonum thurberi Torr.

THURBER'S ANNUAL WILD BUCKWHEAT.

Eriogonum trichopes Torr.

YELLOW TRUMPET. Aubrey Hills 11 0761 826E 38 04 893N Clifton 38919.

Eriogonum umbellatum Torr.

var. *subaridum* S. Stokes

SULFUR-FLOWERED WILD BUCKWHEAT. Mt. Trumbull Loop 12 0314 104E 40 27 009N Clifton 41736.

Eriogonum viscidulum J. T. Howell

STICKY WILD BUCKWHEAT. Limited to extreme nw corner, about 2500 ft. rocky or ± sandy slopes, road cuts and banks.

Eriogonum wrightii Benth.

var. *wrightii*

WRIGHT'S WILD BUCKWHEAT. Open rocky slopes. June-early Dec. Hualapai Mountain Road 12 233 313E 38 92 540N Clifton 38568.

Eriogonum zionis J. Howell

var. *coccineum* J Howell

RED-FLOWERED ZION WILD BUCKWHEAT.

Fallopia

[*Polygonum*-in part]

Fallopia convolvulus (L.) Love

BLACK BINDWEED. Waste places, 4500-8000 ft; introduced from Europe. May-Aug. [*Polygonum convolvulus* L.].

NEMACAULIS

Nemacaulis denudata Nutt.

var. *gracilis* Goodman & L. Benson

INLAND WOOLLY-HEADS. Sandy places, about 550 ft. Mid Mar-Apr. Lake Havasu 11 0740 464E 38 27 009N Clifton 39279.

OXYTHECA

Oxytheca perfoliata T. & G.
PERFOLIATE-LEAVED OXYTHECA.

Persicaria Smartweed
[*Polygonum*-in part]

Note: This group of plants is long over due for a complete overhaul.

- 1 Upper margins of ocreae (sheaths) lacking well-developed cilia or bristles ***P. lapathifolia***
- 1 Upper margins of ocreae (sheaths) having well-developed cilia or bristles (may be hard to see late in season)
- 2 Perianth segments and some of the leaves bearing gland drops ***P. hydropiper***
- 2 Perianth segments and leaves not bearing gland drops
- 3 Plants perennial, rarely branching below the terminal inflorescence; ocreae of the leaf axiles long sheathing
..... ***P. hydropiperoides***
- 3 Plants annual, generally branching below the terminal inflorescence; ocreae shortly sheathing ***P. maculata***

Persicaria hydropiper (L.) Opiz

COMMON SMARTWEED. Fairly frequent, below 6000 ft.; moist to wet places. July-Oct. Knight Creek Spring 12 0276 097E 38 89 514N Clifton 41409. [*Polygonum h. L.*].

Persicaria hydropiperoides (Michx.) Small

MILD WATER-PEPPER. Six Mile Crossing 12 0284 156E 38 26 734N Clifton 27159.

Persicaria lapathifolia (L.) S. Gray

var. ***lapathifolia***

DOCK-LEAVED SMARTWEED. Locally frequent, below 5000 ft.; lake shores, river edges and ditches. This taxon is different from all the others in that it has the veins on the perianth segments that look like an anchor, sometimes hard to see. There are numerous named varieties of this taxon that have been recognized at various times. The flowers are supposed to be pink, but most of the plants on the west coast they are white. June-Oct. Old Trails Road 12 0767 875E 38 95 779N Clifton 41322. [*Polygonum l. L.*].

Persicaria maculata (Raf.) S. Gray

SPOTTED SMARTWEED, LADY'S THUMB. Frequent, below 5000 ft. moist waste places, sand and gravel bars; introduced from Eurasia. June-Nov. [*Polygonum fusiforme* E. Greene, *Polygonum persicaria* L.].

POLYGONUM Knotweed, Smartweed

- 1 Flower clusters subtended by full size leaves or bracts
- 2 Flower clusters in some or all the axils of full sized leaves ***P. arenastrum***
- 2 Flower cluster mostly restricted to branch tips in axils of bracts ***P. argyrocoleon***
- 1 Flower clusters (at least most of them) not subtended by leaves or bracts ***P. douglasii***

Polygonum arenastrum Boreau

WEEDY KNOTWEED. Waste places or even invading native habitat, below 8000 ft. May-Oct. Willow Creek Ranch 12 0277 084E 38 96 090N Clifton 8236, Mt Trumbull Loop 12 0350 573E 40 76 354N Clifton 41713. [*P. aviculare* L., misapplied in part].

Polygonum argyrocoleon Steud.

SILVER-SHEATH KNOTWEED.

Polygonum douglasii E. Greene

var. ***johnstonii*** Munz

JOHNSTON'S KNOTWEED. Dry, open pine forest floors, above 5500 ft. June-Sept. Flag Mine 12 0237 235E 38 85 513N Clifton 37095.

PTEROSTEGIA

Pterostegia drymarioides Fischer & C. Meyer

PTEROSTEGIA. Mid Jan. Old Route 66 11 0743 165E 38 80 133N Clifton 38754.

RUMEX Dock

- 1 Inflorescence with axillary branches; basal leaves not much bigger than the cauline..... *R. salicifolius*
- 1 Inflorescence terminal
 - 2 Callosities lacking..... *R. hymenosepalus*
 - 2 Callosities present
 - 3 Valves toothed along the margins, teeth at least 1 mm long..... *R. stenophyllus*
 - 3 Valves not toothed
 - 4 Inner perianth lobe $\pm$ 5 mm long..... *R. crispus*
 - 4 Inner perianth lobe $\pm$ 3 mm long..... *R. violascens*

***Rumex crispus* L.**

CURLY-LEAVED DOCK, YELLOW DOCK. Frequent, throughout, except at higher elevations; usually somewhat moist places; introduced from Eurasia. Beale Spring 11 0765 565E 38 99 352N Clifton 40677.

***Rumex hymenosepalus* Torr.**

CANAIGRE, WILD-RHUBARB. Sandy washes, and canyon bottoms. Feb-Apr. Alamo Road 12 0239 755E 38 34 938N, Sawmill Canyon 12 0230 390E 38 94 784N Clifton 38864.

***Rumex salicifolius* Weinm.**

var. *mexicanus* (Meisn.) C. Hitchc.

MEXICAN WILLOW DOCK. Marshes, streams and other wet places. July-Sept. [*R. mexicanus* Meisn., *R. triangulivalvis* (Danser) Rech. f.].

***Rumex stenophyllus* Ledeb.**

NARROW-LEAVED DOCK. These plants are not in all respects this taxon, but they are closer to this one than any others. Toroweap Valley 12 0315 682E 40 29 808N Clifton 41728.

***Rumex violascens* Rech. f.**

VIOLET DOCK. Alamo Lake 12 0261 641E 37 94 151N Clifton 39168.

PORTULACACEAE Purslane Family

Note: A number of the genera and species are being played with, however their realignment doesn't seem to clarify their relationships any more than the present alignment.

- 1 Cauline leaves a single pair, these fused into a disk *Claytonia*
- 1 Cauline leaves not as above
 - 2 Flowers with the petal minute, tips fused and cap-like in fruit, falling as a unit..... *Calyptridium*
 - 2 Flowers not as above
 - 3 Flowers red or white *Calandrinia*
 - 3 Flowers yellow or pink
 - 4 Plants prostrate; flowers yellow, copper-colored *Portulaca*
 - 4 Plants erect; flowers pink..... *Talinum*

CALANDRINIA

- 1 Plants very fleshy; flowers white *C. ambigua*
- 1 Plants not very fleshy; flowers red..... *C. ciliata*

***Calandrinia ambigua* (S. Wats.) J. T. Howell**

FLESHY MAIDS. Infrequent, below 600 ft.; subalkaline scalds in sandy-clay loam below the tops of upper old river terraces. Mohave Valley 730 817E 38 46 832N Clifton 43361.

***Calandrinia ciliata* (López & Pavón) DC.**

FRINGED RED MAIDS. Late Jan-Apr. McCracken Mine Road 12 0247 670E 38 16 129N. Clifton 38822, Cook Canyon 11 0766 417E 38 96 817N, Box Canyon 12 0266 368E 38 32 216N, Boriana Canyon 12 0230 797E 38 67 305N.

CALYPTRIDIDIUM Pusypaws

***Calyptridium monandrum* Nutt.**

ONE-SEEDED PUSSYPAWS. Late Feb-Apr. Alamo Road 12 0248 781E 38 13 246N Clifton 38868, Chicken Spring Road 12 0259 294E 38 42 566N.

CLAYTONIA

- 1 Leaf blades tapered to the petiole *C. parviflora*
 1 Leaf blades abruptly tapered to the petiole *C. perfoliata*

***Claytonia parviflora* Hook.**

SMALL-FLOWERED MINER'S LETTUCE. Growing on north facing slopes under the lower edges of boulders in the lower pinyon belt. Hualapai Mountains 11 0770 007E 38 93 191N Clifton 39028, Clay Springs Road 12 0240 279E 39 56 907N Clifton 39369. [*Montia perfoliata* Donn. var. *p.* (Hook.) Torr.].

***Claytonia perfoliata* Willd.**

MINER'S LETTUCE. Late Feb-Apr. Kaiser Spring Wash 12 0271 746E 38 28 800N Clifton 39015, Six Mile Crossing 12 0283 946E 38 26 324N Clifton 39473.

PORTULACA

- 1 Petals 7-12 mm long, copper-colored *P. suffrutescens*
 1 Petals 1-5 mm long
 2 Leaf axils glabrous; flowers just barely open *P. minutiflora*
 2 Leaf axils hairy; flowers open *P. halimoides*

***Portulaca halimoides* L.**

SILK-COTTON PURSLANE. Branch of Knight Creek 12 0277 292E 38 90 810N Clifton 27086. [*P. parvula* A. Gray].

***Portulaca minutiflora* G. Clifton sp. no.**

RETUSE-LEAVED PURSLANE. This is a native plant that comes up after summer rains and is not the same as *P. oleracea*. The flowers just barely open and the petals are not real obvious. It is common on the eastern Mohave Desert in California.

***Portulaca suffrutescens* Engelm.**

COPPER-FLOWERED PURSLANE. Blake Ranch Road 12 0245 741E 38 95 872N Clifton 10359.

TALINUM

***Talinum parviflorum* Nutt.**

PRAIRIE FAMEFLOWER. Camp Levi Levi Road 12 0235 246E 38 87 370N Clifton 41227.

PRIMULACEAE Primrose Family

ANAGALLIS

***Anagallis arvensis* L.**

SCARLET PIMPERNEL, POOR-MAN'S WEATHERGLASS. Bullhead 11 0721 541E 38 94 513N Clifton 39944.

ANDROSACE

Note: This group of plants appear to be self pollinated with many local forms.

- 1 Corolla 2.5-3 mm long, lobes less than 1 mm long, well included in the calyx lobes; calyx lobes and involucral bracts broad, leaf-like *A. occidentalis*
 1 Corolla 3.5-5 mm long, lobes 1.2-2 mm long, from slightly shorter to longer than the tube; calyx lobes narrow subulate-like, longer than the calyx tube or widely lanceolate to triangular, shorter than the tube
 2 Calyx segments and bracts not subulate; stems and stems and pedicels sparsely hairy, branched or not, a few glandular hairs at base of calyx and adjacent pedicels; stems simple; flowers from June-early July *A. septentrionalis*
 2 Calyx segments and bracts subulate; stems and pedicels fairly densely hairy, these all branched; stems often branched from base; flowers from Feb.-March *A. deserticola*

***Androsace occidentalis* Pursh**

WESTERN ROCK-JASMINE. Feb-June. Shack Spring Canyon 11 0769 251E 38 94 301N Clifton 38892, Black Canyon 12 0275 008E 38 27 176N Clifton 39003, Cook Canyon 11 0764 949E 38 99 150N Clifton 39227, Hackberry 12 0252 448E 39 18

024N Clifton 39264.

***Androsace septentrionalis* L.**

var. *glandulosa* (Woot. & Standl.) St. John

PYGMY-FLOWER or NORTHERN ROCK JASMINE. June-early July. Camp Levi 10 0235 515E 38 86 619N Clifton 40732.

***Androsace deserticola* G. Clifton sp. nov.**

SHARP-POINTED DESERT ROCK JASMINE. 3600-4500 ft. These plants are at a low elevation, desert species and are very variable in form, some have the pedicels included to slight longer than the bracts, white others have pedicels much longer than the bracts. Feb-Mar., Shack Springs Canyon 11 0770 007E 38 93 191N Clifton 39026, Grapevine Spring Wash 11 0765 292N 38 99 449N Clifton 38934.

RANUNCULACEAE Buttercup Family

- 1 Plants a climbing vine..... *Clematis*
- 1 Plants not a vine
 - 2 Plants a small annual *Myosurus*
 - 2 Plants perennial
 - 3 Plants having both sepals and petals..... *Ranunculus*
 - 3 Plants lacking petals, none spurred
 - 4 Sepals petaloide, showy..... *Anemone*
 - 4 Sepals not petaloide, small, not showy *Thalictrum*

ANEMONE Windflower

***Anemone tuberosa* Rydb.**

DESERT ANEMONE. Mid Jan-May. Cook Canyon 11 0766 911E 38 96 919N Clifton 38968, Timber Wash 12 0243 284E 38 82 500N.

Ceratocephala (*Ranunculus*)

***Ceratocephala orthoceras* DC.**

PAIN ON THE FINGER BUTTERCUP. waste places, open flats, and valley floors; introduced from Old World. Late March-May: Six Mile Crossing 12 0284 231E 38 26 459N Clifton 39479. [*Ranunculus testiculatus* Crantz].

CLEMATIS

***Clematis drummondii* T. & G.**

TEXAS VIRGIN BOWER.

***Clematis ligusticifolia* Nutt.**

VIRGIN'S BOWER, YERBA DE CHIVA. near streams and along rivers. June-Sept. Knight Creek 12 0276 558E 38 89 296N, Big Sandy River 12 0263 285E 38 38 464N Clifton 15778.

MYOSURUS Mouse-Tail

Note: The fruit needs to be quite mature to determine the name of these plants

- 1 The cup white, corky-thickened; beak strongly triangular; plants generally over 4 cm tall *M. cupulatus*
- 1 The cup not as well developed, not as white, nor not a thick; beak long and narrower; plants up to 4 cm tall..... *M. nitidus*

***Myosurus cupulatus* S. Wats.**

ARIZONA MOUSE-TAIL Mar-Apr. Packsaddle Campground 11 0756 941E 39 26 761N Clifton 39666, Blake Ranch Road 12 0244 255E 38 88 335N Clifton 39796.

***Myosurus nitidus* Eastw.**

WESTERN MOUSE-TAIL. Cook Canyon 11 0764 949E 38 99 150N Clifton 39226.

RANUNCULUS Buttercup

- 1 Plants having creeping by stolons; flowers yellow *R. cymbalaria*
 1 Plants from tufted roots; flowers red-purple or lined with red-purple *R. andersonii*

Ranunculus andersonii A. Grayvar. ***juniperinus*** (M. E. Jones) Welsh

JUNIPER BUTTERCUP. Openings that are sandy to gravelly, throughout. March-May.

Ranunculus cymbalaria Purshvar. ***saximontanus*** Fern.

MARSH or DESERT BUTTERCUP. Mar-Sept. Big Sandy 12 0263 675E 38 38 627N Clifton 39322, 15772.

THALICTRUM Meadow-Rue***Thalictrum fendleri*** A. Gray

FENDLER'S MEADOW-RUE. Along streams and meadow edges, in shade of thickets, on north and east facing slopes in yellow pine forest. The other variety is found in California. May-Mid July. Camp Levi Road 12 0235 753E 38 87 262N Clifton 40715, Mt. Trumbull 12 0308 869E 40 30 200N.

RESEDACEAE Mignonette Family**OLIGOMERIS*****Oligomeris linifolia*** (M. Vahl) J. F. Macbr

LINE-LEAF WHITEPUFF. Aubrey Hills 11 0761 826E 38 04 893N Clifton 38923.

RHAMNACEAE Buckthorn Family

- 1 Flowers inconspicuous; pedicels green or gray
 2 Twigs not thorn-tipped *Rhamnus*
 2 Twigs thorn-tipped *Ziziphus*
 1 Flowers conspicuous; pedicels about the same color as the flowers *Ceanothus*

CEANOTHUS California Wild Lilac

- 1 Leaves opposite *C. greggii*
 1 Leaves alternate
 2 Branchlets not spiny at tip; twigs not rigid, glabrous or obscurely puberulent *C. integrerrimus*
 2 Branchlets spiny at tip; twigs rigid, copiously pubescent *C. fendleri*

Ceanothus fendleri A. Gray

DEER-BRIER

Ceanothus greggii A. Gray

- a Leaves upper surface yellow-green var. *perplexans*
 a Leaves upper surface gray-green var. *vestitus*

var. ***greggii***

GREGG'S CEANOTHUS. Mount Dellenbaugh Road 12 2681 197E 40 03 747N Clifton 42329

var. ***perplexans*** (Trel.) Jeps.

CUPLEAF CEANOTHUS. The flowering spur branchlets are longer, flowers whitish. Cerbat Canyon 11 0762 774E 39 10 743N Clifton 39324.

var. ***vestitus*** (E. Greene) McMinn

MOJAVE CEANOTHUS. Frequent, open brushy slopes and flats, The flowering spur branchlets are very short, flowers purplish-white. Cerbat Canyon 11 0762 774E 39 10 743N Clifton 39325.

Ceanothus integrerrimus H. & A.CALIFORNIA DEERBRUSH. brushy slopes and in open woodlands. Our plants have been call var. *californicus* (Kell.) G.T. Benson.

RHAMNUS Cascara, Coffee Berry

- 1 Leaves small, yellow-green below, surfaces glabrous or puberulent ***R. ilicifolia***
 1 Leaves larger, fairly densely tomentose below ***R. tomentella***

Rhamnus ilicifolia Kell.

HOLLY-LEAVED REDBERRY. Hualapai Mountain Road 12 0235 221E 38 89 557N Clifton 40685.

Rhamnus tomentella Benth.

var. ***ursina*** (E. Greene) G. Clifton comb. nov.

BEAR COFFEEBERRY. Knight Creek Spring 12 0275 984E 38 89 527N Clifton 39914. [ssp. *u.* (E. Greene) J. Sawyer].

ZIZYPHUS***Zizyphus obtusifolia*** (T. & G.) A. Gray

var. ***canescens*** (A. Gray) M. Johnston

GRAYTHORN. Boriana Canyon 12 0231 303E 38 66 905N Clifton 39338.

RHINANTHACEAE Paintbrush Family
 (Scrophulariaceae in part)

- 1 Calyx consisting of 1 segment enclosing the upper part of the bud and a bract acting as a calyx segment enclosing the lower part of the bud; roots yellow ***Cordylanthus***
 1 Calyx normal, bract not taking the place of the lower calyx segment
 2 Galea curled for most of its length or if not then acting as a hood and somewhat inflated; leaves pinnate or simple, leaves or leaflets toothed; bracts serrate ***Pedicularis***
 2 Galea straight for most of its length, sometimes hooked at very apex, if acting as a hood, then it is inflated; leaves or leaflets entire
 3 Stigma entire; tip of upper corolla lip closed (lip galeate) ***Orthocarpus***
 3 Stigma capitate; tip of upper corolla lip open (lip beaked) ***Castilleja***

CASTILLEJA Indian Paintbrush

- 1 Plants annual
 2 Plants close to water; corolla red; beak much longer than the lower lobes ***C. minor***
 2 Plants of dry places; lower corolla lobes forming a pouch; beak not much longer than the lower lobes ***C. exserta***
 1 Plants perennial
 3 The calyx more deeply cleft on the front side than the back which causes the corolla to project down through the deeply cleft front side ***C. linariifolia***
 3 The calyx ± equally cleft on the front and back
 4 Stems usually grayish, pilose or villous-hirsute; calyx 15-20 mm long ***C. chromosa***
 4 Stems tomentose or lanate; calyx 25-35 mm long ***C. integra***

Castilleja chromosa A. Nels.

DESERT INDIAN PAINTBRUSH. Late Jan-July. Oatman Road 11 0741 532E 38 80 212N Clifton 38663, Clack Canyon 11 0766 820E 38 99 486N Clifton 38883.

Castilleja exserta (A. Heller) Chuang & Heckard

var. ***exserta***

PURPLE OWL'S CLOVER. Signal Road 12 0255 282E 38 18 063N Clifton 38842.

Castilleja integra A. Gray

SQUAWFEATHER. Branch of Truxton Wash 12 0276 454E 39 21 109N Clifton 39741.

Castilleja linariifolia Benth.

NARROW-LEAVED INDIAN PAINTBRUSH. June-Oct. Wheeler Wash 12 0238 658E 38 86 227N Clifton 40922.

Castilleja minor A. Gray

- a Corolla 15-20 mm long; herbage with most of hairs glandular var. ***minor***
 a Corolla 25-35 mm long; herbage with a lot fewer glandular hairs var. ***spiralis***

Var. *minor*

SMALL-FLOWERED ANNUAL PAINTBRUSH. Six Mile Crossing 12 0284 156E 38 26 734N Clifton 22856.

Var. *spiralis* (Jeps.) Chuang & HeckardLARGE-FLOWERED ANNUAL PAINTBRUSH [C. *stenantha* A. Gray].**CORDYLANTHUS** Birdsbeak

- 1 Plants widely open, calyx tips densely white canescent; plants of Hualapai Mountains in conifer forest *C. nevinii*
 1 Plants compact; calyx tips glandular hairy; plants wide spread in the pinyon-juniper belt..... *C. parviflorus*

Cordylanthus nevinii A. Gray

NEVIN'S BIRDSBEAK. Camp Levi Levi Road 12 0235 570E 38 87 324N Clifton 41231.

Cordylanthus parviflorus (Ferris) WigginsSMALL-FLOWERED BIRDSBEAK. Aug.-Sept. Branch of Truxton Wash 12 0276 830E 39 20 000N Clifton 41243,
Grapevine Canyon 234 350E 39 76 436N Clifton 42344.**ORTHOCARPUS*****Orthocarpus luteus*** Nutt.

YELLOW ORTHOCARPUS. moist open places among sagebrush and woodlands, above 7000 ft. July-Aug.

PEDICULARIS***Pedicularis centranthera*** A. Gray

DWARF LOUSEWORT. Openings in brush and woods, above 5400 ft. May-July:

ROSACEAE Rose Family

- 1 Plants shrubs or vines
 2 Plants bearing thorns
 3 Stems angled; petals white..... *Rubus*
 3 Stems round in cross section; petals rose..... *Rosa*
 2 Plants lacking thorns, branchlets may be sharp pointed at end
 4 Leaves compound or lobed
 5 Leaves compound, fern-like..... *Chamaebatiaria*
 5 Leaves pinnately lobed
 6 Leaves glandular-dotted..... *Purshia*
 6 Leaves rusty-lepidote on the lower surface, upper pubescent or glabrate *Fallugia*
 4 Leaves not compound or lobed
 7 Petals lacking (rarely 1 or 2 in *Coleogyne*)
 8 Leaves bearing hairs that are attached in the middle with both ends free *Coleogyne*
 8 Leaves bearing other kinds of hairs or glabrous *Cercocarpus*
 7 Petals present
 9 Bark shredding; inflorescence a panicle *Holodiscus*
 9 Bark not shredding; inflorescence not a panicle
 10 Fruit single per flower
 11 Style 1, sometimes deciduous *Prunus*
 11 Style 2-5 lobed
 12 Styles generally 3-5 lobed; leaves alternate *Amelanchier*
 12 Styles generally 2 lobed; leaves clustered on short shoots..... *Peraphyllum*
 10 Fruit several per flower *Purshia*
 1 Plants herbaceous; petals yellow *Potentilla*

AMELANCHIER Service-Berry***Amelanchier utahensis*** Koehne

UTAH SERVICE-BERRY. Cerbat Mountains 11 0758 442E 39 23 349N Clifton 39661.

CERCOCARPUS Mountain-Mahogany

- 1 Leaves narrowly linear, inrolled to midrib; anthers glabrous..... *C. intricatus*
 1 Leaves widely elliptic or obovate, not much inrolled; anthers hairy..... *C. montanus*

Cercocarpus intricatus S. Wats.

SMALL-LEAVED or DWARF MOUNTAIN MAHOGANY. Steep slopes that are often rocky or soil very shallow, below 7200 ft. April-early June

Cercocarpus montanus Raf.

var. *paucidentatus* (S. Wats.) F. L. Martin

SOUTHERN ALDER-LEAF MOUNTAIN-MAHOGANY. These plants don't seem to lose their leaves at least on some of the shrubs. There seems to be two forms growing together. One has the leaves broadly obovate and the other has the leaves narrowly oblanceolate. None of the plants in this area look like the plants that grow in California. It is doubtful that variety *glabra* is found in this County. Mid Feb- Poachie Range 12 0271 934E 38 16 474N Clifton 39011.

CHAMAEBATIARIA***Chamaebatiaria millefolium*** (Torr.) Maxim.

FERN BUSH, DESERT SWEET. Frequent, 6500-10000 ft.; dry brushy slopes. May-Sept. Old 66 12 0285 250E 39 36 800N Clifton 41241.

COLEOGYNE***Coleogyne ramosissima*** Torr.

BLACKBUSH. Slopes, alluvial fans, and flats, below 5200 ft. April-May. Clay Springs Road 12 0240 279E 39 56 907N Clifton 39375, Beaver Dam Mountains. 12 0248 766E 40 96 415N.

FALLUGIA***Fallugia paradoxa*** (D. Don.) Endl.

APACHE PLUME. Brushy slopes in the pinyon belt. Nov. Frees Wash 12 0236 172E 38 94 068N Clifton 38602.

HOLODISCUS Spiraea***Holodiscus dumosus*** (Nutt.) A. Heller

ROCK-SPIRAEA. Very rocky slopes and cliffs. June-early Oct. Flag Mine 12 0237 008E 38 85 150 Clifton 40700. [*H. microphyllus* Rydb., *H.m. ssp. glabrescens* (Greenm.) Ley].

PETROPHYTUM***Petrophytum caespitosum*** (Nutt.) Rydb.

ROCK-SPIRAEA. Forming mats on rocky slopes and cliffs, above 4500 ft. July-Sept.

POTENTILLA Cinquefoil***Potentilla subviscosa*** E. Greene

STICKY CINQUEFOIL. Hayden Peak 12 0235 206E 38 85 819N. Clifton 40716.

PRUNUS Stone-Fruits

- 1 Leaves in fascicles; fruit densely pubescent..... *P. fasciculata*
 1 Leaves not in fascicles; fruit not densely pubescent
 2 Flowers few, short corymbiform..... *P. emarginata*
 2 Flowers many in elongate racemes
 3 Leaves mostly round or subcordate at base; petals about 5 mm long *P. virginiana*
 3 Leaves mostly acute or acutish at base; petals about 3 mm long *P. serotina*

Prunus emarginata (Hook.) Walp.

BITTER CHERRY. rocky slopes, old burns, canyons and moist slopes. April-May:

Prunus fasciculata (Torr.) A. Grayvar. ***fasciculata***

DESERT ALMOND. Another variety of this taxon grows in coastal California. Feb-May. Clack Canyon 11 0766 845E 38 99 372N Clifton 38882, Poachie Range 12 0273 830E 38 17 170N Clifton 39008, Grapevine Canyon 12 0233 746E 39 75 700N.

Prunus serotina Ehrh.var. ***virens*** (Woot. & Standl.) Shreve

SOUTHWESTERN CHOKE CHERRY rocky slopes or moist slopes, sometimes in moist canyons. April-May:

Prunus virginiana L.var. ***demissa*** (Nutt.) Torr.

WESTERN CHOKE CHERRY. brushy slopes and flats. May-June:.

PURSHIA Antelope Bush

- 1 Stems of current year bearing stipitate-glandular hairs.....***P. glandulosa***
- 1 Stems of current year not bearing stipitate-glandular hairs
 - 2 Leaves generally entire, sometimes a few have one small lob on one side or on both sides.....***P. subintegra***
 - 2 Leaves obviously lobed
 - 3 Leaves commonly 5-7 lobed; style long and plumose in fruit; petals 7-14 mm long.....***P. stansburiana***
 - 3 Leaves commonly 3 lobed; style short and canescent at tip in fruit; petals 3.5-7 (10) mm long.....***P. tridentata***

Purshia glandulosa Curran

DESERT BITTERBRUSH.

Purshia tridentata (Pursh) DC.

BITTERBRUSH, ANTELOPE BITTERBRUSH. Mt. Trumbull

Purshia stansburiana (Torr.) Henr.NORTHERN ANTELOPE BUSH. dry slopes and flats. May-July (Nov.-early Dec.) Hualapai Mountain Road 12 0233 313E 38 92 757N Clifton 38598. [*Cowania mexicana*. D. Don var. s. (Torr.) Jeps., *Cowania* s. Torr., *P. m.* (D. Don) Welsh var. s. (Torr.) Welsh].***Purshia subintegra*** (Kearney) G. Clifton comb. nov.

BURRO CREEK ANTELOPE BUSH. They have tried to make this a cross with a present species and one that doesn't exist.

This is absolutely unprovable and pure speculation which would not hold up in a court of law. Six Mile Crossing Road 12 0282 162E 38 28 745 Clifton 39487.

ROSA Roses***Rosa woodsii*** Lindl. var. ***ultramontana*** (Wats.) Jeps.INTERIOR ROSE. June-Aug. [*R. arizonica* Rydb.].**RUBUS** Berries***Rubus idaeus*** L. var. ***strigosus*** (Michx) Maxim.

AMERICAN RED RASPBERRY. Frequent, 6000-11000 ft.; riparian, limestone crevices, rocky wooded slopes. July-Aug.

RUBIACEAE Madder Family**GALIUM** Bedstraw; Cleavers

- 1 Plants annual
 - 2 Leaves in whorls of 5-8; plants becoming long and straggly.....***G. aparine***
 - 2 Leaves in whorls of 2-4; plants not becoming long and straggly.....***G. proliferum***
- 1 Plants perennial
 - 3 Corolla purple or brown***G. wrightii***
 - 3 Corolla white, yellowish, or greenish
 - 4 Flowers subsessile in the leaf axiles either on the main stem or on a short branch; inflorescence sometimes

beginning at or near the base; fruit when young, papillate, becoming smooth when mature; flowers perfect

-*G. microphyllum*
 4 Flowers not as above; fruit with long $\pm$ straight hairs
 5 Plants rough-sandpaper-like; lateral veins not obvious*G. stellatum*
 5 Plants not near as rough; lateral veins fairly obvious.....*G. watsonii*

***Galium aparine* L.**

CLEAVERS, GOOSE GRASS. grassy places, woodlands and waste places; introduced from Europe. March-July. Poachie
 Range 12 0273 830E 38 17 170N Clifton 39007.

***Galium microphyllum* A. Gray**

BRACTED BEDSTRAW. The fruit on these plants doesn't dry purplish, the surface is very crinkly, translucent, with white
 spicules showing through the surface. Antelope Wash 12 0242 095E 38 84 755N Clifton 39399.

***Galium proliferum* A. Gray**

LIMESTONE BEDSTRAW. Six Mile Crossing Road 12 0283 360E 38 28 493N Clifton 39445.

***Galium stellatum* A. Gray**

var. *eremicum* Hilend & J. Howell

DESERT BEDSTRAW. Jan. McCracken Mine Road 12 0247 670E 38 16 129N Clifton 38739.

***Galium watsonii* (A. Gray) A. Heller**

WATSON'S BEDSTRAW. Clack Canyon 11 0767 233E 38 99 356N Clifton 39239.

***Galium wrightii* A. Gray**

WRIGHT'S BEDSTRAW. Kaiser Spring Wash 12 0272 021E 38 28 855, Clifton 39315, Hualapai Mountain Road 12 0235
 221E 38 89 557N Clifton 40683. [var. *rothrockii* (A. Gray) Ehrendorfer].

RUTACEAE Rue Family

- 1 Leaves simple; plants a broom-like small shrub; flowers dark blue.....*Thamnosma*
 1 Leaves trifoliate; plants not broom-like; flowers white *Ptelea*

PTELEA

***Ptelea trifoliata* L.**

- a Bark of twigs mahogany-brown or plum-purple; leaves bright green or bluish-green var. *angustifolia*
 a Bark of twigs straw-colored or light olive-colored var. *pallida*

var. *angustifolia* (Benth.) V. Bailey

DARK BARK HOP-TREE Infrequent in the yellow pine belt.

var. *pallida* (E. Greene) V. Bailey

LIGHT BARK HOP-TREE. The type came from Peach Springs. Big Wash Road 11 0755 962E 39 27 976N Clifton 39654,
 Knight Creek 12 0276 832E 38 89 451N Clifton 39894, Flag Mine 12 0237 070E 38 85 068 Clifton 40702, Mt. Trumbull 12
 0308 869E 40 30 200N Clifton 41745.

THAMNOSMA

***Thamnosma montana* Torr. & Frém.**

TURPENTINE BUSH. Jan-Apr. Alamo Crossing Road 12 0245 233E 38 28 390N Clifton 38730, Grapevine Canyon 12 0233
 746E 39 75 700N.

SALICACEAE Willow Family

- 1 Leaves normally quite a bit longer than wide; catkins erect, bracts entire *Salix*
 1 Leaves normally not much longer than wide; catkins hanging down, bracts cut into narrow
 segments *Populus*

POPULUS Poplar

- 1 Leaves lanceolate..... *P. angustifolia*

- 1 Leaves ovate, or triangular
- 2 Leaf blades triangular, margins coarsely scalloped.....*P. fremontii*
- 2 Leaf blades ovate to nearly round, margin finely scalloped.....*P. tremuloides*

Populus angustifolia James

NARROW-LEAVED COTTONWOOD Spring: .

Populus fremontii S. Wats.var. *fremontii*

FREMONT'S COTTONWOOD. moist places. Mar-Apr. Cook Canyon 11 0766 577E 38 96 020N Clifton 38969.

Populus tremuloides Michx.

AMERICAN ASPEN, QUAKING ASPEN. Hayden Peak 12 0235 129E 38 86 240N Clifton 40725.

SALIX Willow

- 1 Petioles 3 mm or less long; plants often forming extensive under ground root systems..... *S. exigua*
- 1 Petioles usually greater than 3 mm long; plants individual
- 2 Lower leaf surface not glaucous not very hairy *S. gooddingii*
- 2 Lower leaf surface glaucous or very hairy
- 3 Leaves very long-and sharply acuminate; stamens 3 *S. bonplandiana*
- 3 Leaves rounded to short acuminate; stamens 2 *S. lasiolepis*

Salix exigua Nutt.

NARROW-LEAVED WILLOW, SLENDER WILLOW. Along streams and rivers. March-May: Bullhead 11 0721 541E 38 94 513N Clifton 39942.

Salix gooddingii Ball.

GOODDING'S BLACK WILLOW. moist places. Mar-Apr. Six Mile Crossing 12 0284 168E 38 26 800N Clifton 39465, Bill Williams River 11 0773 605E 37 94 900 Clifton 39778.

Salix laevigata Bebb

RED WILLOW, POLISHED WILLOW. Fairly frequent, below 5000 ft.; along streams, around ponds and sometimes other moist places. The appendage opposite the scale is broad, rounded and short and seems to remain after the scale falls. March-May: Big Sandy River 12 0263 595E 38 38 696N Clifton 39001.

Salix lasiolepis Benth.

ARROYO WILLOW. along stream and other moist places. March-April. Pine Lake 12 0238 700E 38 86 524N Clifton 40935.

SANTALACEAE Sandalwood Family**COMANDRA** Bastard Toad-Flax***Comandra umbellata*** (L.) Nutt.var. *pallida* (A. DC.) M. E. Jones

PALLID BASTARD TOAD-FLAX. dry slopes; a root-parasite. May-Aug. Boriana Canyon 12 0231 273E 38 67 484N Clifton 39345, Wolf Hole Valley 12 0273 110E 40 69 000N Clifton 42296.

SAPINDACEAE Soap-berry Family**SAPINDUS*****Sapindus saponaria*** L.var. *drummondii* (H. & A.) L. Benson

DRUMMOND'S SOAP-BERRY, CHINABERRY. Infrequent, above 2500 ft.; along streams

SARCOBATAACEAE**SARCOBATUS*****Sarcobatus vermiculatus*** (Hook.) Torr.

GREASEWOOD. subalkaline washes and valley floors. May-Aug. Bitter Seeps Wash 12 0351 832E 40 78 966N Clifton 41709.

SAURURACEAE

ANEMOPSIS

Anemopsis californica (Nutt.) H. & A.

YERBA MANSA. Big Sandy River 12 063 381E 38 38776N Clifton 39849.

SAXIFRAGACEAE Saxifrage Family

HEUCHERA Alum-Root

Heuchera rubescens Torr.

RED ALUM-ROOD, JACK O'THE ROCKS. Wheeler Wash 12 0237 778E 38 85 538N Clifton 40688. [*S. versicolor* E. Greene].

SCROPHULARIACEAE Figwort Family

- 1 Fertile anther-bearing stamens 5 *Verbascum*
- 1 Fertile anther-bearing stamens 4 or 2
 - 2 Flowers with a staminode (sterile 5th stamen)
 - 3 Corolla 7-9 mm long, upper half maroon, lower cream *Scrophularia*
 - 3 Corolla 13-32 mm long, blue, rose-pink, pale pink, violet, red-violet, lavender, red, yellow or magenta
 - 4 Flowers yellow *Keckiella*
 - 4 Flowers not yellow *Penstemon*
 - 2 Flowers lacking a staminode
 - 5 Fertile stamens 2
 - 6 Flowers 2-6 mm long; plants of moist to wet places *Veronica*
 - 6 Flowers 15-35 mm long; plants of dry places *Mohavea*
 - 5 Fertile stamens 4
 - 7 Leaves hastate to sagittate *Maurandya*
 - 7 Leaves not as above
 - 8 Leaves alternate; flowers yellow and gold or white with violet veins
 - 9 Flowers yellow and gold; pedicels twining *Neogaerrhinum*
 - 9 Flowers white with violet veins; pedicels not twining *Sairocarpus*
 - 8 Leaves opposite; flowers blue and white *Collinsia*

COLLINSIA

Collinsia parviflora Dougl.

SMALL-FLOWERED BLUE EYED MARY. Spring moist soil in openings, above 5000 ft. Knight Creek 12 0276 558E 38 89 296N Clifton 39906.

KECKIELLA

Keckiella antirrhinoides (Benth.) Straw

var. *microphyllus* (A. Gray) N. Holmgren

SMALL-LEAVED CHAPARRAL BEARDTONGUE. Alamo Crossing Road 12 0226 224E 38 51 199N Clifton 38795.

MAURANDYA

Maurandya antirrhiniflora Willd.

VIOLET TWINING SNAPDRAGON. Trailing over shrubs in open brushy places, rocky canyons. Hualapai Mountains Clifton 37096 12 0237 429E 38 85 255, Kaiser Spring Wash 12 0272 021E 38 28 855, Clifton 39313.

MOHAVEA

- 1 Corolla pale yellow, 25-35 mm long, lower lip shallowly cleft *M. confertiflora*
 1 Corolla bright yellow, 15-20 mm long, lower lip deeply cleft *M. breviflora*

***Mohavea breviflora* Cov.**

DESERT GHOST-SNAPDRAGON. Dry sandy or stony slopes, below 2500 ft. From 20 miles south of Lake Mead to Beaver Dam. March-April. Petroglyph Wash 718 357E 39 92 454N Clifton 43459.

***Mohavea confertiflora* (Benth.) A. Heller**

GHOSTFLOWER. Sandy places and stony talus slopes, below 2500 ft. Feb.-April. Highway 95 11 0763 321E 38 03 543N Clifton 38986.

NEOGAERRHINUM

***Neogaerrhinum filipes* (A. Gray) Rothm.**

YELLOW TWINING-SNAPDRAGON. Mid Jan-May. McCracken Mine Road 12 0247 670E 38 16 129N Clifton 38733, Meadow Creek 11 0748 427E 38 79 536N Clifton 39175. [*Antirrhinum* f. A. Gray].

PENSTEMON

- 1 Corolla red, scarlet-red, orangish-red, magenta
 2 Corolla glandular-pubescent externally; leaves dentate; limited to the Beaver Dam Mountains. *P. petiolatus*
 2 Corolla glabrous externally; leaves entire, not limited to the Beaver Dam Mountains
 3 Leaves glaucous, relatively thick and fleshy; anthers divaricate, opening wide *P. utahensis*
 3 Leaves otherwise; anthers if divaricate, not opening wide
 4 Lower lips of corolla reflexed
 5 Anthers horseshoe shaped; calyx pubescent *P. rostriflorus*
 5 Anthers divergent; calyx glabrous *P. barbatus*
 4 Lips of corolla with the lower straight
 6 Anthers horseshoe shaped *P. eatonii*
 6 Anthers divaricate, opening wide *P. subulatus*
 1 Corolla shades of blue, purple, lavender, rose, or pink
 7 Leaves with at least some of them with teeth on the margins or obscurely denticulate
 8 Leaves obscurely denticulate; none of the upper leaves perfoliate
 9 Corolla villose within; anthers not widely open *P. whippleanus*
 9 Corolla glandular hairy within; anther open widely *P. ophianthus*
 8 Leaves obviously toothed; upper leaves perfoliate
 10 Corolla not much inflated, reddish-pink
 11 Staminode hairy; floor of the throat villous towards the lip *P. bicolor*
 11 Staminode glabrous; floor of the throat glabrous *P. pseudospectabilis*
 10 Corolla inflated *P. palmeri*
 7 Leaves entire
 12 Herbage bearing retrorsely appressed, flattened, scale like hairs *P. thompsoniae*
 12 Herbage not as above
 13 Leaves 1-3 mm wide
 14 Corolla glabrous externally; leaves rolled upward; inflorescence not secund *P. thurberi*
 14 Corolla generally hairy externally; leaves not rolled; inflorescence secund *P. linarioides*
 13 Leaves (at least basal) wider than 3 mm
 15 Plants of low desert close to Yucca; leaves white margined *P. albomarginatus*
 15 Plants well above the low desert; leaves not white margined
 16 Staminode glabrous *P. virgatus*
 16 Staminode hairy, often densely so
 17 Corolla glabrous externally
 18 Basal leaves glaucous, thick
 19 Inflorescence narrow, flowers ± sessile *P. pachyphyllus*
 19 Inflorescence open, flowers out on naked branches *P. nudiflorus*
 18 Basal leaves usually lacking, if any present, green and not thick *P. watsonii*
 17 Corolla pubescent externally
 20 Anthers horseshoe shaped; plants from Mt Trumbull *P. distans*

20 Anthers divaricate; plants from else where

21 Corolla villose within; anthers not widely open..... *P. whippleanus*

21 Corolla glandular hairy within; anther open widely..... *P. ophianthus*

Penstemon albomarginatus M. E. Jones

WHITE-MARGINED BEARDTONGUE. Found in ± shallow drifting sand, graded roadside banks, 2000-2800 ft. Mid Mar-Jun. Alamo Road 12 0227 683E 3849 840N, Alamo Road 11 0773 198E 38 50 541N Clifton 39154, Alamo Road 11 0771 315E 38 52 750N, Borianna Mine Road 11 0771 853E 38 62 644N.

Penstemon barbatus (Cav.) Roth

var. *torreyi* (Benth.) A. Gray

TORREY'S SCARLET BEARDTONGUE. Rocky slopes, above 3600 ft. Feb-July. Cook Canyon 11 0764 969E 38 99 327N Clifton 38944, Cedar Wash 12 0244 470E 38 77 739N, Flag Mine 12 0237 235E 38 85 513N Clifton 37096.

Penstemon bicolor (Brandeg.) Clokey & Keck

var. *roseus* (Clokey & Keck) G. Clifton Comb. nov.

ROSE-COLORED PINTO BEARDTONGUE. It is doubtful that the variety is real. alluvial fans and plains in creosote-bush scrub. Portland Mine to Chloride. April-May.

Penstemon distans N. Holmgren

MOUNT TUMBULL BEARDTONGUE.

Penstemon eatonii A. Gray

a Herbage glabrous throughout..... var. *eatonii*

a Herbage puberulent..... var. *undosus*

var. *eatonii*

HAIRLESS FIRECRACKER. Feb-July. Alamo Crossing Road 12 0245 357E 38 28 332N Clifton 38804.

var. *undosus* M. E. Jones

HAIRY FIRECRACKER.

Penstemon linarioides A. Gray

var. *sileri* (A. Gray) Keck

SILER'S PENSTEMON. Gravelly openings in woodlands, above 4500 ft. June-Aug. Flag Mine Road 12 0237 900E 38 84 655N Clifton 40742, Tom Brown Road 12 0274 166E 38 62 485N Clifton 41314.

Penstemon nudiflorus A. Gray

FLAGSTAFF BEARDTONGUE.

Penstemon ophianthus Pennell

ARIZONA BEARDTONGUE. Sandy places in pinyon-juniper, 4500-7000 ft. May-June.

Penstemon pachyphyllus A. Gray

var. *congestus* (M. E. Jones) N. Holmgren

CONGESTED THICK-LEAVED BEARDTONGUE. Hidden Hills 12 0264 992E 40 23 580N Clifton 42319.

Penstemon palmeri A. Gray

PALMER'S PENSTEMON. Openings in brush, along roads. Blake Ranch Road 12 0246 096E 38 76 689N Clifton 39813, Mt. Trumbull 12 0309 464E 40 28 057N Clifton 41739.

Penstemon petiolatus Brandeg.

PETIOLATE BEARDTONGUE.

Penstemon pseudospectabilis M.E. Jones

DESERT BEARDTONGUE. Blake Ranch Road 12 0244 750E 38 94 453N Clifton 39794.

Penstemon rostriflorus Kell.

BEAKED PENSTEMON. Frequent, June-Aug.(Nov.). Hualapai Mountain Road 12 0235 225E 38 89 534N Clifton 38591, Mt Trumbull 12 0309 350E 40 29 362N.

Penstemon subulatus Eastw.

HACKBERRY BEARDTONGUE. Stony slopes, canyons, and mesas. Feb.-May. Type came for Hackberry

Penstemon thompsoniae (A. Gray) Rydb.

THOMPSON'S BEARDTONGUE. Limestone gravelly slopes and small ridges, 4000-7000 ft. Mid Apr-June. Branch of Truxton Wash 12 0276 454E 39 21 109N Clifton 39739, East Branch Tuckayou Wash 12 0282 077E 39 04 778N Clifton 39872, Grapevine Canyon 234 350E 39 76 436N Clifton 42343.

Penstemon thurberi Torr.

THURBER'S PENSTEMON. Open, sandy-stony slopes and in scrub-oak thickets, 2000-5000 ft. March-Aug.

Penstemon utahensis Eastw.

UTAH FIRECRACKER. Canyons and mesas. March-May. White Hills 11 0746 684E 39 62 390N Clifton 39709, Mt. Trumbull Loop Road 12 0270 556E 40 79 460N Clifton 42272.

Penstemon virgatus A. Gray

var. ***glabratus*** G. Clifton var. nov.

SMOOTH HAIRLESS-TONGUE. These plants hardly look like the species. They are a darker green, not as strict, glabrous, the calyx lobes are hyaline. There may be other glabrous plants within the range of the species that need to be look at to see if there characters match the ones from the Hualapai Mountains. July. Camp Levi Levi 12 0235 275E 38 86 681N Clifton 41223.

Penstemon watsonii A. Gray

WATSON'S BEARDTONGUE. Gravelly to rocky places in the sagebrush and pinyon-juniper. Limited to Mokiak Pass. June-July.

Penstemon whippleanus A. Gray

WHIPPLE'S PENSTEMON. Openings in montane forest, above 6500 ft. Limited the Hualapai Mountains. July-Aug.

SAIROCARPUS Toad's Mouth

Sairocarpus kingii (S. Wats.) D. A. Sutton

KING'S TOAD'S MOUTH. rocky slopes in scrub. [*Antirrhinum* k. S. Wats.].

SCROPHULARIA Figwort

Scrophularia parviflora Woot. & Standl.

SMALL-FLOWERED FIGWORT. Rich soil in coniferous forests, above 5500 ft. Hualapai Mountains. July-Oct. Flag Mine 12 0237 016E 38 85 222N Clifton 40703.

VERBASCUM

Verbascum thapsus L.

WOOLLY MULLEIN. Disturbed places, below 6500 ft.; introduced from Eurasia. June-Sept. Antelope Wash 12 0236 535E 38 84 049N Clifton 40941, Mt. Trumbull 12 0309 013E 40 30 059N.

VERONICA Speedwell, Brooklime

1 Plants annual; corolla white..... ***V. peregrina*** ssp. ***xalapensis***

1 Plants perennial; corolla blue or pale lavender to bluish, with violet lines ***V. anagallis-aquatica***

Veronica anagallis-aquatica L.

GREAT WATER SPEEDWELL. along rivers and in ponds; introduced from Europe. These plants often bloom the first year appearing annual. Apr-Nov. Six Mile Crossing Road 12 0275 393E 38 33 100N Clifton 39492, Bill Williams River 11 0773 605E 37 94 900N, Knight Creek 12 0276 558E 38 89 296N Clifton 39901.

Veronica peregrina L. ssp. ***xalapensis*** (Kunth) Pennell

PURSLANE SPEEDWELL. vernal moist places and receding lake margins. April-early Nov.:

SIMAROUBACEAE Quassia Family

AILANTHUS

Ailanthus altissima (P. Mill.) Swingle

TREE OF HEAVEN. Hualapai Mountain Road 12 0234 063E 38 91 287N Clifton 40921.

SOLANACEAE Nightshade Family

1 Corolla 15-20 cm long..... ***Datura***

1 Corolla 0.5-3.5 cm long

2 Plants a tree with yellow flowers ***Nicotiana***

2 Plants otherwise

3 Plants prostrate; flowers violet with a yellow tube ***Calibrachoa***

3 Plants otherwise

- 4 Plants a well developed woody shrub with thorns *Lycium*
- 4 Plants herbaceous to a subshrub that may be slightly woody at base, lacking thorns
- 5 Corolla with a tube 15-27 mm long *Nicotiana*
- 5 Corolla with tube very short or not obvious
- 6 Some of the hairs branched
- 7 The fornices white-velvety *Chamaesaracha*
- 7 The fornices (if present) not as above *Physalis*
- 6 None of the hairs branched
- 8 Anthers tightly connivent around the style *Solanum*
- 8 Anthers loose around the style *Physalis*

CALIBRACHOA

Calibrachoa parviflora (Juss.) D'Arcy

SMALL-FLOWERED PETUNIA. Moist sand in washes, below 5000 ft. April-Dec. Old Trails Road 11 0767 917E 38 95 755N Clifton 38644. [*Petunia p.* Juss.].

CHAMAESARACHA

Chamaesaracha coronopus (Dunal) A. Gray

GREEN-LEAVED FIVE-EYES. April-Sept. Lookout Wash 12 0278 900E 38 98 260N Clifton 39876, Old 66 12 0285 250E 39 36 800N Clifton 41238.

DATURA

Datura wrightii Regel

TOLGUACHA. Timber Wash 12 0243 284E 38 82 503N, Beale Spring 11 0765 565E 38 99 352N Clifton 40675.

LYCIUM

- 1 Plants glandular pubescent
- 2 Calyx 8-15 mm long, lobes generally greater than 2 mm long *L. cooperi*
- 2 Calyx 8 mm or less long, lobes less than 2 mm long
- 3 Filaments with a tuft of hair above base; corolla lobes erect *L. fremontii*
- 3 Filaments thin hairy from base to about middle
- 4 Filaments shorter to $\pm$ equaling corolla; lobes of calyx half as long to longer than the tube *L. parishii*
- 4 Filaments exerted 2-5 mm; lobes of calyx less than half as long (generally 1/4 as long) *L. exsertum*
- 1 Plants not glandular pubescent or only very slightly so on a few of the leaves
- 5 Calyx-tube 2.5-4 mm long, lobes as long as or 2 times longer, margins glabrous *L. pallidum*
- 5 Calyx-tube often less than 2.5 mm long, lobes shorter than the tube, margins hairy
- 6 Anthers and style not much exerted beyond the corolla lobes *L. andersonii*
- 6 Anthers and style exerted beyond the corolla lobes *L. torreyi*

Lycium andersonii A. Gray

ANDERSON'S DESERT-THORN. Lake Havasu City 11 0753 560E 38 15 445N Clifton 38909, Signal Road 12 0263 888E 38 28 302N Clifton 38849, Red Lake 11 0760 996E 39 51 149N Clifton 39393.

Lycium cooperi A. Gray

PEACH-THORN. Grapevine Spring 11 0764 673E 38 99 873N Clifton 39222, Clack Canyon 11 0767 340E 38 98 390N Clifton 39331.

Lycium exsertum A. Gray

ARIZONA DESERT-THORN. Frequent, below 4000 ft; rocky slope. The ovary blood red at base. The flowers are declined May flower any time but mainly Jan-early March. Alamo Road 12 0250 751E 38 13 246N Clifton 38869, Old Trails Road 768 149E 38 95 618N.

Lycium fremontii A. Gray

FREMONT'S DESERT-THORN. The ovary blood red at base. May flower any time but mainly Jan-early March. Oatman Road 11 0741 901E 38 80 172N Clifton 38891, Bill Williams River 11 0767 794E 37 99 341N Clifton 38984.

Lycium pallidum Miers

PALLID DESERT-THORN. Clay Springs Road 12 0240 279E 39 56 907N Clifton 39371.

Lycium parishii A. Gray

PARISH'S DESERT-THORN. Jan-Apr. Alamo Road 12 0249 956E 38 07 984N Clifton 38835, Alamo Road 12 0250 751E 38 13 246N Clifton 38870.

Lycium sp. 38849 Lake Havasu City 11 0753 560E 38 15 445N Clifton 38910.

MARGARANTHUS

Margaranthus solanaceus Schlecht.

NETTED GLOBE-CHERRY. Knight Creek 12 0276 680E 38 89 213N Clifton 41401.

NICOTIANA Tobacco

- 1 Plants a tree; flowers yellow ***N. glauca***
- 1 Plants herbs; flowers white
 - 2 Cauline leaves not clasping; annual; flowers closed during the day
 - 3 Middle cauline leaves petioled ***N. attenuata***
 - 3 Middle cauline leaves sessile ***N. clevelandii***
 - 2 Cauline leaves clasping; perennial; flowers open during the day
 - 4 Calyx lobes not much longer than the tube, not completely inclosing the fruit ***N. obtusifolia***
 - 4 Calyx lobes often 3 times as long as the tube, completely inclosing the fruit ***N. palmeri***

Nicotiana attenuata Torr.

COYOTE TOBACCO. disturbed places, usually sandy. May-Oct. Flag Mine Road 12 0238 016E 38 84 636N Clifton 40744, Mt. Trumbull 12 0309 013E 40 30 059N Clifton 41744.

Nicotiana clevelandii A. Gray

CLEVELAND'S TOBACCO.

Nicotiana glauca Graham

TREE TOBACCO. Along streams, ditches and washes, below 3000 ft.; introduced from South America. Flowers most anytime of the year. Old Trails Road 11 0767 917E 38 95 755 Clifton 38642

Nicotiana obtusifolia Martens & Galeotti

June-early Dec. Griffith Road 11 0761 291E 38 80 388N Clifton 38670. [*N. trigonophylla* Dunal].

Nicotiana palmeri A. Gray

PALMER'S TOBACCO. Cane Spring Wash 12 0259 967E 38 66 431N Clifton 38951.

PHYSALIS Ground-Cherry

Note: The plants in this group have been moved around from one species to another with great regularity. It still appears that after all this movement they are still misunderstood. Most of this movement has been made by arm chair taxonomist. Most floras that have been written don't agree with each other at all. The following is base on what the author sees in the field and names are used to separate the plants, but they may or may not be right.

- 1 Herbage cover with gland-tipped hairs
 - 2 Plants annual; pedicels 1 mm thick ***P. subulata***
 - 2 Plants perennial; pedicels up to 0.7m m thick
 - 3 Pedicels longer than the flower or fruiting calyx ***P. crassifolia***
 - 3 Pedicels shorter than the flower or the fruiting calyx ***P. hederifolia***
- 1 Herbage covered with branched hairs ***P. hederifolia***

Physalis crassifolia Benth.

YELLOW NIGHTSHADE GROUND-CHERRY. Jan-June, Aug-Oct. Alamo Crossing Road 12 0228 720E 38 48 213N Clifton 38714.

Physalis hederifolia A. Gray

- 1 Stems with branched hairs var. ***fendleri***
- 1 Stems glandular var. ***palmeri***

var. ***fendleri*** (A. Gray) Cronq.

FENDLER'S IVY-LEAVED GROUND-CHERRY. Dry, open places, above 5400 ft. May-Oct. Wheeler Wash 12 0238 730E 38

86 258N Clifton 40923, Fort Rock Exit 12 0284 685E 38 96 409N Clifton 40759.

var. **hederifolia**

IVY-LEAVED GROUND-CHERRY. Dry, open places, 5200-6500 ft. May-Oct. Silver Springs Road 12 0266 408E 38 92 235N Clifton 39851.

Physalis subulata Rydb.

var. **neomexicana** (Rydb.) Waterfall

NEW MEXICO GROUND-CHERRY. Blye Canyon 12 0286 164E 39 24 412N Clifton 41613.

SOLANUM Nightshade

- 1 Plants densely stellate, and most often bearing prickles
 - 2 Corolla yellow **S. rostratum**
 - 2 Corolla purple or blue..... **S. elaeagnifolium**
- 1 Plants not densely stellate, lacking prickles
 - 3 Flowers dark blue or lavender **S. xantii**
 - 3 Flowers white
 - 4 Leaves pinnate, rachis naked between leaflets..... **S. jamesii**
 - 4 Leaves entire to variously toothed or lobed, rachis not naked
 - 5 Anthers 2.5-4 mm long
 - 6 Plants annual; leaves deeply lobed **S. triflorum**
 - 6 Plants perennial; leaves $\pm$ entire, to 1-2 lobed at base or coarsely and irregularly toothed..... **S. douglasii**
 - 5 Anthers 1.4-2.2 mm long **S. americanum**

Solanum americanum P. Mill.

SMALL-FLOWERED or AMERICAN BLACK NIGHTSHADE. usually moist waste places or about seeps. April-Nov. Warm Springs 746 272E 38 64 564N Clifton 43438. [**S. nodiflorum** Jacq.].

Solanum douglasii Dunal

DOUGLAS' NIGHTSHADE.

Solanum eleagnifolium Cav.

WHITE HORSE-NETTLE. Along road, other waste places, spreading into native habitat; introduced from central US or Mexico. In various places the flower are white, some in populations by them selves and sometimes mixed with the purple form. June-early Sept. Temple Bar Road 11 0722 568E 39 68 954N Clifton 39684, W. Spring St. 11 0767 400E 38 98 167N Clifton 40669, Hackberry Road 12 0258 850E 39 04 480N Clifton 8230.

Solanum jamesii Torr.

WILD POTATO. Toroweap Valley 12 0315 682E 40 29 808N Clifton 41726.

Solanum rostratum Dunal

BUFFALO BERRY. Nov. D-W Ranch Road 12 0236 947E 38 96 451N Clifton 38606.

Solanum triflorum Nutt.

THREE-FLOWERED NIGHTSHADE. Potato Valley 0302 497E 40 30 783N Clifton 41755.

Solanum xantii A. Gray

PURPLE NIGHTSHADE. May-Nov. Hualapai Mountain Road 12 0235 225E 38 89 534N Clifton 38592.

STERCULIACEAE Cacao Family

AYENIA

Ayenia compacta Rose

CALIFORNIA AYENIA. Kane Springs Wash 12 0259E 38 66 602N Clifton 39290.

TAMARICACEAE Tamarisk Family

TAMARIX

- 1 Twig-leaves not overlapping, clasping **T. aphylla**
- 1 Twig-leaves overlapping, not clasping
 - 2 Twig-leaves oblong to narrowly lanceolate, acute; sepals entire **T. chinensis**
 - 2 Twig-leaves ovate, acute to acuminate; sepals minutely toothed..... **T. ramosissima**

Tamarix aphylla (L.) Karst.

ATHEL. Alamo Lake 12 0261 105E 37 94 617N Clifton 38878.

Tamarix chinensis Lour.

FIVE-STAMEN TAMARISK.

Tamarix ramosissima Ledeb.

MUCH-BRANCHED TAMARISK. Bullhead 11 0721 541E 38 94 513N Clifton 39941.

ULMACEAE Elm Family**CELTIS*****Celtis reticulata*** Torr.

NET-LEAF HACKBERRY. Grapevine Spring 11 0764 827E 38 99 926N Clifton 40681.

ULMUS***Ulmus pumila*** L.

SIBERIAN ELM. Hualapai Mountain Road 12 0233 434E 38 92 613N Clifton 38629.

URTICACEAE Nettle Family**PARIETARIA**

1

Parietaria hespera B. HintonRILLITA PELLITORY. Feb-April. Burro Creek 12 0274 831E 38 24 010N Clifton 38700. [*P. floridana* Nutt. misapplied].***Parietaria pennsylvanica*** Willd.

PENNSYLVANIA PELLITORY. Rocky cliffs in the shade. July-Aug. Clay Springs Road 12 0240 279E 39 56 907N Clifton 39373.

URTICA***Urtica urens*** L.

DWARF NETTLE. About cattle staging areas around watering places. Blooms any time of the year. Baker Well 12 0248 115E 38 11 486N Clifton 38832.

VALERIANACEAE**VALERIANA*****Valeriana arizonica*** A. Gray

WESTERN VALERIAN

VERBENACEAE Vervain Family

- 1 Plants a shrub..... *Aloysia*
 1 Plants herbs
 2 Calyx 5t-toothed *Verbena*
 2 Calyx 2-4 toothed *Phyla*

ALOYSIA***Aloysia wrightii*** (A. Gray) A. Heller

OREGANILLO. Hualapai Mountain Road 12 0230 855E 38 94 502N Clifton 38619.

PHYLA

Phyla cuneifolia (Torr.) E. Greene
WEDGELEAF FOGFRUIT.

VERBENA Vervain

- 1 Flowers well exerted beyond the bracts, showy
 - 2 Corolla tube only slightly longer than the calyx; floral bractlets shorter than calyx ***V. gooddingii***
 - 2 Corolla tube well exerted from calyx; floral bractlets usually exceeding the calyx.....***V. bipinnatifida***
- 1 Flowers much shorter than the bracts, not showy
 - 3 Plants prostrate; bracts much longer than the flowers.....***V. bracteata***
 - 3 Plants erect; bracts not much longer than the flowers
 - 4 Leaf blades serrate-dentate or shallowly incised..... ***V. macdougallii***
 - 4 Leaf blades deeply incised-dentate to pinnatifid ***V. neomexicana***

Verbena bipinnatifida (Nutt.)

SMALL-FLOWERED VERVAIN. Bly Canyon 280 519E 39 27 750N Clifton 41609

Verbena bracteata Lag. & Rodr.

BRACKETED VERVAIN. Infrequent, below 5000 ft.; along road and pond shores. June-Aug. Hualapai Mountain Road 235 221E 38 89 557N Clifton 40682.

Verbena gooddingii Briq.

SOUTHWESTERN VERVAIN. Disturbed places, openings in pinyon-juniper woodland. July-Jan. Thunderhead Drive 12 0234 502E 38 93 303N Clifton 38551, Alamo Crossing Road 12 0241 952E 38 32 750N Clifton 38724, Grapevine Canyon 12 0233 746E 39 75 700N.

Verbena macdougallii Heller

MACDOUGAL'S VERVAIN.

Verbena neomexicana (A. Gray) Small

NEW MEXICO VERVAIN.

VIOLACEAE Violet Family

- 1 Petals about 3 mm long; leaves sessile or subsessile ***Hybanthus***
- 1 Petals 8-12 mm long; leaves with long petioles.....***Viola***

HYBANTHUS

Hybanthus verticillatus (Ortega) Baill.

BABY-SLIPPERS. Hualapai Mountain Road 12 0230 719E 38 94 445N Clifton 38618, Branch of Truxton Wash 12 0277 194E 39 18 054N Clifton 39744.

VIOLA

Viola vallicola A. Nels.

VALLEY VIOLET.

VISCACEAE Mistletoe Family

- 1 Pistillate sepals 2; berry on a recurved pedicel, compressed***Arceuthobium***
- 1 Pistillate sepals 3; berry sessile, globose***Phoradendron***

ARCEUTHOBIUM DWARF MISTLETOE

Arceuthobium vaginatum (Willd.) J. Presl var. ***cryptopodum*** (Engelm.) Cronq.

SOUTHWESTERN MISTLETOE. Frequent, parasitic on Yellow Pine. Camp Levi 12 0235 328E 38 86 747N Clifton 40736.

PHORADENDRON Mistletoe

- 1 Leaves reduced to connate scales
- 2 Stems glabrous; parasitic on juniper *P. juniperinum*
- 2 Stems canescent, especially at tips; on *Acacia*, *Cercidium*, *Larrea* *P. californicum*
- 1 Leaves well developed; parasitic on oaks and cottonwood
- 3 Leaves generally less than 3 cm long; generally on oaks *P. coryae*
- 3 Leaves usually over 3 cm long; generally on cottonwood *P. macrophyllum*

Phoradendron californicum Nutt.

DESERT MISTLETOE. Hualapai Mountain Road 12 0230 433E 38 94 826N Clifton 38613.

Phoradendron coryae Trel.

SMALL-LEAVED MISTLETOE. Frequent, parasitic on oaks Hualapai Mountain Road 12 0231 028E 38 94 075N Clifton 38625.

Phoradendron juniperinum A. Gray

JUNIPER MISTLETOE. parasitic on Juniper. Hualapai Mountain Road 12

Phoradendron macrophyllum (Engelm.) Cockerell

BIG LEAF MISTLETOE. Big Sandy River 12 0263 032E 38 38 961N Clifton 38954.

VITACEAE Grape Family

- 1 Leaves simple; inflorescence a panicle *Vitis*
- 1 Leaves palmately compound; inflorescence a cyme *Parthenocissus*

PARTHENOCISSUS***Parthenocissus vitacea*** (Knerr) Hitchc.

VIRGINIA CREEPER.

VITIS Grape***Vitis arizonica*** Engelm.

ARIZONA GRAPE. Infrequent, in canyon bottoms, mostly along intermittent streams. Hualapai Mountain Road 12 0235 221E 38 89 557N Clifton 40686.

ZYGOPHYLLACEAE Caltrop Family

- 1 Leaflets 2 *Larrea*
- 1 Leaflets 3 or more
- 2 Stipules spine-tipped; leaflets 3 *Fagonia*
- 2 Stipules lacking spines; leaflets 6-18
- 3 Stipules subulate; fruit lacking spines *Kallstroemia*
- 3 Stipules membranaceous; fruit bearing spines *Tribulus*

FAGONIA***Fagonia laevis*** Standl.

CALIFORNIA FAGONBUSH. McCracken Mine Road 12 0247 670E 38 16 129N. Clifton 38812.

KALLSTROEMIA

- 1 Herbage with widely spreading hairs, also strigose; beak of fruit strigose *K. hirsutissima*
- 1 Herbage glabrous to strigose; beak
- 2 Beak of fruit 4-6 mm long, longer than the nutlet; petals 6-12 mm long *K. californica*
- 2 Beak of fruit 3-3 mm long, shorter than the nutlet; petals 3-5 mm long *K. parviflora*

Kallstroemia californica (S. Wats.) Vail

CALIFORNIA CALTROP. Blake Ranch Road 12 0245 741E 38 95 872N Clifton 10357.

Kallstroemia parviflora Norton

SMALL-FLOWERED CALTROP. Blake Ranch Road 12 0245 741E 38 95 872N Clifton 41303.

Kallstroemia hirsutissima Vail

HAIRY CALTROP. Old Trails Road 11 0767 866E 38 95 832N Clifton 38639.

LARREA

Larrea tridentata (DC.) Cov.

CREOSOTE BUSH. Blooms after rain. McCracken Mine Road 12 0247 670E 38 16 129N Clifton 38735.

TRIBULUS Puncture-Vine

Tribulus terrestris L.

BULLHEAD; PUNCTURE-VINE. Old Trails Road 11 0767 866E 38 95 832N Clifton 38638.

MONOCOTS

AGAVACEAE Agave Family [Liliaceae-in part]

- 1 Plants herbs..... ***Hesperocallis***
- 1 Plants shrubs
 - 2 Margins of the leaf with short curved spines; perianth segments narrow ***Agave***
 - 2 Margins of the leaf entire or denticulate; perianth segments broad ***Yucca***

AGAVE

1

Agave deserti Engelm.

DESERT CENTURY-PLANT.

Agave mckelveyana Gentry

MCKELVEY'S CENTURY-PLANT. Flag Mine Road 12 0237 900E 38 85 629N Clifton 37202.

Agave utahensis Engelm.

UTAH CENTURY-PLANT. Beaver Dam Mountains 12 0248 782E 40 96 646N Clifton 42234.

HESPEROCALLIS

Hesperocallis undulata A. Gray

DESERT LILY. Lake Havasu 11 0740 618E 38 27 206N Clifton 39278.

YUCCA

- 1 Leaf margins separating, forming curly fibers
 - 2 Plants that are well developed, have a definite trunk ***Y. schidigera***
 - 2 Plants lacking a well developed trunk, ± acaulescent to short caulescent
 - 3 Inflorescence down among the leaves..... ***Y. baccata***
 - 3 Inflorescence surpassing the leaves by some degree
 - 4 Inflorescence bearing some branches
 - 5 Style longer and contracted abruptly to the ovary; leaves 0.7-1.5 cm wide ***Y. elata***
 - 5 Style short and tapered to the ovary; leaves 2.5-4 cm wide, if flattened, up 6 cm wide..... ***Y. baccata***
 - 4 Inflorescence racemose ***Y. angustissima***
- 1 Leaf margins not separating..... ***Y. brevifolia***

Yucca angustissima Engelm.

FINE-LEAVED YUCCA.

Yucca baccata Torr.

- a Inflorescence down among the leaves var. *vespertina*
 a Inflorescence surpassing the leaves by some degree var. *baccata*

Var. ***baccata*** Torr.

SPANISH BAYONET. Mt. Trumbull Loop 271 485E 40 84 730N Clifton 42261.

var. ***vespertina*** McKelvey

PURPLE-STEMMED SPANISH BAYONET. Cook Canyon 11 0766 723E 38 97 109N Clifton 39439, Blake Ranch Road 12 0244 757E 38 94 453.

Yucca brevifolia Engelm.

JOSHUA TREE. Feb-May. Alamo Road 12 0244 515E 38 29 857N Clifton 38865, Beaver Dam Mountains. 12 0248 766E 40 96 415N.

Yucca elata Engelm.var. ***utahensis*** (McKelvey) Reveal

UTAH SOAPTREE YUCCA. Beaver Dam Mountains 12 0248 782E 40 96 646N Clifton 42232.

Yucca schidigera K. Ortgies

MOJAVE YUCCA, SPANISH DAGGER. Hualapai Mountains 11 0766 985E 38 91 488N Clifton 39032. [*Y. mohavensis* Sarg.].

Yucca whipplei Torr.

OUR-LORDS-CANDLE

ALLIACEAE Onion Family
 [Liliaceae-in part]

ALLIUM Wild Onion

- 1 Leaf 1 per stem, cylindric
 2 Pedicels stout, usually shorter than the flowers *A. parishii*
 2 Pedicels slender, longer than the flowers *A. atrorubens*
 1 Leaf at least 2 per stem
 3 Inner whorl of perianth segments obscurely serrulate-denticulate; bulb coats obvious to the naked eye; ovary crests lacking *A. acuminatum*
 3 Inner whorl of perianth segments not serrulate-denticulate; bulb coats not obvious to the naked eye; over crests obvious
 4 Bulb coats light; style longer than the stamens; plants generally taller *A. bisceptrum*
 4 Bulb coats dark brown; style slightly shorter than the stamens; plants shorter than the last *A. bigelovii*

Allium acuminatum Hook.

HOOKER'S ONION. Infrequent, 3000-6700 ft.; rocky openings in brush. May-July: Mount Dellenbaugh Road 269 009E 40 04 027N Clifton 42326

Allium atrorubens S. Wats.var. ***cristatum*** (S. Wats.) D. McNeal

DARK RED ONION. [*A. nevadense* S. Wats. var. *c.* S. Wats., var. *inyoensis* (M. E. Jones) Ownbey & Aase]

Allium bigelovii S. Wats.

BIGELOW'S ONION. Six Mile Crossing Road 12 0283 210E 38 28 339N Clifton 39442.

Allium bisceptrum S. Wats.var. ***palmeri*** (S. Wats.) Cronq.

PALMER'S PATIS ONION. Camp Levi 10 0235 515E 38 86 619N Clifton 40729

Allium parishii S. Wats.

PARISH'S ONION. April. Chemehuevi Valley in 1903.

CALOCHORTACEAE Star Tulip Family
 [Liliaceae-in part]

- 1 Perianth, orange or yellow with a big dark blotch at the base *C. kennedyi*
 1 Perianth light lavender to white (may have a dark blotch in *C. flexuosus*)
 2 Filaments of the stamens expanded at the base; lacking a dark band above the gland *C. flexuosus*
 2 Filaments of the stamens about the same from the top to the bottom; dark banded above the gland

- 3 Stamens whitish; the upper band deeply lunate; the surface next to the gland glabrous.....*C. nuttallii*
 3 Stamens pinkish; the upper band only slightly curved; the surface next to the gland hairy.....*C. ambiguus*

Calochortus ambiguus (M. E. Jones) Ownbey

DOUBTING MARIPOSA-LILLY

Calochortus flexuosus S. Wats

SINUOUS MARIPOSA-LILY. Dry stony slopes, mesas and flats, below 6500 ft. Late Mar-Jun. Chicken Spring Road 12 0257
 444E 38 42 404N Clifton 39292, Truxton 12 0269 780E 39 29 790N Clifton 39725, Detrital Valley 728 355E 39 80 000N
 Clifton 43454

Calochortus kennedyi Porter

- a Flowers yellow var. *munzii*
 a Flowers orange var. *kennedyi*

var. *kennedyi*

KENNEDY'S MARIPOSA LILY. White Cliffs Wagon Trail Park 11 0768 644E 38 99 954N Clifton 39787, Blake Ranch Road
 12 0244 757E 38 94 453.

var. *munzii* Jeps.

YELLOW KENNEDY'S MARIPOSA LILY. White Cliffs Wagon Trail Park 11 0768 240E 38 99 289N Clifton 39789.

Calochortus nuttallii T. & G.

SEGO LILY. Dry slopes and flats, throughout. June-July.

CONVALLARIACEAE Lily-of-the-Valley Family [Liliaceae-in part]

- 1 Plants herbs..... *Smilacina*
 1 Plants shrub-like *Nolina*

NOLINA

Nolina bigelovii (Torr.) S. Wats.

BIGELOW'S NOLINA.

Nolina microcarpa S. Wats.

SACAHUISTA, SMALL-FRUITED NOLINA. Wheeler Wash 12 0237 792E 38 85 470N Clifton 40690

Nolina parryi S. Wats.

PARRY'S NOLINA.

SMILACINA Solomon's-Seal

Smilacina stellata (L.) Desf.

STAR SOLOMON'S SEAL. Frequent, usually above 4000 ft.; moist wooded slopes, often in brush in canyons. April-June

CYPERACEAE Sedge Family

- 1 Achenes surrounded by closed bracts (perigynia)..... *Carex*
 1 Achenes not surrounded by closed bracts
 2 Plants coarse, in dense bunches with leaves sharply serrate *Cladium*
 2 Plants not combining the above characters
 3 Floral bracts alternating with each other along the rachis..... *Cyperus*
 3 Floral bracts arranged in a spiral
 4 Perianth bristles absent *Bulbostylis*
 4 Perianth bristles generally present
 5 Stem leaves lacking; spikelet 1 per stem..... *Eleocharis*
 5 Stems with at least one leaf; spikelets several per stem *Schoenoplectus*

BULBOSTYLIS Hair Sedge

- 1 Spikelets both at the base and at apical, single per stem..... *B. funkii*

1 Spikelets apical, generally more than 1 per stem *B. capillaris*

Bulbostylis capillaris (L.) C. B. Clarke

DENSE-TUFT HAIR SEDGE. Branch of Knight Creek 12 0277 292E 38 90 810N Clifton 11939

Bulbostylis funckii (Steud.) C. B. Clarke

FUNCK'S HAIR SEDGE. Hualapai Mountain County Park 12 0235 660E 38 87 100N Clifton 41386. [*Fimbristylis c.* (L.) A. Gray, *Stenophyllus c.* (L.) Britt].

CAREX Sedge

- 1 Perigynia hairy
 - 2 Leaves over topping the fruiting spikes; dry places *C. rossii*
 - 2 Leaves shorter than the fruiting spikes; wet places *C. pellita*
- 1 Perigynia glabrous
 - 3 Pistillate flowers and staminate flowers on separate plants
 - 4 Culms generally smooth and less than 2 dm tall; perigynium finely nerved ventrally *C. douglasii*
 - 4 Culms generally roughened above and more than 2 dm tall; perigynium nerveless ventrally *C. praegracilis*
 - 3 Staminate flowers above pistillate flower in each spikelet or at least in the upper
 - 5 The stem strongly spongy-triangular; the hyaline part of the leaf sheath cross-rugulose and fragile *C. stipata*
 - 5 The stem rather thin, not spongy; the hyaline part of the leaf sheath smooth and fairly indurate
 - 6 Inflorescence usually compound *C. alma*
 - 6 Inflorescence not compound
 - 7 Perigynia 4.5-6.2, margin with a well developed wing *C. siccata*
 - 7 Perigynia 2.5-4.0 mm long, margin lacking a well developed wing
 - 8 Perigynia abruptly contracted to the beak and completely filled by fruit, not evidently serrulate-margined to the naked eye *C. vallicola*
 - 8 Perigynia with beak indistinct, not completely filled by fruit, upper margins obviously serrulate to the naked eye
 - 9 Plants normally $\pm$ caespitose; beak of fruit not obviously bidentate *C. occidentalis*
 - 9 Plants strongly rhizomal; beak of fruit obviously bidentate *C. praegracilis*
 - 3 Staminate flowers below pistillate flowers in each spikelet *C. subfusca*

Carex alma L. Bailey

STURDY SEDGE. New Years Cabin Spring 12 0238 460E 38 83 800N Clifton 40747, Pine Lake 12 0238 687E 38 86 526N Clifton 40930.

Carex douglasii Boott

DOUGLAS' SEDGE

Carex occidentalis L. Bailey

WESTERN SEDGE. Flag Mine 12 0236 979E 38 85 521N Clifton 40704.

Carex pellita Muhl.

WOOLLY SEDGE. Frequent, 6000-9000ft.; wet places in riparian, along streams. [*C. lanuginosa* Michx. misapplied].

Carex praegracilis W. Boott.

CLUSTERED FIELD SEDGE. moist places. Late March-June. Knight Creek 12 0276 558E 38 89 296N Clifton 39896.

Carex rossii Boott

ROSS' SEDGE. East Branch Tuckayou Wash 12 0280 889E 39 03 148N Clifton 39870.

Carex siccata Dewey

DRY SEDGE.

Carex stipata Muhl.

AWL-FRUITED SEDGE.

Carex subfusca W. Boott

RUSTY SEDGE. Camp Levi 10 0235 515E 38 86 619N Clifton 40734, Camp Levi Road 12 0235 753E 38 87 262N Clifton 40714.

Carex vallicola Dewey

VALLEY LOVING SEDGE. Some have made *C. rusbyi* conspecific with this taxon. By more study it may still deserve recognition.

CLADIUM Twig Rush

Cladium californicum (S. Wats.) O’Niell
SAW-GRASS. Columbine Falls.

CYPERUS Umbrella-Sedge

- 1 Style branches 2; fruit 2-angled *C. laevigatus*
- 1 Style branches 3; fruit 3-angled
 - 2 Stems arising from hard knotty or tuber-like bases; flowering bracts when flattened are $\pm$ as wide as long
 - 3 Spikes composed of no more than 4 or 5 spikelets, often less *C. fendlerianus*
 - 3 Spikes with some or most of them composed of more than 5 spikelets
 - 4 Rays of the inflorescence not obvious; bracts of the inflorescence generally spreading to drooping; not on pink sand *C. sphaerolepis*
 - 4 Rays of the inflorescence often naked for some distance; bracts of the inflorescence generally erect; found on pink sand in nw part of the county *C. schweinitzii*
- 2 Stems arising from annual roots
 - 5 Flowering bracts 2-4 mm long *C. odoratus*
 - 5 Flowering bracts 0.6-1.5 mm long
 - 6 Spikelets 50-100 or more; flowering bracts 0.6-0.8 mm long *C. difformis*
 - 6 Spikelets less than 50; flowering bracts 1.3-1.5 mm long *C. erythrorhizos*

Cyperus difformis L.

SMALL-FRUITED FLAT-SEDGE. Wet ditches; introduced from Asia. July-Sept. This taxon was reported from Topock, however this site is under water and these plants may not exist in this county

Cyperus erythrorhizos Muhl.

RED-ROOTED CYPERUS or FLAT-SEDGE. Road side ditches, river beds, margins of lakes, often below high water mark. July-Oct. Temple Bar 11 0741 352E 39 91 272N Clifton 42345. Separation Canyon.

Cyperus fendlerianus Boeckl.

FENDLER’S FLAT-SEDGE. Moist gravelly slopes and benches, above 4500 ft. Aug-Sep. Hualapai Mountain County Park 12 0235 660E 38 87 100N Clifton 41385..

Cyperus odoratus L.

RUSTY FLAT-SEDGE.

Cyperus laevigatus L.

SMOOTH FLAT-SEDGE. Six Mile Crossing Road 12 0279 185E 38 32 472N Clifton 10370.

C. schweinitzii Torr.

SAND FLAT-SEDGE.

Cyperus sphaerolepis Boeckl.

RUSBY’S FLAT-SEDGE. Moist gravelly slopes and flats. Aug-Sep. Branch of Knights Creek 12 0277 277E 38 90 603N Clifton 18044.

Cyperus squarrosus L.

AWNED FLAT-SEDGE. There are two very different forms of this taxon. One form is quite dainty with the spikelets loose and the scales are quite narrow. The other form is fairly coarse with tight spikelets and the scales are quite broad. Branch of Knights Creek 12 0277 326E 38 90 613N Clifton 18042, Hualapai Mountain County Park 12 0235 660E 38 87 100N Clifton 41385.

ELEOCHARIS Spike-Rush

- 1 Styles generally 2-branched
 - 2 Plants annual, rhizome lacking; spikelets oblong to rounded
 - 3 Tubercle narrower than the top of the fruit; perianth bristles only slightly longer than the dark fruit *E. geniculata*
 - 3 Tubercle as wide as the top of the fruit; perianth bristles quite a bit longer than the light fruit *E. obtusa*
 - 2 Plants perennial, rhizomes present; spikelets elongate, $\pm$ acute *E. macrostachya*
- 1 Styles generally 3-branched *E. parishii*

Eleocharis geniculata (L.) Roemer & Schultes

CAPITATE SPIKE-RUSH. , Six Mile Crossing Road 12 0275 393E 38 33 100N Clifton 1634.

Eleocharis macrostachya Britt.

CREeping SPIKE-RUSH. ditches. This taxon is very variable as to stem shape Knight Creek Spring 12 0275 984E 38 89 527N. [*E. palustris* (L.) Roemer & Schultes, in part].

Eleocharis obtusa (Willd.) Schultes

BLUNT SPIKE-RUSH. Colorado River 11 0704 076E 39 86 342N Clifton 39203, Warm Springs 746 272E 38 64 564N

Eleocharis parishii Britton

PARISH'S SPIKE-RUSH. Moist, often sandy places, throughout. Knight Creek Spring 12 0275 984E 38 89 527N Clifton 39912.

SCHOENOPLECTUS Bulrush, Tule (*Scirpus*, in part)

- 1 Stems cylindric to 3-angled above
- 2 Stems 3-angled above ***S. californicus***
- 2 Stems cylindric throughout..... ***S. acutus***
- 1 Stems 3-angled at least above
- 3 Inflorescence head-like
- 4 Plants with wiry culms, the upper part with sides $\pm$ convex; scales of the spikelet with awns 0.5-1.5 mm long..... ***S. pungens***
- 4 Plants with culms not wiry, the sides deeply concave; scales of the spikelet with an awn less than 0.5 mm long
- ***S. americanus***
- 3 Inflorescence widely branching..... ***S. maritimus***

Schoenoplectus acutus (Bigelow) A. & D. Löve

var. ***occidentalis*** (S. Wats.) S. G. Sm.

VISCID BULRUSH or TULE, HARD STEM CLUB-RUSH. Six Mile Crossing 12 0284 247E 38 26 924N Clifton 39464.

[*Scirpus a.* Bigelow var. *o.* (S. Wats.) Beetle].

Schoenoplectus americanus (Pers.) Schinz & R. Keller

THREE-SQUARE, CHAIRMAKER'S CLUB-RUSH. Limited, below 7000 ft.; wet places, sometimes subalkaline. June-Sept.

Six Mile Crossing 12 0284 110E 38 26 613N Clifton 39472. [*Scirpus a.* Pers.].

Schoenoplectus californicus ©. Mey.) Palla

CALIFORNIA BULRUSH or TULE, CALIFORNIA CLUB-RUSH. Lake Havasu 11 0739 749E 38 26 119N Clifton 39769.

[*Scirpus c.* C. Mey.) Steud.]

Schoenoplectus maritimus (L.) Lye

MARSH BULRUSH. [*Scirpus. paludosus* Nels., *S. maritimus* L.].

Schoenoplectus pungens (Vahl) Palla

var. ***longispicatus*** (Britton) Cronq.

THREE-SQUARE . Big Sandy River 12 0263 600E 38 38 564N Clifton 39843.

IRIDACEAE Iris Family

SISYRINCHIUM Eyed-Grass

Sisyrinchium demissum E. Greene

LOWLY BLUE-EYED GRASS.

JUNCUS Rush, Wire-Grass

- 1 Annuals, usually under 10 cm. tall..... ***J. bufonius***
- 1 Perennials, usually much larger
- 2 Stems and leaves very shinny-scabrous ***J. scabrosus***
- 2 Stems and leaves smooth
- 3 Plants coarse; leaf tips and stem tips spinescent ***J. acutus***
- 3 Plants not as coarse; leaf tips and stem tips not spinescent
- 4 The lowest bract of the inflorescence generally overtopping the inflorescence
- 5 Leaves terete with complete septa..... ***J. torreyi***
- 5 Leaves not both terete and with complete cross walls
- 6 Stems tufted; 2-3 bracts exceeding the inflorescence..... ***J. tenuis***
- 6 Stems arising at intervals from a creeping rootstocks; 1 bract exceeding the inflorescence ***J. arcticus***

- 4 Lowest bract not overtopping the inflorescence
 7 Leaves with the edges next to each other on the lower part and with incomplete cross walls
 8 Hyaline margin of the leaves ending in small ears *J. saximontanus*
 8 Hyaline margin of the leaves ending abruptly or tapering to a point *J. xiphioides*
 7 Leaves not as above
 9 Leaf blade flat, auricles 0-.5-1.5 mm long; anthers cream or pale yellow..... *J. longistylis*
 9 Leaf blade channeled, auricles 1.5-3 mm long; anthers brownish *J. macrophyllus*

***Juncus acutus* L.**

var. ***leopoldii*** (Parl.) G. Clifton Comb. nov.

SPINY RUSH. Bill Williams River 11 0767 794E 37 99 341N Clifton 38983, Big Sandy River 12 0263 285E 38 38 464N Clifton 15775. [S. a. L. var. *sphaerocarpus* Engelm., ssp. *l.* (Parl.) Snog.].

***Juncus arcticus* Willd**

var. ***ater*** (Rydb.) G. Clifton Comb. nov.

WIRE RUSH or GRASS. From dry meadow borders to quit wet places. Many named taxa have been proposed for this group of plants that range from Europe across Asia and North America. Until some one does a complete study of this group of plants (including what we call *J. balticus*) the most conservative approach is to use a name that represents the plants with long anthers. Most of the plants look somewhat alike whether they have long or short anthers. Just because some plants have longer anthers then others doesn't necessarily make them different species when in respect they look somewhat the same. The last study for this group of plants was done by Buchenau in 1906 and most likely with a limited amount of material from the western United States. In certain areas these plants seem to be consistent but in other areas they seem to be more mixed which would make you wonder about their relationships. Plants with twisted, flat stems have been called *J. balticus* Willd var. *mexicanus* (Willd.) Kuntz and *J. mexicanus* Willd. The ones with straight, rounded stems have been called *J. balticus* Willd. Knight Creek Spring 12 0275 984E 38 89 527N Clifton 39913. [ssp. *a.* (Rydb.) Hult.].

***Juncus bufonius* L.**

COMMON TOAD RUSH. Big Sandy River 12 0263 600E 38 38 564N Clifton 39844.

***Juncus longistylis* Torr.**

LONG-STYLED RUSH.

***Juncus macrophyllus* Cov.**

LONG-LEAF RUSH. Pine Lake 12 0238 700E 38 86 524N Clifton 40936.

***Juncus saximontanus* A. Nels.**

These are most like varieties of *J. ensifolius*

a Inflorescence congested; heads many-flowered, fruit tapered, exserted beyond the perianth var. ***arizonica***

a Inflorescence open; heads fewer-flowered; fruit obtuse, included var. ***saximontanus***

var. ***arizonicus*** G. Clifton var. nov.

ARIZONA MOUNTAIN RUSH. Cook Canyon 11 0766 577E 38 96 020N Clifton 38971, Grapevine Spring 11 0764 827E 38 99 926N Clifton 40680.

var. ***saximontanus***

ROCKY MOUNTAIN RUSH. Flag Mine 12 0237 254E 38 85 129 N Clifton 37098, Pine Lake 12 0238 700E 38 86 524N Clifton 40933.

***Juncus scabrosus* G. Clifton**

GRITTY-SKIN RUSH. Johnson Spring 766 377E 39 02 407N Clifton 42170

***Juncus tenuis* Willd.**

SLENDER or POVERTY RUSH. Knight Creek 12 0276 558E 38 89 296N Clifton 39900, Camp Levi 10 0235 515E 38 86 619N Clifton 40735.

***Juncus torreyi* Cov.**

TORREY'S RUSH. Bullhead 11 0721 541E 38 94 513N Clifton 39947.

***Juncus xiphioides* E. Mey.**

IRIS-LEAVED RUSH.

LEMNACEAE Duckweed Family

LEMNA Duckweed

- 1 Lower surface of the thallus strongly gibbous with many inflated cells *L. gibba*

- 1 Lower surface $\pm$ flat, cells not inflated..... *L. minor*

***Lemna gibba* L.**

INFLATED DUCKWEED.

***Lemna minor* L.**

LESSER DUCKWEED. Floating in water. Old Trails Road 11 0767 917E 38 95 755N Clifton 38647, Big Sandy River 12 0263 600E 38 38 564N Clifton 39841.

ORCHIDACEAE Orchid Family

EPIPACTIS

***Epipactis gigantea* Hook.**

STREAM-SIDE ORCHID, GIANT HELLEBORINE. Seeps, rocky stream and river margins, throughout. April-Aug.

POACEAE Grass Family

- 1 Leaves lacking ligules..... *Echinochloa*
- 1 Leaves bearing ligules, these sometimes a ring of hairs
- 2 Plants reeds 2-6 m tall with large plume-like panicles
- 3 Lemmas naked; rachilla hairy *Phragmites*
- 3 Lemmas hairy; rachilla naked *Arundo*
- 2 Plants not combining the above characters
- 4 Spikelet or several spikelets bur-like
- 5 Spikelet bearing spines *Cenchrus*
- 5 Spikelet bearing stout hooked prickles *Tragus*
- 4 Spikelet or spikelets not as above
- 6 Glumes boat-shaped with broad wings on the keel *Phalaris*
- 6 Glumes not as above
- 7 Spikelets attached to on side of the rachis
- 8 Spikelets bearing 2- to several fertile flowers
- 9 Spikelets in dense clusters at the end of the branchlets..... *Dactylis*
- 9 Spikelets distributed along the branchlets..... *Leptochloa*
- 8 Spikelets bearing 1 fertile floweret
- 10 Florets bearing awns, awns generally over 1 mm long
- 11 Spikes feathery or silky, digitate *Chloris*
- 11 Spikes not as above..... *Bouteloua*
- 10 Florets lacking awns (awned up to 1 mm in one)
- 12 Floret with a hardened, bulb-like base *Eriochloa*
- 12 Floret lacking such a base
- 13 Inflorescence branches racemosely arranged; spikelets linear *Schedonnardus*
- 13 Inflorescence not combining the two above characters
- 14 Plants with extensive rhizomes and often stolons
- 15 Inflorescence branches generally more than 2 *Cynodon*
- 15 Inflorescence branches generally 2 *Paspalum*
- 14 Plants not as above
- 16 Spikelets villous *Paspalum*
- 16 Spikelets not villous..... *Digitaria*
- 7 Spikelets attached other wise
- 17 Spikelets subtended by bristles
- 18 The bristles not hiding the spikelets..... *Setaria*
- 18 The bristles hiding the spikelets..... *Pennisetum*
- 17 Spikelets not subtended by bristles
- 19 Rachis joint long hairy
- 20 Inflorescence a dense spike
- 21 Inflorescence densely silky; leaves 3-8 mm wide *Imperata*
- 21 Inflorescence woolly; leaves involute, about 1 mm wide..... *Elyonurus*
- 20 Inflorescence with branches separated or tufted at apex

- 22 Racemes one per peduncle *Schizachyrium*
- 22 Racemes 2 or more per peduncle
- 23 Racemes tufted at the apex or a long peduncle *Bothriochloa*
- 23 Racemes arranged along the stems on much shorter peduncles *Andropogon*
- 19 Rachis joint (if present) other than long hairy
- 24 Glume and sterile lemma copiously silky..... *Trichachne*
- 24 Glume and sterile lemma (if present) not copiously silky
- 25 Awns 4-18 cm long, bent at least once (this doesn't include awn that are twisted together)
- 26 Spikelets sessile
- 27 Rachis of inflorescence not obvious *Heteropogon*
- 27 Rachis of inflorescence obvious..... *Trachypogon*
- 26 Spikelets not sessile *Stipa*
- 25 Awns when present less than 4 cm long, if longer than not bent
- 28 Spikelets in 3's above and in 2's below, these composed of a sessile spikelet and the others on pedicels *Sorghum*
- 28 Spikelets not as above
- 29 Spikelets composed of 1 fertile floret that is subtended by a sterile lemma; fertile lemma indurate, margins thick, in rolled and clasping the palea by its margins..... *Panicum*
- 29 Spikelets lacking sterile lemmas, 1-many flowered
- 30 Plants with staminate spikelets with lemmas lacking awns and pistillate spikelets with lemmas bearing long awns, the staminate and pistillate on the same plant or on separate plants *Scleropogon*
- 30 Plants not as above
- 31 Spikelets sessile in groups of 3, the groups falling, the central 1 floret (2) spikelet fertile, the 2 lateral spikelets staminate, 2 flowered (3); glumes of the 3 forming a false involucre or at least connate *Hilaria*
- 31 Spikelets not as above
- 32 Plants with spikelets in a group of 2's or 3's on a short rachis, the group enclosed in the broad sheaths of short leaves, forming a cluster or head at the ends of the branches..... *Munroa*
- 32 Plants not as above
- 33 Spikelets composed of 1 floret
- 34 Lemmas awned
- 35 Awn of lemma 3-branched *Aristida*
- 35 Awn of lemma simple
- 36 The stiff glumes completely inclosing the palea and fruit
- 37 Callus not jointed to the lemma; lemma bearing some hair..... *Stipa*
- 37 Callus jointed to the lemma; lemma glabrous *Aristida*
- 36 The glumes not stiff nor completely inclosing the palea and fruit
- 38 Glumes and lemmas awned
- 39 1st glume 2 awned..... *Lycurus*
- 39 1st glume 1 awned
- 40 Glume body longer than the lemma body..... *Polypogon*
- 40 Glume body shorter than the lemma body..... *Muhlenbergia*
- 38 Glumes lacking awns; lemmas awned
- 41 Lemma not indurate; awns not deciduous *Agrostis*
- 41 Lemma indurate; awns deciduous *Piptatherum*
- 34 Lemmas not awned
- 42 Lemma longer than the glume, if not, than upper corner of margins of leaf sheath long pilose
- 43 Nerves of the lemma silky *Blepharoneuron*
- 43 Nerves of the lemma not silky
- 44 Upper corner of margins of leaves long pilose..... *Sporobolus*
- 44 Upper corner of margins of leaves lacking long hairs *Muhlenbergia*
- 42 Lemma shorter than the glume *Agrostis*
- 33 Spikelets of more than 1 floret
- 45 Leaf sheath closed for at least ¼ of its length
- 46 Glumes papery; lemmas firm, strongly nerved; upper florets sterile, often reduced to rudiments infolded by the broad upper lemmas *Melica*
- 46 Glumes not papery; upper florets like the others
- 47 Lemmas awned; spikelets commonly quite long..... *Bromus*
- 47 Lemmas not awned; spikelets commonly much shorter *Poa*
- 45 Leaf sheath open for over ¼ of its length

- 46 Glumes awned, mucro-pointed, aristate
 - 47 Glumes appearing to be reduced to awns
 - 48 Inflorescence with lateral spikelets pedicellate, central sessile *Hordeum*
 - 48 Inflorescence not as above *Elymus*
 - 47 Glumes otherwise
 - 49 Florets one per spikelet
 - 50 Lemma acute at apex *Muhlenbergia*
 - 50 Lemma truncate, toothed *Polypogon*
 - 49 Florets 2 or more per spikelet
 - 51 Glumes tips 3-pointed, sometimes the central one may be mucro-pointed to long awned *Triticum*
 - 51 Glumes tips not 3-pointed
 - 52 Plants generally less than 1.6 dm tall; spikelets white woolly *Dasyochloa*
 - 52 Plants generally much taller; spikelets not white woolly
 - 52 Inflorescence elongate; spikelets $\pm$ appressed *Elymus*
 - 52 Inflorescence short; spikelets closely imbricate, these divergent or spreading-ascending.... *Agropyron*
 - 46 Glumes not as above
 - 53 Lemmas awned, awn at least 1 mm long
 - 54 Lemmas awned below tip
 - 55 Florets 1 per spikelet *Agrostis*
 - 55 Florets 2 or more per spikelet
 - 56 Glumes 18-28 mm long *Avena*
 - 56 Glumes 4-6 mm long *Deschampsia*
 - 54 Lemmas awned from apex, awn over 1 mm long
 - 57 Spikelets subtended by 1 glume, inserted sideways to the rachis *Lolium*
 - 57 Spikelets not as above
 - 58 Lemmas pilose at least in part *Erioneuron*
 - 58 Lemmas not pilose
 - 59 Awns plumose below tip *Enneapogon*
 - 59 Awns not plumose
 - 60 Plants perennial well over 4 dm tall
 - 61 Inflorescence paniculate *Schedonorus*
 - 61 Inflorescence spicate *Elymus*
 - 60 Plants annual, less than 4 dm tall *Vulpia*
 - 53 Lemmas lacking awns, awns may be 1 mm long
 - 62 Glumes with the 1st narrow-lanceolate, 1-nerved, 2nd broadly obovate to oblanceolate, 3- (5)-nerved *Sphenopholis*
 - 62 Glumes $\pm$ uniform in shape
 - 63 Ligule with a fringe of long hairs
 - 64 Glumes about as long as the spikelet *Schismus*
 - 64 Glumes much shorter than the spikelet *Eragrostis*
 - 63 Ligule margins erose-ciliate, ciliate or lacerate
 - 65 Glumes shorter than the first floret
 - 66 Lemmas densely pilose on the lower half of the nerves and on the callus *Tridens*
 - 66 Lemmas not as above
 - 67 Leaves 2-ranked; spikelets 7- to 15- flowered, staminate has up to 15 flowers *Distichlis*
 - 67 Leaves not 2-ranked; spikelets generally less than 7 flowered *Poa*
 - 65 Glumes longer than the first floret, often as long as all the florets *Koeleria*

AGROPYRON

Agropyron desertorum (Fisch.) Schultes

DESERT CRESTED WHEATGRASS. Frequently planted, below 10000 ft. along road margins; introduced from Europe. July-Sept.

AGROSTIS Bent-Grass

- 1 Inflorescence branches naked at the base *A. scabra*
- 1 Inflorescence branches with florets to near or at base

- 2 Palea well developed, usually over ½ as long as lemma
 - 3 Anthers at least 1 mm long *A. stolonifera*
 - 3 Anther less than 1 mm long *A. viridis*
- 2 Pale reduced to a scale, well less than ½ as long as lemma *A. exarata*

***Agrostis exarata* Trin.**

WESTERN or SPIKED BENT-GRASS. moist open meadows and moist banks along streams. Plants with awns and a more open inflorescence has been called var. *pacifica* Vasey. The ones with awns and a more dense inflorescence has been called var. *monolepis* (Torr.) A.S. Hitchc. June-Aug.: var. *exarata*

***Agrostis scabra* Willd.**

ROUGH HAIRGRASS, TICKLE-GRASS. Frequent, usually above 3500 ft.; moist meadows and moist logging road ditches. July-Sept.: [*A. hiemalis* (Walt.) B. S. P.].

***Agrostis stolonifera* L.**

REDTOP, CARPET BENTGRASS. wet places; introduced from Europe. June-Sept.: . [var. *major* (Gaudin) Farw., var. *palustris* (Huds.) Farw., *A. alba* L.].

***Agrostis viridis* Gouan**

WATER BENTGRASS. long ditches and in moist places; introduced from Europe. May-June Bullhead 11 0721 541E 38 94 513N Clifton 39946, Grapevine Spring 11 0764 827E 38 99 926N Clifton 40679. [*A. semiverticillata* (Forsskal) C. Chr.].

ANDROPOGON Beard Grass

***Andropogon glomeratus* (Walt.) Britt., Sterns, Pogg.**

var. *pumilus* L. H. Dewey

SOUTHWESTERN BUSHY BLUESTEM. Limited, below 3400 ft. seeps and wet areas on granite. Aug.-Sept. Colorado River 11 0704 076E 39 86 342N Clifton 39205.

ARISTIDA

- 1 Plants annual *A. adscensionis*
- 1 Plants perennial
 - 2 Lower stems densely hairy *A. californica*
 - 2 Lower stems glabrous
 - 3 Awns with one long the other two lacking or up to 2 mm long
 - 4 Awn column twisted *A. orcuttiana*
 - 4 Awn column not twisted *A. ternipes*
 - 3 Awns all developed
 - 5 Plants with culms radiating in all directions or the inflorescence diffuse
 - 6 Branchlets spreading *A. havardii*
 - 6 Branchlets appressed *A. hamulosa*
 - 5 Plants with the culms more compact; inflorescence not diffuse
 - 7 Glumes ± the same length; awn column twisted *A. arizonica*
 - 7 Glumes most often with one half as long as the other, if only 2 mm less, than awn column not twisted; awn column once or twice twisted or not *A. purpurea*

Note: The characters that separate several of the species are at times overlapping making it hard to distinguish between them. Numerous plants have not read the book to see how they should look.

***Aristida adscensionis* L.**

SIX WEEKS THREE-AWN. Hualapai Mountain Road 12 0230 820E 38 94 477N Clifton 38616, Cane Spring Wash 12 0259 967E 38 66 431N.

***Aristida arizonica* Vasey**

ARIZONA THREE-AWN.

***Aristida californica* Thurb.**

CALIFORNIA THREE-AWN. Alamo Road 12 0245 211E 38 28 588N Clifton 39161.

***Aristida hamulosa* Henr.**

DIFFUSE THREE-AWN. This author is not convinced that this taxon is that much related to *A. ternipes*. Griffith Road 11 0762 053E 38 80 326N Clifton 38673. *A. ternipes* Cav. var. *gentilis* (Henr.) Allred].

Aristida havardii Vasey

HAVARD'S THREE-AWN. Interstate 40 12 0246 936E 38 95 440N Clifton 28245. [*A. barbata* Fourn.].

Aristida orcuttiana Vasey

ORCUTT'S SINGLE-AWN. Branch of Knight Creek 12 0277 332E 38 90 684N Clifton 27807.

Aristida purpurea Nutt.

The characters that separate the varieties of *A. purpurea* are at times overlapping making it hard to distinguish between them.

- a Inflorescence branches and spikelet stalks slender, appearing S- or U-shaped var. ***purpurea***
- a Inflorescence branches and spikelet stalks stiff, straight
 - b Awns 4-10 cm long var. ***longiseta***
 - b Awns under 3.5 cm long
 - c Beak of awn 3-5 mm long, twisted, exserted beyond the longest glume var. ***nealleyi***
 - c Beak 3 mm or less long, not twisted, included in the glumes
 - d Glumes with one obviously much shorter than the other
 - e Leaves generally basal, blades generally less than 10 cm long; inflorescence generally 3-14 cm long var. ***fendleriana***
 - e Leaves often more up the stem, blades generally over 10 cm long; inflorescence generally 15-30 cm long var. ***wrightii***
 - d Glumes with one only several mm shorter than the other var. ***parishii***

var. ***fendleriana*** (Stend.) Vasey

FENDLER'S PURPLE THREE-AWN. Aubrey Hills 11 0756 243E 38 09 646N Clifton 39275.

var. ***longiseta*** (Steudel) Vasey

LONG-AWN PURPLE THREE-AWN. North Fork Knight Creek 12 0277 387E 38 90 266N Clifton 39889, Mt. Trumbull Loop Road 12 0286 188E 40 47 000N Clifton 42309.

var. ***nealleyi*** (Vasey) Allred

NEALLEY'S PURPLE THREE-AWN. The difference between this and *A. arizonica* is not very different. Kaiser Spring Wash 12 0272 294E 38 29 368N Clifton 39836.

var. ***parishii*** (A. Hitchc.) K. Allred

PARISH'S PURPLE THREE-AWN. Hualapai Mountain Road 12 0230 765E 38 92 437N Clifton 38587, Hualapai Mountain Road 12 0233 380E 38 92 613N Clifton 38627, Cane Spring Wash 12 0259 967E 38 66 431N Clifton 38952.

var. ***purpurea***

PURPLE THREE-AWN.

var. ***wrightii*** (Nash) Allred

WRIGHT'S PURPLE THREE-AWN

Aristida ternipes Cav.

SPIDER GRASS. Hualapai Mountain Road 12 0232 687E 38 93 267N Clifton 26218.

ARUNDO***Arundo donax*** L.

GIANT-REED. Colorado River 11 0716 351E 38 75 237N Clifton 41288.

AVENA Oats***Avena fatua*** L.

WILD OAT. Limited, below 5500 ft.; disturbed places about farms; introduced from Europe. May-Aug. Clack Canyon 11 0767 377E 38 99 094N Clifton 38979.

BLEPHARONEURON***Blepharoneuron tricholepis*** (Torr.) Nash

PINE-DROPSEED. Hualapai Mountain County Park 12 0235 660E 38 87 100N Clifton 41387, Mt. Trumbull 12 0308 817E 40 29 918N.

BOTHRIOCHLOA***Bothriochloa barbinodis*** (Lagasca) Herter

CAPE BLUESTEM. Hualapai Mountain Road 12 0233 313E 38 92 540N Clifton 39002. [*Andropogon b.* Lagasca].

BOUTELOUA

- 1 Spikes generally 20-50 *B. curtipendula*
- 1 Spikes fewer than 20
 - 2 Spikelets 2-10
 - 3 Plants annual; spikelets 2-4 *B. aristidoides*
 - 3 Plants perennial; spikelets 6-10 *B. repens*
 - 2 Spikelets 12-65
 - 4 Plants annual
 - 5 Spikes one per branch *B. simplex*
 - 5 Spikes more than one per branch
 - 6 Rachis lacking pilose hairs *B. barbata*
 - 6 Rachis papillose-pilose *B. parryi*
 - 4 Plants perennial
 - 7 Culms white-lanate *B. eriopoda*
 - 7 Culms not white-lanate
 - 8 Spikes commonly 2 sometimes 1 or 3
 - 9 Rachis prolonged beyond the spikelets as a naked point *B. hirsuta*
 - 9 Rachis not prolonged as a naked point *B. gracilis*
 - 8 Spikes normally 4 or more
 - 10 Glumes glabrous; awns about 5 mm long; culms 10-20 cm tall *B. trifida*
 - 10 Glumes scabrous; awns 1-2 mm long; culms 25-50 cm tall *B. rothrockii*

Bouteloua aristidoides (Kunth) Griseb.

var. *aristidoides*

NEEDLE GRAMA. Old Highway 66 11 0747 279E 38 79 118N Clifton 38660.

Bouteloua barbata Lag.

SIX-WEEKS GRAMA. Along roads, fine gravelly slopes. early Dec. Old 66 12 0285 250E 39 36 800N Clifton 41368.

Bouteloua curtipendula (Michx.) Torr.

SIDE-OATS GRASS. Road banks, open slopes, below 7000 ft. April-Nov. Hualapai Mountain Road 12 0233 313E 38 92 540N Clifton 38567. [var. *caespitosa* Gould & Kapadia].

Bouteloua eriopoda (Torr.) Torr.

BLACK GRAMA. Hualapai Mountain Road 12 0229 431E 38 95 286N Clifton 38579, Northern Ave. 772 860E 39 05 093N Clifton 43314

Bouteloua gracilis (Kunth) Lag.

BLUE GRAMA. Camp Levi Levi Road 12 0235 370E 38 87 285N Clifton 41216, Highway 389 12 0329 220E 40 84 959N Clifton 41681.

Bouteloua hirsuta Lag.

HAIRY GRAMA. Hualapai Mountain Road 12 0232 739E 38 93 258N Clifton 26212, Branch of Knight Creek 12 0277 320E 38 90 540N.

Bouteloua parryi (Fourn.) Griffiths

PARRY'S GRAMA. Hualapai Mountain Road 12 0229 210E 38 95 412N Clifton 38612

Bouteloua repens (Kunth) Scribn. & Merr

SLENDER GRAMA.

Bouteloua rothrockii Vasey

ROTHROCK'S GRAMA.

Bouteloua simplex Lag.

MAT GRAMA. Truxton 12 0268 229E 39 29 750N Clifton 41375.

Bouteloua trifida Thurb.

RED GRAMA. Beaver Dam Mountains 12 0250 389E 40 94 100N Clifton 42245.

BROMUS Brome

- 1 Lower glume 3-7-veined, upper 5-9-veined
- 2 Lower glume 5-7-veined; awns very short *B. catharticus*
- 2 Lower glume 3-5-veined; awns longer

- 3 Lemma more hairy on the outer margins than else where, lobes at apex rather prominent.....**B. arizonicus**
 3 Lemma glabrous to uniformly hairy, lobes not prominent..... **B. carinatus**
 1 Lower glume 1-veined, upper 3-veined (rarely some with lower 3-nerved and upper 5 nerved)
 4 Plants perennial; glumes lacking teeth on each side of the awn or teeth very short
 5 Inflorescence and spikelets nodding **B. ciliatus**
 5 Inflorescence erect **B. inermis**
 4 Plants annul; glumes with longer teeth on each side of the awn
 6 Awns 30-40 mm long; lower glume 12-25 mm long **B. rigidus**
 6 Awns 8-25 mm long; lower glume 5-11 mm long
 7 Inflorescence fairly compact, branches very short **B. madritensis**
 7 Inflorescence more open, branches quite long
 8 Inflorescence soon nodding; awns remaining straight **B. tectorum**
 8 Inflorescence erect; awns becoming twisted and bent..... **B. trinii**

Bromus arizonicus (Shear) Stebb.

ARIZONA BROME. The difference between this and the next taxon are often not very distinct. Kane Spring Wash 12 0259 768E 38 66 016N Clifton 39291, Box Canyon 12 0266 621E 38 31 961N Clifton 39299, Big Sandy River 12 0263 374E 38 38 727N Clifton 39845.

Bromus carinatus H. & A.

MOUNTAIN or CALIFORNIA BROME. Clack Canyon 11 0767 241E 38 98 695N Clifton 39413. [*B. marginatus* Nees, *B. polyanthus* Scribn.].

Bromus catharticus Vahl

RESCUE GRASS. introduced from South America. Big Sandy River 12 063 381E 38 38776N Clifton 39848.

Bromus ciliatus L.

FRINGED BROME. The plants that bloom in the spring are not like the ones that bloom in the fall. The ones that bloom in the spring are like a pyramid, dropping all directions. The ones that bloom in the fall are the typical ones that drop to one side. Camp Levi Levi 12 0235 042E 38 86 654N Clifton 41218, Flag Mine Road 12 0237 414E 38 84 880N Clifton 26215.

Bromus rigidus Roth

RIPGUT GRASS. introduced from Europe. A number of plants combine the characters of *B. rigidus* and *B. Diandrus* and since the oldest name is *B. rigidus* it is use. Johnston Canyon 11 0767 034E 39 01 060N Clifton 38945. [*B. Diandrus* Roth, *B. rigidus* Roth. var. *gussonii* (Parl.) Coss. & Durieu].

Bromus inermis Leyss.

SMOOTH BROME. Mt. Dellenbaugh Road 12 0268 145E 40 03 835N Clifton 42331

Bromus madritensis L. var. **rubens** (L.) G. Clifton

FOXTAIL BROME. grassy fields, open slopes and road banks; introduced from south Europe. Alamo Road 12 0241 952E 38 32 750N Clifton 38722. [ssp. *r.* (L.) Husnot].

Bromus tectorum L.

DOWNY BROME, CHEAT-GRASS BROME. open fields, along roads, openings in sagebrush and etc.; introduced from Europe. Feb-June. Johnston Canyon 11 0767 034E 39 01 060N Clifton 38776.

Bromus trinii Desv.

CHILEAN CHESS. introduced from W. South America. Kaiser Spring Wash 12 0271 657E 38 28 799N Clifton 39307, Clay Springs Road 12 0240 279E 39 56 907N Clifton 39370.

CENCHRUS**Cenchrus longispinus** (Hackel) Fern.

FIELD SANDBUR. Sandy disturbed places, below 5000 ft. July-Sept. Highway 389 12 0339 880E 40 80 460N Clifton 41177.

CHLORIS**Chloris virgata** Sw.

FEATHER WINDMILL GRASS. Hualapai Mountain Road 12 0230 765E 38 94 437N Clifton 38588, Blake Ranch Road 12 0245 741E 38 95 872N Clifton 41306, Old 66 12 0285 250E 39 36 800N.

CYNODON**Cynodon dactylon** (L.) Pers.

BERMUDA GRASS. road edges and other waste places; introduced from Eurasia. June-Sept. Colorado River 11 0704 359E 39 86 544N Clifton 39213, Timber Wash 12 0243 284E 38 82 500N.

DASYOCHLOA

Dasyochloa pulchellum (Kunth) Willd.

FLUFF GRASS. Sometimes these plants appear to be annual. Hualapai Mountain Road 12 0231 230E 38 94 314N Clifton 38633, Aubrey Hills 11 0756 765E 38 08 460N Clifton 39270. [*Erioneuron p.* (Kunth) Tateoka, *Tridens p.* (Kunth) A. Hitchc.]

DACTYLIS

Dactylis glomerata L.

ORCHARD GRASS. Frequent, below 8000 ft.; along roads, meadows; introduced from Eurasia. June-Aug. Wheeler Wash 12 0238 884E 38 86 351N Clifton 40928.

DESCHAMPSIA

Deschampsia elongata (Hook.) Benth.

SLENDER HAIR-GRASS. Frequent, 5700-9000 ft.; moist places. June-Aug

DIGITARIA

Digitaria sanguinalis (L.) Scop.

HARRY CRAG GRASS. Knight Creek 12 0276 680E 38 89 223N Clifton 41403.

DISTICHLIS

Distichlis spicata (L.) E. Greene

SALT GRASS. Bitter Seeps Wash 12 0351 832E 40 78 966N Clifton 41706, Big Sandy River 12 0263 285E 38 38 464N Clifton 15775

ECHINOCHLOA Barnyard Grass (family key)

- 1 Racemes simple, often quite spread apart, 1-2 cm long; spikelets very short acute, in 4 ± uniform rows***E. colona***
- 1 Racemes at least in part, branched (branching sometimes not very obvious), some of them over 2 cm long; spikelets longer, acute, not in uniform rows ***E. crusgalli***

Echinochloa colona (L.) Link

JUNGLE-RICE. Knight Creek 12 0276 680E 38 89 223N Clifton 41405.

Echinochloa crusgalli (L.) Beauv.

BARNYARD GRASS. below 5500 ft. roadside ditches; introduced from Old World. July-Oct. Flag Mine Road 12 0237 926E 38 86 681N Clifton 26217.

ELYMUS

Note: This group of plants have been played with by many over a long period of time. There may be a number of genera as set forth by Barkworth. However, since some of these plants seem to cross with each other it seems rather pointless to put them in different genera. To have them all in the same genus makes the keying of them much more simpler.

- 1 Glumes awned, the awns at least 8 mm long, the body of the glume obvious or not***E. elymoides***
- 1 Glumes awnless or with awns not longer than 8 mm
 - 2 Lemmas with awns at least 6 mm or longer
 - 3 Spikelets mostly 2 per node ***E. glaucus***
 - 3 Spikelets mostly 1 per node
 - 4 Awns usually divergent; anthers 4-6 mm long ***E. spicatus***
 - 4 Awns mostly straight; anthers 1-2 mm long ***E. trachycaulus***
 - 2 Lemmas awnless or with awns less than 6 mm

- 5 Rachis at the base of the spikelet twisted so that the glume exposes the mid-nerve of the lemma; glumes generally subulate
- 6 Glumes 4-6.5 mm long; glumes often noticeably shorter than the spikelet..... *E. junceus*
- 6 Glumes 7-11 mm long; glumes generally not much shorter than the spikelet
- 7 Spikes 7-12 mm broad; plants usually forming large clumps *E. cinereus*
- 7 Spikes usually less than 7 mm wide; plants widely spreading from rhizomes *E. triticoides*
- 5 Rachis at the base of the spikelet not twisted, glume covering the mid-nerve; glumes broader
- 8 Glumes blunt or broadly rounded at apex, sometimes with a short pointed cusp at tip *E. hispidus*
- 8 Glumes acute to short awned
- 9 Anthers 1-2 mm long; palea rounded at apex *E. trachycaulus*
- 9 Anthers 4-6 mm long; palea notched at apex
- 10 Old leaf sheaths persisting in large clumps; stems wiry; rhizomes usually lacking *E. spicatus*
- 10 Old leaf sheaths not persisting in large clumps; stems more coarse; rhizomes usually present *E. lanceolatus*

Elymus cinereus Scribn. & Merr.

BASIN WILD RYE. Fairly frequent, below 8500 ft. openings in sagebrush and juniper, meadow margins. June-Aug. Lookout Wash 12 0278 166E 38 97 318N Clifton 39863, Trumbull Loop Road 12 0270 285E 40 80 566N Clifton 42267. [*Leymus c.* (Scribn. & Merr.) A. Löve].

Elymus elymoides (Raf.) Swezey

var. ***brevifolius*** (J. G. Smith) C. Hitchc.

SQUIRRELTAIL. White Cliff Wagon Trail Park 11 0768 179E 38 99 325N Clifton 39785, North Fork Knight Creek 12 0277 379E 38 90 789N Clifton 39883, Mt. Trumbull 12 0309 026E 40 30 560N Clifton 41747.

Elymus glaucus Buckl.

WESTERN RYEGRASS, BLUE WILD RYE. openings in shrublands, woodlands, forests. Knight Creek 12 0276 558E 38 89 296N Clifton 39898.

Elymus hispidus (Opiz) Meld.

INTERMEDIATE WHEATGRASS. Widely scattered, below 6600 ft.; open areas and along roads; introduced from Eurasia. This taxon is often seeded. Highway 389 12 0339 880E 40 80 460N Clifton 41178. [*Agropyron intermedia* (Host.) Beauv., *Elytrigia l.* (Host) Nevski].

Elymus junceus Fisch.

RUSSIAN- WILD RYE. Limited. Mt. Dellenbaugh Road 12 0268 145E 40 03 835N Clifton 42330

Elymus lanceolatus (Scribn. & J. G. Smith) Gould

DOWNY or THICKSPIKE WHEATGRASS. Wheeler Wash 12 0237 778E 38 85 538N Clifton 40693.

Elymus sp. This may be some enhanced variety of one of the named species. Wheeler Wash 12 0237 778E 38 85 538N Clifton 40921.

Elymus repens (L.) Gould

CREEPING WILD RYE. Toroweap Valley 12 0315 682E 40 29 808N Clifton 41733.

Elymus spicatus (Pursh) Gould

BLUE BUNCHED WHEATGRASS. Open rocky places. June-July. Lookout Wash 12 0278 166E 38 97 318N Clifton 39864, Flag Mine 12 0237 207E 38 85 102N Clifton 40705. [*Pseudoroegneria s.* (Pursh) A. Löve, *Agropyron s.* (Pursh) Scribn. & Sm., A. s. var. *inerme* (Scribn. & Sm.).

Elymus trachycaulus (Link.) Shinn.

SLENDER WHEATGRASS. Open rocky slopes, open woodlands, meadows, above 5000 ft.. June-Aug

Elymus triticoides Buckley

BEARDLESS WILD RYE. Frequent, below 8500 ft.; saline, alkaline, or fresh water meadows, often on the dry side. May-Aug.

ELYONURUS

Elyonurus barbiculmis Hack.

WOOL-SPIKE BALSAMSCALE.

ENNEAPOGON

Enneapogon desvauxii Beauv.

SPIKE PAPPUSGRASS. This taxon is generally a perennial but at various time it acts like a annual. July-Dec. Sawmill Canyon 11 0767 868E 38 95 091N Clifton 38657, Branch of Knight Creek 12 0277 332E 38 90 684N Clifton 27807, Old 66 12 0285 250E 39 36 800N.

ERAGROSTIS Lovegrass

- 1 Depressed, saucer-like glands present on the panicle branches, leaf blades, and on keel of lemmas
- 2 Glands limited to the keel of the lemmas; spikelets 2.5 mm wide *E. cilianensis*
- 2 Glands almost wholly limited to the branches and leaves; spikelets up to 2 mm wide *E. lutescens*
- 1 Depressed glands lacking
- 3 Plants perennial
- 4 Plants wiry, strongly geniculate and often rooting at the lower nodes *E. lehmanniana*
- 4 Plants in no respects as above
- 5 Stems erect or erect-ascending, not at all bent at the lower nodes; lateral veins of lemma obscure *E. intermedia*
- 5 Stems bent at the lower nodes; lateral veins obvious *E. curvula*
- 3 Plants annual
- 6 The main rachis of the inflorescence with thickened, shiny yellow or purple patches just below the lower branches *E. barrelieri*
- 6 The main rachis of the inflorescence lacking patches
- 7 Fruit surface checkered; $\pm$ grooved full length on side opposite embryo, tips usually truncate *E. mexicana*
- 7 Fruit surface $\pm$ smooth; not grooved on side opposite embryo, tips usually round *E. pectinacea*

Eragrostis barrelieri Daveau

MEDITERRANEAN LOVE-GRASS. The plants on the Hualapai Mountain Road have the spikelets lead-gray and the shiny spots purplish. Kingman 11 0770 479E 39 00 899N Clifton 26230, Hualapai Mountain Road 12 0229 591E 38 95 204N Clifton 38574.

Eragrostis cilianensis (All.) Janchen

STINK-GRASS, CANDY-GRASS. road edges, washes; introduced from Eurasia. June-Dec. Hualapai Mountain Road 12 0229 210E 38 95 412N Clifton 38610. [*E. megastachya* (Koeler) Link.].

Eragrostis curvula (Schrud.) Nees

WEeping LOVE-GRASS. Wash 12 0237 778E 38 85 538N Clifton 40694.

Eragrostis intermedia Hitchc.

PLAINS LOVEGRASS. Hualapai Mountain Road 12 0233 313E 38 92 540N Clifton 38571, Branch of Knight Creek 12 0277 332E 38 90 684N Clifton 18051.

Eragrostis lehmanniana Nees.

LEHMANN'S LOVEGRASS. Along road and other waste places, 3000-5000 ft.; introduced from South Africa. Aug-Dec. Griffith Road 11 0762 053E 38 80 326N Clifton 38674.

Eragrostis lutescens Scribn

PALE LOVEGRASS

Eragrostis mexicana (Hornem.) Link

var. *mexicana*

MEXICAN LOVEGRASS. roadsides and reservoir shores below high water mark. Inflorescence narrow, branches often strict. May-early Nov. Old 66 12 0285 250E 39 36 800N Clifton 41362, Knight Creek 12 0276 524E 38 89 276N Clifton 41407. [*E. orcuttiana* Vasey].

Eragrostis pectinacea (Michx.) Nees

var. *pectinacea*

PECTINATE LOVEGRASS. road edges, sand or gravel bars and waste places. June-Oct. Willow Creek Ranch 12 0277 084E 38 96 090N Clifton 8234, Truxton 12 0268 229E 39 29 750N Clifton 41376. [*E. diffusa* Buckl.].

ERIOCHLOA***Eriochloa acuminata*** (J. Presl) Kunth

TAPER-TIP CUP GRASS. Fairgrounds Blvd. 11 0770 550E 38 98 911N Clifton 26220. [*E. gracilis* (Fourn.) Hitchc.].

ERIONEURON***Erioneuron pilosum*** (Buckl.) Nash

HAIRY ERIONEURON. Blye Canyon 12 0278 910E 39 26 934N Clifton 41602.

HETEROPOGON***Heteropogon contortus*** (L.) Beauv.

TWISTED TANGLE-HEAD. On sandy slopes and rocky canyons, 1000-5500 ft. Sept.-Oct. (Jan.-April).

HILARIA

- 1 Stem internodes sparsely to densely felty-pubescent *P. rigida*
- 1 Stem internodes glabrous to puberulent
 - 2 Glumes subhyaline, widest at the fimbriate summit *P. mutica*
 - 2 Glumes firm, not widened nor fimbriate at the summit
 - 3 The group of spikelets long villous *P. jamesii*
 - 3 The group merely short hairy *P. belangeri*

Hilaria belangeri (Steud.) Nash var. ***longifolia*** (Vasey) A. S. Hitchc.

LONG-LEAVED CURLY-MESQUITE. Six Mile Crossing Road 12 0283 298E 38 28 391E Clifton 39450.

Hilaria jamesii (Torr.) Benth.

GALLETA, CURLYGRASS. Dry slopes and flats, below 6500 ft. May-Aug. Highway 95 11 0719 614E 38 62 129N Clifton 39957. [*Pleuraphis j.* Torr.].

Hilaria mutica Buckl.

TOBOSA GRASS. 2000-6000 ft. Apr-Oct. Six Mile Crossing Road 12 0283 210E 38 28 339N Clifton 39441. [*Pleuraphis m.* Buckl.].

Hilaria rigida (Thurb.) Scribn.

BIG GALLETA. Dry slopes and flats, below 4000 ft. March-June. Hualapai Mountain Road 12 0229 210E 38 95 412N Clifton 38611, Blake Ranch Road 12 0244 690E 38 77 056N, Grapevine Wash 770 068E 39 74 983N Clifton 41332. [*Pleuraphis r.* Thurb.].

HORDEUM

- 1 Inner glumes ciliate; annual *B. murinum*
- 1 Inner glumes merely scabrous; perennial *B. jubatum*

Hordeum jubatum L.

FOXTAIL BARLEY. Bobcat Reservoir 12 0322 219E 40 41 286N Clifton 41724, Twin Springs Road 12 0389 730E 38 92 584N Clifton 40795.

Hordeum murinum L.

MOUSE BARLEY. Limited, below 6,000 ft.; waste places. This taxon has been treated as consisting of two or more species or subspecies, however in the field there is no visible difference. Often a single character or several measurable differences are used to separate this group. The correlation between even two of the six features used by various persons as distinguishing differences are quit often lacking in numerous plants. So trying to separate this group is pointless; introduced from the Mediterranean. Johnston Canyon 11 0767 034E 39 01 060N Clifton 38947. [ssp. *leporinum* (Link) Arcang., *H. leporinum* Link].

IMPERATA

Imperata brevifolia Vasey

CALIFORNIA SATINTAIL.

KOELERIA

Koeleria nitida Nutt.

JUNEGRASS. Fairly frequent, throughout; drying open places. This taxon has been applied to several European and Asian taxa. It has been called *K. macrantha* based on *Aira m.* from Asia which it is most likely not related and *Poa pyramidata* from Europe which it is most likely not related to either. To avoid confusion, the oldest New World name is used in this treatment. May-July: East Branch Tuckayou Wash 12 0280 560E 39 05 936N Clifton 39875, North Fork Knight Creek 12 0277 379E 38 90 789N Clifton 39882. [*K. cristata* (L.) Pers., an illegitimate name, *K. macrantha* (Ledeb.) J. Shultes misapplied].

LEPTOCHLOA Sprangle-Top

- 1 Plants perennial; lemmas notched at apex, glabrous on the lateral nerves *L. dubia*
- 1 Plants annual; lemmas, if slightly notched, than mucronate; hairy on the nerves
 - 2 Lemmas awned *L. fascicularis*

- 2 Lemmas not awned, may be mucronate
- 3 Spikelets 1-2 mm long; sheaths papillose-pilose *L. filiformis*
- 3 Spikelets more than 2 mm long; sheaths smooth or scabrous *L. uninervia*

Leptochloa dubia (Kunth) Nees

GREEN SPRANGLETOP. Rocky slopes and canyons in fine gravel. June-Oct. Hualapai Mountain Road 12 0232 739E 38 93 258N Clifton 26212.

Leptochloa fascicularis (Lam.) A. Gray

BEADED SPRANGLETOP. This has been made a subspecies of *L. fusca*, but it isn't convincing. Fairgrounds Blvd. 11 0770 550E 38 98 911N Clifton 26221.

Leptochloa filiformis (Lam.) Beauv

NEEDLE SPRANGLETOP. This has been make a subspecies of *L. panicea*, but it isn't convincing. Branch of Knight Creek 12 0277 237E 38 90 833N Clifton 18043.

Leptochloa uninervia (Presl) Hitchc. & Chase

MEXICAN SPRANGLETOP. This has been made a subspecies of *L. fusca*, but it isn't convincing. Old Trails Road 11 0767 917E 38 95 755N Clifton 38645.

LOLIUM Ryegrass (Group 2)

- 1 Glume shorter than the spikelet *L. multiflorum*
- 1 Glume as long or longer than the spikelet..... *L. rigidum*

Lolium multiflorum Lam

ITALIAN RYE-GRASS. Highway 95 11 0719 614E 38 62 129N Clifton 39953.

Lolium rigidum Gaudin

RIDGED RYEGRASS.

LYCURUS

Lycurus phleoides Kunth

COMMON WOLF'S-TAIL. Branch of Knight Creek 12 0277 332E 38 90 684N Clifton 26973.

MELICA

Melica porteri Scribn.

PORTER'S MELIC GRASS. In aspens below large rocky cliffs, about 7680 ft. Limited to Hualapai Mountains. Camp Levi Levi 12 0235 042E 38 86 654N Clifton 41217.

MUHLENBERGIA Muhly Grass

- 1 Plants annual
- 2 Lemmas lacking awns; panicle-bearing almost to base
- 3 Spikelets 1.2-1.5 mm long; glumes pilose; branches ascending *M. minutissima*
- 3 Spikelets 1-1.1 mm long; glumes glabrous; branches widely spreading..... *M. fragilis*
- 2 Lemmas having awns
- 4 First glume 2-nerved, 2-toothed..... *M. depauperata*
- 4 First glume 1-nerved, not obviously toothed
- 5 Inflorescence very narrow; lemma 4.5-6 mm long, densely appressed pilose on the callus and margins at base; plants up to 5 dm tall *M. appressa*
- 5 Inflorescence more open; lemma 2-4 mm long, a few spreading hairs on the margins..... *M. microsperma*
- 2 Plants perennial
- 6 Plants with the inflorescence contracted; lemma and glumes awnless; plants 10-15 dm tall..... *M. rigens*
- 6 Plants not combining the above characters
- 7 Lemmas bearing awns, sometimes a few on a plant may lack awns (if apiculate look in next)
- 8 Lemmas pilose or villous below
- 9 Inflorescence open, branches obvious
- 10 Branches of inflorescence not long exserted from the leaf sheath, not subfiliform..... *M. mexicana*
- 10 Branches of inflorescence long exserted from the leaf sheath, subfiliform..... *M. sylvatica*

- 9 Inflorescence dense, branches not obvious *M. emersleyi*
- 8 Lemmas not pilose below, may have a tuft of hairs about the callus
- 11 Inflorescence narrow, branches appressed. not naked at base
- 12 Awns of lemma up to 3 mm long
- 13 Glumes awn pointed *M. wrightii*
- 13 Glumes lacking awns
- 14 Culms nodulose-roughened; spikelets close together *M. richardsonis*
- 14 Culms smooth; spikelets interrupted *M. repens*
- 12 Awns of lemma 8-20 mm long *M. pauciflora*
- 11 Inflorescence evidently spreading, branches naked at base
- 15 Plants usually supported by other plants, much branched, wiry, the base knotty *M. porteri*
- 15 Plants not supported by other plants, more erect
- 16 Leaves curled or falcate, blades 1-3 cm long *M. torreyi*
- 16 Leaves not curled or falcate, generally 5-8 cm long *M. arenicola*

Muhlenbergia appressa Goodding

DEVIL'S CANYON MUHLY. Fine gravelly slopes and flats, rocky slopes. Sawmill Canyon 11 0768 485E 38 95 102N Clifton 38781, Antelope Wash 12 0242 095E 38 84 755N Clifton 39398.

Muhlenbergia arenicola Buckl.

SAND MUHLY. Dry open places, 4000-7000 ft. Aug.-Oct.

Muhlenbergia depauperata Scribn.

SIX-WEEKS MUHLY. Drying, bare gravel. Old 66 12 0285 250E 39 36 800N Clifton 41367, Bobcat Reservoir 12 0322 594E 40 41 235.

Muhlenbergia emersleyi Vasey

BULL GRASS. Knight Creek 12 0276 832E 38 89 451N, Hualapai Mountain Road 12 0232 739E 38 93 258N.

Muhlenbergia fragilis Swallen

FRAGILE MUHLY. moist sites. Aug.-Oct. Branch of Knight Creek 12 0277 292E 38 90 810N Clifton 11938.

Muhlenbergia mexicana (L.) Trin.

MEXICAN MUHLY.

Muhlenbergia microsperma (DC.) Kunth

LITTLESEED MUHLY. Aubrey Hills 11 0756 765E 38 08 460N Clifton 39269, Spanish Ranch Road 759 458E 38 54 045N Clifton 42163.

Muhlenbergia minutissima (Steud.) Swallen

LEAST MUHLY. Vernal moist benches, slopes. Hualapai Mountain County Park 12 0235 660E 38 87 100N Clifton 41383.

Muhlenbergia pauciflora Buckl.

NEW MEXICAN MUHLY. These plants don't have the glumes awned like they should, but they don't fit *M. arsenei* in other ways. Blye Canyon 12 0280 253E 39 27 465N Clifton 41607, Mt Trumbull 12 0309 350E 40 29 362N Clifton 41741.

Muhlenbergia porteri Scribn.

BUSH MUHLY, MESQUITE GRASS. Sawmill Canyon 11 0767 868E 38 95 091N Clifton 38655.

Muhlenbergia repens (J. Presl) A. S. Hitchc.

CREEPING MUHLY. Blye Canyon 12 0286 164E 39 24 412N Clifton 41614, Toroweap Valley 12 0315 631E 40 33 869N Clifton 41735.

Muhlenbergia richardsonis (Trin.) Rydb.

MATTED MUHLY. The plants from eastern Nevada and northern Arizona don't even begin to look like the plants that grow in the Sierra Nevada of California. The plants from Toroweap Valley have the inflorescence rather open. Toroweap Valley 12 0315 682E 40 29 808N Clifton 41734.

Muhlenbergia rigens (Benth.) A. Hitchc.

DEER GRASS. dry or moist grassy openings in brush or woodlands, along intermittent streams. June-Sept. Frees Wash 12 0236 578E 38 92 538N Clifton 12055.

Muhlenbergia sylvatica (Torr.) Torr.

WOODLAND MUHLY. Grapevine Canyon, 2500 ft.

Muhlenbergia torreyi (Kunth) Hitchc.

TORREY'S MUHLY. Fort Rock Exit 12 0284E 38 96 406N Clifton 41213.

Muhlenbergia wrightii Vasey

SPIKE MUHLY. Hayden Peak 12 0235 305E 38 85 686N Clifton 40721, Bobcat Reservoir 12 0322 594E 40 41 235 Clifton 41719.

***Munroa squarrosa* (Nutt.) Torr.**

FALSE BUFFALO GRASS. Fairly frequent, below 6700 ft. mostly road margins in fine gravel. June-Sept. Tom Brown Road 12 0277 014E 38 62 400N Clifton 41316, Interstate 40 12 0246 786E 38 95 209N.

PANICUM Panicgrass

- 1 Plants annual, including some that are perennial that appear annual
- 2 Inflorescence among the leaves ***P. mohavense***
- 2 Inflorescence beyond the leaves, at least in part
- 3 Inflorescence many flowered and dense ***P. miliaceum***
- 3 Inflorescence fewer flowered, open
- 4 Fruit transversely rugose ***P. arizonicum***
- 4 Fruit smooth to minutely rugose
- 5 On mature plants the aging leaves curling like shavings ***P. hallii***
- 5 On mature plants the aging leaves not curling ***P. hirticaule***
- 1 Plants obviously perennial
- 6 Culms with a corm-like base ***P. bulbosum***
- 6 Culms lacking a corm-like base
- 7 First glume almost as long as the spikelet ***P. obtusum***
- 7 First glume most often about ½ as long as the spikelet
- 8 Plants from stout rhizomes; spikelets 3-3.4 mm long ***P. plenum***
- 8 Plants lacking rhizomes ***P. hallii***

***Panicum arizonicum* Scribn. & Merr.**

ARIZONA PANIC GRASS. Interstate 40 12 0246 936E 38 95 440N Clifton 22857. [*Urochloa a.* (Scribn. & Merr.) O. Morrone & F. Zuloaga].

***Panicum bulbosum* Kunth**

BULB PANICUM July-Sept. Hualapai Mountain County Park 12 0235 660E 38 87 100N Clifton 41390. [var. *occidentale* Rydb.]

***Panicum hallii* Vasey**

HALL'S PANIC GRASS. Pine Lake 12 0238 730E 38 86 258N Clifton 41294.

***Panicum hirticaule* Presl**

MEXICAN PANIC GRASS. Hualapai Mountain Road 12 0230 820E 38 94 477N Clifton 38615.

***Panicum miliaceum* L.**

HOG-MILLET. Kingman 11 0770 479E 39 00 899N Clifton 26227.

***Panicum mohavense* J. Reeder**

MOHAVE PANIC GRASS. These plants are like the vernal phase of perennials, but the other phase is lacking and they are strictly annual. They appear to be limestone endemics. Mid Aug-early Sept. Grapevine Canyon 12 0236 519E 39 78 547N Clifton 41348, Bobcat Reservoir 12 0322 594E 40 41 235 Clifton 41718.

***Panicum obtusum* Kunth.**

BLUNT PANIC GRASS. Willow Creek Ranch 12 0277 084E 38 96 090N Clifton 8235, New Water Well 12 0277 784E 38 91 847N Clifton 4146.

***Panicum plenum* Hitchc. & Chase**

BULBLESS PANICUM.

PASPALUM

- 1 Inflorescence branches 2, rarely 3, erect ***P. distichum***
- 1 Inflorescence branches 3-5 spreading ***P. dilatatum***

***Paspalum dilatatum* Poir.**

DALLIS GRASS. Bullhead 11 0721 541E 38 94 513N Clifton 39945.

***Paspalum distichum* L.**

KNOTGRASS. below 3500 ft.; on margin of creeks in the water, may later be out of the water as it recedes. Sept.-Oct. Big Sandy River 12 0263 285E 38 38 464N Clifton 15774.

PENNISETUM

Pennisetum setaceum (Forsk.) Choiv.

CRIMSON FOUNTAIN GRASS. Colorado River 11 0716 351E 38 75 237N Clifton 41289.

PHALARIS

Phalaris minor Retz.

LESSER CANARY GRASS. Lake Havasu 11 0760 441E 38 04 500N Clifton 39772, Blake Ranch Road 12 0244 255E 38 88 335N Clifton 39800.

PHRAGMITES

Phragmites australis (Cav.) Steudel

COMMON REED. along creeks, about ponds and seeps. Warm Springs 746 272E 38 64 564N

PIPTATHERUM

Piptatherum micranthum (Trin. & Rupr.) Barkworth

LITTLE-SEEDED RICEGRASS. Infrequent, 7000-9200 ft.; rocky places, often in crevices. June-Aug. Hayden Peak 12 0235 305E 38 85 686N Clifton 40720, Hualapai Mountain County Park 12 0235 565E 38 87 050N Clifton 41393.

POA Bluegrass

- 1 Plants annuals, the remains of old culms never present
 - 2 Lemmas lacking webbing at the base; plants usually less than 2 dm tall ***P. annua***
 - 2 Lemmas webbed at the base; plants usually taller..... ***P. bigelovii***
- 1 Plants perennial
 - 3 Stems compressed; 2-edged; rhizomatous ***P. compressa***
 - 3 Stems not 2-edged, more terete
 - 4 Lemmas cobwebby at the base..... ***P. pratensis***
 - 4 Lemmas lacking cobwebby hairs at the base
 - 5 Plants not dioecious, perfect flowered ***P. secunda***
 - 5 Plants dioecious, generally pistillate..... ***P. fendleriana***

Poa annua L.

ANNUAL BLUEGRASS. Infrequent, below 8500 ft.; meadows and seeps; introduced from Europe. Baker Well 12 0248 115E 38 11 486N Clifton 38833.

Poa bigelovii Vasey & Scribn.

BIGELOW'S BLUEGRASS. Aubrey Hills 11 0762 558E 38 04 920N Clifton 38992, Colorado River 11 0704 076E 39 86 342N.

Poa compressa L.

CANADIAN BLUEGRASS. Wheeler Wash 12 0238 884E 38 86 351N Clifton 40932.

Poa fendleriana (Steud.) Vasey

MUTTON GRASS. Rocky slopes and ridges, open woodland floors, above 4000 ft. Some plants seem to have long or short ligules on the same plant. Mid Mar-Jul. Antelope Wash 12 0238 241E 38 84 500N Clifton 39397, Lookout Wash 12 0278 166E 38 97 318N Clifton 39866. [*P. f.* (Steud.) Vasey ssp. *longiligula* (Scribn. & Williams) R. Soreng].

Poa pratensis L.

KENTUCKY BLUEGRASS. meadows, stream banks, pastures. Knight Creek 12 0276 558E 38 89 296N Clifton 39897.

Poa secunda Presl

WESTERN BLUEGRASS. most any habitat except wet places or deep forest floors. Mt. Trumbull Loop Road 12 0270 285E 40 80 566N Clifton 42265. [*Poa canbyi* (Scribn.) Howell]

POLYPOGON Beard Grass

- 1 Awns of glumes 6 mm long or longer..... *P. monspeliensis*
 1 Awns of glumes 3-5 mm long..... *P. interruptus*

***Polypogon interruptus* Kunth**

DITCH BEARD GRASS. Grapevine Spring 11 0764 827E 38 99 926N Clifton 40678.

***Polypogon monspeliensis* (L.) Desf.**

ANNUAL BEARD GRASS, RABBIT'S FOOT BEARD GRASS. Moist places; introduced from Europe. April-Aug. Old Trails Road 11 0767 917E 38 95 755N Clifton 38646, Bill Williams River 11 0773 605E 37 94 900N.

SCHEDONNARDUS

***Schedonnardus paniculatus* (Nutt.) Trel.**

TUMBLEGRASS. Blye Canyon 12 0286 164E 39 24 412N Clifton 41612.

SCHEDONORUS

***Schedonorus arundinaceus* (Schreb.) G. Clifton comb. nov.**

REED-GRASS. Some of the plants in this genus cross with *Lolium* so some have put these plants in that genus, but this author believes that they do indeed belong in the same group as *Lolium*, but they are so different from that genus that they should be in their own genus.. Wheeler Wash 12 0238 884E 38 86 351N Clifton 40929.

SCHISMUS

- 1 Teeth of lower lemma narrowly triangular and quite deep; palea of lowest floret acute, shorter than the lemma *S. arabicus*
 1 Teeth of lower lemma broadly triangular to obtuse, shallow; palea of lowest floret obtuse, longer than the lemma..... *S. barbatus*

***Schismus arabicus* Ness**

BEARDED MEDITERRANEAN GRASS. introduced from S. Europe. Warm Springs Wash 11 0730 605E 38 47 811N Clifton 38756.

***Schismus barbatus* (L.) Thell.**

COMMON MEDITERRANEAN GRASS. introduced from S. Europe. Alamo Crossing Road 11 0767 166E 38 57 682N Clifton 38707.

SCHIZACHYRIUM

- 1 Upper ½ of inflorescence sparingly branching; first glume of sessile spikelet pubescent *S. hirtiflorum*
 1 Upper ½ of inflorescence freely branching; first glume of sessile spikelet glabrous *S. scoparium*

***Schizachyrium sanguineum* (Retz.) Alston var. *hirtiflorum* (Nees) Hatch**

HAIRY-FLOWERED BEARDGRASS Branch of Knight Creek 12 0277 320E 38 90 540N Clifton 41400. [*S. h.* Nees var. *feensis* (Fourn.) Hack.].

***Schizachyrium scoparium* (Michx.) Nash**

LITTLE BLUESTEM.

SCLEROPOGON

***Scleropogon brevifolius* Phil.**

BURROGRASS. Truxton 12 0269 780E 39 29 790N Clifton 39730, Truxton 12 0268 229E 39 29 750N Clifton 41373.

SETARIA Bristly Foxtail

Note: Most of the species within this group of plants are a nomenclatural nightmare. They move from one name to another with great frequency.

- 1 Bristles below each spikelet 4-12 *S. lutescens*
 1 Bristles below each spikelet 1-3
 2 Bristles hairs pointed downward..... *S. verticillata*
 2 Bristles hairs point upward

- 3 Plants perennial
 - 4 Inflorescence 14-17 cm long; sterile palea two fifths to three fourths as long as the fertile palea *S. leucopila*
 - 4 Inflorescence less than 14 mm long
- 3 Plants annual
 - 5 Inflorescence branches obvious; lower rachis obvious *S. grisebachii*
 - 5 Inflorescence compact, branches nor rachis obvious
 - 6 Spikelets 2.5-3 mm long; inflorescence nodding *S. faberi*
 - 6 Spikelets $\pm$ 2 mm long; inflorescence erect *S. viridis*

***Setaria faberi* Herm.**

JAPANESE BRISTLE-GRASS.

***Setaria grisebachii* Fourn.**

GRISEBACH'S BRISTLE-GRASS. Old Highway 93 12 0247 518E 38 92 757N Clifton 28269, Knight Creek 12 0276 643E 38 89 262N Clifton 41404.

***Setaria leucopila* (Scribn. & Merr.) K. Shum.**

STREAMBED BRISTLE-GRASS. Interstate 40 12 0246 786E 38 95 209N Clifton 26209, Blake Ranch Road 12 0245 741E 38 95 872N Clifton 41301.

Setaria lutescens* (Weig.) F. Hubbard**PEARL MILLET. Some one has put this taxon in *Pennisetum*, but that is very doubtful. Kingman 11 0770 479E 39 00 899N Clifton 26223.Setaria macrostachya* Kunth**

PLAINS BRISTLE-GRASS Numerous plants incorporate characters of several perennial species and some don't seem to incorporate any characters of any of the species. The plants at Old Trails Road have spikelets about 3 mm long with the fertile lemma as long as the second glume. The spikelets don't seem to be turgid at there base as stated in the Texas flora. Some are now saying *S. macrostachya*=*S. vulpiseta* (Roemer) & Schultes. It seems unlikely that anyone really knows which plants belong to which species. The plants in the wash on Old Trails Road has the first glume 3-nerved and the spikelets almost 3 mm long. The plants up in the rocks along the same road have the first glume 5-nerved and the spikelets just a little over 2 mm long. Old Trails Road 11 0767 810E 38 95 867N Clifton 38637, Sawmill Canyon 11 0767 868E 38 95 091N Clifton 38654.

***Setaria verticillata* (L.) Beauv.**

ROUGH BRISTLE-GRASS. Old Trails Road 11 0767 671E 38 96 042N Clifton 41767.

***Setaria viridis* (L.) Beauv.**

GREEN BRISTLE-GRASS. Kingman 11 0770 479E 39 00 899N Clifton 26229, Bobcat Reservoir 12 0322 310E 40 41 356N Clifton 41721.

SORGHUM

- 1 Plants annual *S. bicolor*
- 1 Plants perennial with rhizomes *S. halepense*

Sorghum bicolor* (L.) Moench**SORGHUM, MILO, SUDAN GRASS. Along roads. Known in many forms in agriculture; introduced from Europe. Hualapai Mountain Road 12 0229 591E 38 95 204N Clifton 38575. [*S. sudanense* (L.) Pers.].Sorghum halepense* (L.) Pers.**

JOHNSON GRASS. disturbed areas, ditch banks, roadsides; introduced from southern Europe. July-Nov. Fairgrounds Blvd. 11 0770 550E 38 98 911N Clifton 26222.

SPHENOPHOLIS***Sphenopholis obtusata* (Michx.) Scribn.**

PRAIRIE WEDGEGRASS.

SPOROBOLUS Dropseed

- 1 Plants annual *S. neglectus*
- 1 Plants perennial
 - 2 Spikelets 4-6 mm long *S. interruptus*
 - 2 Spikelets 1.5-3 mm long
 - 3 Inflorescence open, well over 4 cm broad

- 4 Summit of sheaths conspicuously villous
- 5 Pedicels appressed; inflorescence fairly neat *S. cryptandrus*
- 5 Pedicels spreading; inflorescence tangled *S. flexuosus*
- 4 Summit of sheaths glabrous *S. airoides*
- 2 Inflorescence a spike, 0.3-1.6 cm broad; ligule 0.5-1.5 mm long
- 6 Spikelets 2-2.5 mm long; ligule 0.5-1 mm long; culms at their thickest point, 5 mm or less *S. contractus*
- 6 Spikelets 2.5-3.5 mm long; ligule 1-1.5 mm long; culms at their thickest point, 4-7 mm *S. giganteus*

***Sporobolus airoides* Torr.**

ALKALI-SACATON. Red Lake 11 0761 147E 39 52 062N Clifton 39721, Six Mile Crossing Road 12 0283 210E 38 28 339N Clifton 28184, Mt Trumbull Loop 12 0350 573E 40 76 354N Clifton 41714.

***Sporobolus contractus* Hitchc..**

SPIKE DROPSEED. Six Mile Crossing 12 0284 247E 38 26 924N Clifton 39463, Blake Ranch Road 12 0245 741E 38 95 872N Clifton 41302.

***Sporobolus cryptandrus* (Torr.) A. Gray**

SAND DROPSEED. Metcalfe Road 11 0767 191E 38 98 574N Clifton 38685.

***Sporobolus flexuosus* (Thurb.) Rydb.**

MESA DROPSEED. Gem Acres Road 11 0759 905E 38 53 459N Clifton 38677.

***Sporobolus giganteus* Nash**

GIANT DROPSEED. Highway 389 12 0361 776E 40 88 757N Clifton 41158.

***Sporobolus interruptus* Vasey**

BLACK DROPSEED.

***Sporobolus neglectus* Nash**

SMALL DROPSEED. Road and reservoir margins. Some of these plants have not read the book in that the inflorescence is almost completely exserted from the sheaths. However the characters of the spikelets are that off this taxon. Old Trails Road 11 0767 914E 38 95 847N Clifton 38651, Bobcat Reservoir 12 0322 310E 40 41 356N Clifton 41721.

STIPA Needle-grass, Rice-grass

Note: There may well be several genera reflected in this group of plants, but since they look the same in their general appearance, tradition is here followed, except for *S. hymenoides* which has been included in *Oryzopsis* in the past.

- 1 Awn shorter than 8 mm, usually early deciduous; lemmas hairs over 2 mm long, $\pm$ spreading *S. hymenoides*
- 1 Awns over 11 mm long, geniculate; lemmas hairs not longer than 2 mm, $\pm$ appressed
- 3 Awn of lemma 12-20 cm long
- 4 Awn plumose *S. neomexicana*
- 4 Awn scabrous *S. comata*
- 3 Awn of lemma 1.7-7.5 cm long; scabrous
- 4 First segment of awn plumose *S. speciosa*
- 4 First segment of awn scabrous
- 5 Margin of leaf sheath close to mouth not long hairy *S. arida*
- 5 Margin of leaf sheath close to mouth long hairy *S. coronata*

***Stipa arida* M. E. Jones**

MORMON NEEDLEGRASS. Mt. Trumbull Loop Road 12 0270 285E 40 80 566N Clifton 42266.

***Stipa comata* Trin. & Rupr.**

NEEDLE-AND-THREAD. Old Highway 66 12 0285 250E 39 36 800N Clifton 41360, Cerbat Mountains 11 0757 505E 39 26 203N Clifton 42183.

***Stipa coronata* Vasey**

PARISH NEEDLEGRASS. Cerbat Mountains 11 0757 350E 39 26 207N Clifton 42187. [*S. coronata* Thurb. var. *depauperata* (M. E. Jones) A. Hitchc., *Achnatherum p.* (Vasey) Barkworth].

***Stipa hymenoides* Roemer & Schultes**

INDIAN RICEGRASS, INDIAN MOUNTAIN-RICE. The plants collected on the Mt. Trumbull Loop are somewhat different from the typical in that the inflorescence is more compact, the glumes are purplish and so are the anthers. White Hills 11 0746 684E 39 62 390N Clifton 39704, Mt. Trumbull Loop Road 12 0270 285E 40 80 566N Clifton 42262. [*Oryzopsis h.* (Roemer & Schultes) Ricker, *Achnatherum h.* (Roemer & Schultes) Barkworth].

Stipa neomexicana (Thurb.) Scribn.

NEW MEXICO FEATHERGRASS. Truxton 12 0271 388E 39 29 579N Clifton 39755.

Stipa speciosa Trin. & Rupr.

DESERT NEEDLEGRASS. . Cook Canyon 11 0764 767E 38 99 339N Clifton 38940, Sawmill Canyon 12 0230 345E. 38 94 546N.

TRACHYPOGON***Trachypogon spicatus*** (L.) KuntzeCRINKLE-AWN GRASS. [*T. secundus* (Presl) Scribn.**TRAGUS*****Tragus berteronianus*** Schult.

SPIKED BURR-GRASS. Interstate 40 12 0246 786E 38 95 209N Clifton 26208.

TRICHACHNE***Trichachne californica*** (Benth.) ChaseCOTTONTOP. The name is a misnomer because this grass is not found in California at all. Some have put this genus into *Digitaria*, but it doesn't seem to belong there. Sawmill Canyon 12 0769 085E 38 94 893N Clifton 41319.**TRIDENS*****Tridens muticus*** (Torr.) Nashvar. ***elongatus*** (Buckl.) Shinn.

TALL AWNLESS FLUFF GRASS. Open rocky or gravelly slopes. April-Oct. Hualapai Mountain Road 12 233 313E 38 92 540N Clifton 38569, Beaver Dam Mountains. 12 0248 766E 40 96 415N.

TRITICUM***Triticum aestivum*** L.

WHEAT. Frees Wash 12 0236 172E 38 94 068 Clifton 38600.

VULPIA

- 1 First glume greater than half as long as second, 3-7 mm long
- 2 Plants with 6-15 flowers per spikelets; lemma awns generally less than 4 mm long ***V. octoflora***
- 2 Plants with 1-5 (8) flowers per spikelets; lemma awns generally over 4 mm long
- 3 Lower branches or spikelets ascending; spikelet stalk flat or winged ***V. bromoides***
- 3 Lower branches or spikelets widely spreading to deflexed (not always in any given population); spikelet stalk angular
..... ***V. microstachys***
- 1 First glume less than half as long as second, 0.3-1.5 mm long ***V. myuros***

Vulpia bromoides (L.) S. F. Gray

BROME SIX-WEEKS GRASS. Aubrey Hills 11 0762 397E 38 04 477N Clifton 38994.

Vulpia microstachys (Nutt.) Benth.

- a Spikelets pubescent var. ***ciliata***
- a Spikelets glabrous or scabrous (sometimes plants with scabrous spikelets not spreading or reflexed) var. ***pauciflora***

var. ***ciliata*** (Beal) Lonard & GouldFRINGED FESCUE. open grassy places and open woods. March-June. Clack Canyon 11 0767 233E 38 99 356N Clifton 39241, Big Wash Road 11 0754 851E 39 27 961N Clifton 39669. [*Festuca eastwoodae* Piper, *Festuca grayi* (Abrams) Piper].var. ***pauciflora*** (Beal) Lonard & Gould

FEW-FLOWERED SIX-WEEKS GRASS. Cook Canyon 11 0764 949E 38 99 150N Clifton 39228.

Vulpia octoflora (Walter) Rydb.

- a Margins and tip of lemma bearing long scabrous hairs; plants normally short.....var. *hirtella*
 a Margins and tip of lemma lacking long hairs; plants normally quite tall.....var. *octoflora*

var. *hirtella* (Piper) Henrard

HAIRY EIGHT-FLOWERED SIX-WEEKS GRASS. Shack Spring Canyon 11 0769 113E 38 94 286N Clifton 38895, Borianna Canyon 12 0230 797E 38 67 305N.

var. *octoflora*

EIGHT-FLOWERED SIX-WEEKS GRASS. dry slopes. April-June. These plants are generally taller than the preceding. Blake Ranch Road 12 0244 750E 38 94 453N Clifton 39795 *Festuca o.* Rydb].

POTAMOGETONACEAE Pondweed Family

POTAMOGETON Pondweed

- 1 The stipule forming a sheath for 1 cm or longer to the point where the leaf is attached..... *P. pectinatus*
 1 The stipules not sheathing, the leaf attached at stipule base or if attached to stipule, the attachment no more than 2 mm above its base
 2 Glands at leaf base 2, prominent, some leaf bases may not have glands..... *P. pusillus*
 2 Leaves lacking basal glands
 3 Inflorescence capitate; keel of fruit dentate *P. foliosus*
 3 Inflorescence short-cylindric; keel of fruit plain *P. pusillus*

Potamogeton foliosus Raf.

var. *foliosus*

LEAFY PONDWEED. below 7200 ft.; ponds. July-Oct.

Potamogeton pectinatus L.

FENNEL-LEAF PONDWEED. below 7000 ft.; ponds and slow streams. May-July. Pine Lake 12 0238 613E 38 86 527N Clifton 40938, Knight Creek Spring 12 0276 097E 38 89 514N Clifton 41410.

Potamogeton pusillus L.

- a Stipules connate at the base surrounding the internodes, usually persistent inflorescence 2-4 whorled.....var. *pusillus*
 a Stipules with free margins, often deciduous; inflorescence 1-2 whorled var. *tenuissimus*

var. *pusillus*

SMALL PONDWEED.

Potamogeton pusillus L.

var. *tenuissimus* Mert. & Koch

BERCHTOLD'S SMALL PONDWEED. Knight Creek 12 0276 622E 38 89 257N Clifton 39895.

THEMIDACEAE

- 1 Flowers ± sessile, in heads; petals not as below *Dichelostemma*
 1 Flowers on long upturned pedicels; tips of petals bearing glandulosities..... *Androstephium*

ANDROSTEPHIUM

Androstephium breviflorum S. Wats.

PINK FUNNEL-LILY. These plants have perianth segments revolute with a thickened end that has glandulosities. Mohave Valley 730 584E 38 46 847N Clifton 43360.

DICHELOSTEMMA

Dichelostemma capitatum (Alph.) Wood var. *pauciflorum* (Torr.) Hoover

DESERT BLUE DICKS. . Cook Canyon 11 0764 767E 38 99 339N Clifton 38939, Six Mile Crossing Road 12 0283 360E 38 28 493N Clifton 39448.

TYPHACEAE Cat-Tail Family**TYPHA** Cat-Tail

- 1 Pistillate flower cluster separated from the staminate flowers by an open space; spikes light brown..... *T. domingensis*
 1 Pistillate flower cluster not separated from the staminate flower cluster by an open space; spikes dark brown..... *T. latifolia*

Typha domingensis Pers.

SOUTHERN CATTAIL. Ponds and ditches, 1000-5500 ft. June-July. Beale Spring 11 0765 565E 38 99 352N Clifton 40676.

Typha latifolia L.

SOFT FLAG, BROAD-LEAVED CATTAIL. Marshes, roadside ditches, sluggish water of streams, 3000-7500 ft. June-July

ZANNICHELLIACEAE Horned Pondweed Family**ZANNICHELLIA*****Zannichellia palustris*** L.

HORNED-PONDWEED. Infrequent, below 7000 ft.; slow streams and ponds. Big Sandy 12 0263 675E 38 38 627N Clifton 39319.

Cryptantha decipiens (M.E. Jones) A. Heller. The type came from Yucca

Astragalus ensiformis M. E. Jones, Pagumpa Springs.

Astragalus episcopus S. Wats var. *lancearius* (A. Gray) Isely, near Beaver Dam. May-June.

Astragalus holmgreniorum Barneby, Mokiah Wash

Astragalus lentiginosus Hook. var. *ambiguus* Barneby, Peach Springs

Astragalus lentiginosus Hook. var. *yuccanus* M. E. Jones, Yucca

Astragalus newberryi A. Gray var. *blyae* (Rydb.) Barneby, near Kingman.

Astragalus preussii A. Gray var. *laxiflorus* A. Gray, Beaver Dam.

Astragalus tephrodes A. Gray var. *chloridae* (M. E. Jones) Barneby, Chloride

Eucrypta chrysanthemifolia var. *bipinnatifida*, Sitgreaves Pass, Black Mountains.

Nama pusillum A. Gray, Fort Mohave.

Phacelia glechomifolia A. Gray, between Peach Spring and the Grand Canyon

Phacelia laxiflora J. Howell, Toroweap Point.

Phacelia lemmonii A. Gray, Mineral Park

Pholistoma auritum (Lindl.) Lilja var. *arizonicum* (M. E. Jones) Constance, Yucca

Camissonia confertiflora (Raven) Raven. Vulcan's Throne, Toroweap Valley

Camissonia claviformis (Torr. & Frém.) Raven var. *aurantiaca* (S. Wats.) Cronq. The lectotype came from Fort Mojave.

Camissonia exilis (Raven) Raven, Cottonwood Springs, east base of Virgin Mountains

Eriogonum mortonianum Rev. Highway 389.

Ptelea trifoliata L. var. *pallida* (E. Greene) V. Bailey Peach Springs.

Penstemon distans Whitmore Canyon

Penstemon subulatus Eastw., Hackberry