

| A FIELD GUIDE TO THE SPECIAL STATUS PLANTS OF GRAND CANYON NATIONAL PARK |

By Nancy J. Brian | Science Center, Grand Canyon National Park, Grand Canyon, Arizona | 2000

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INTRODUCTION | More than 1,400 different species of vascular or higher plants are known from Grand Canyon National Park. This is due in large part to the unique geology, topography, elevation range of almost 8,000 feet, and varying temperature and moisture regimes. Also, the ranges of many biotic communities converge in the park, having followed migratory routes created by the Colorado River that incises the region. The park has about 9% of the approximately 290 Arizona plants that the U.S. Fish and Wildlife Service (FWS) has given special status designations.

The purpose of this publication is to provide a nontechnical, field guide for park staff, researchers, visitors, and river/trail guides. It serves as an introduction to the special status and rare plants known to occur in Grand Canyon National Park. Most of the park receives little visitation and the ranges of many plants are still undocumented. Not only are these plants of interest scientifically, but finding them adds to the enjoyment and appreciation of the Grand Canyon landscape and experience.

This guide includes 63 plant species that have Federal listing, candidate status, or are considered rare, endemic, or new to science. It is arranged in a 3-ring binder to make it easy to add or subtract pages as new information warrants changes. Single sheets can be removed for field use. If you know ahead of time that you will encounter a specific habitat, soil type, or feature described by a place name, those species listed alphabetically by these characteristics can be removed and taken into the field. The plants covered in this guide are arranged alphabetically by genus. A code written in the upper right hand corner of each sheet identifies whether the plants are Federally Protected Plants (Endangered Species and Species of Special Concern), Category 3b and 3c, or rare. Some plants have no illustration or photographs available at this time. When these items become available, replacement sheets can be inserted. At present, no threatened, Category 1, or Category 3a plants are known to occur in Grand Canyon National Park. Definitions of these codes are given in "Codes, Definitions, and Abbreviations."

Gathering or collecting plants for study or identification in Grand Canyon National Park requires a collecting permit. Permits are issued through the Science Center's Research Administrator and approved by the Park Superintendent. However, it is often difficult to identify unknown plants without the plant in hand. Field identification can be uncertain. It may also require the use of several plant identification keys and magnifying or dissecting scopes. Rare plants may also be sensitive to human disturbance. This field guide provides illustrations, aids to identification, and photographs where available of the plant and its habitat to help field workers and visitors to identify rare plants. If a new locality is discovered in Grand Canyon National Park, please notify the park botanist through the Science Center at P.O. Box 129, Grand Canyon, AZ 86023 or phone 520-638-7751. A photograph or line drawing, accompanied by a description of the locality (i.e., elevation, mileage and direction from a known feature, habitat, abundance, etc.) would be helpful for verification. Editorial comments, submissions of information, illustrations, and photography for future revisions are also welcome.

HOW TO USE THIS GUIDE | Each of the plants described in this guide is listed by scientific name and a page number. The following format is followed throughout this field guide:

GENUS AND SPECIES NAME | CODE (SEE CODE LIST)

SCIENTIFIC NAME | The scientific name follows that listed by floral catalogues for the state of Arizona.¹

COMMON NAME | The common name(s) are those followed by the botanical manuals cited above. Common names are not capitalized unless it is a proper name. The translation or meaning of the scientific name is also given.

FAMILY (COMMON NAME) | Scientific and (Common name) for the plant family

SYNONYMS | Taxonomic names that are equivalent to or have been superseded by another designation.

DISTRIBUTION | Other states outside of and counties in Arizona where the species is found. Specific locations in Grand Canyon National Park (NP) are also listed.

HABITAT | Life (annual, perennial, or biennial) and form (grass, herb, shrub, or tree). Information on habitat, plant community, soil, geology, elevation in feet, and blooming months in the park are also listed.

LOOK-ALIKES | Any similar looking species both from inside and outside of Grand Canyon NP is compared or contrasted.

Simple field characteristics in English or metric units are identified on a line drawing. Color photographs of the plant and its habitat if available are presented on the reverse of the page.

Suggested references, manuals, and identification keys for further information include:

- Benson, L. 1969. The Cacti of Arizona. Third Edition. The University of Arizona Press, Tucson.
- Hickman, J.C. (Editor) 1993. The Jepson Manual: Higher Plants of California. University of California Press, Berkeley.
- Kearney, T.H., R.H. Peebles, and Collaborators. 1960. Arizona Flora, with supplement by J.T. Howell and E. McClintock, and Collaborators. University of California Press, Berkeley.
- Mickel, J.T. 1979. How to know the ferns and fern allies. Wm. C. Brown Company Publishers, Dubuque.
- McDougall, W.B. 1964. Grand Canyon Wildflowers. Museum of Northern Arizona, Flagstaff.
- McDougall, W.B. 1973. Seed Plants of Northern Arizona. Museum of Northern Arizona, Flagstaff.
- Phillips, A.M., III. 1979. Grand Canyon Wildflowers. Grand Canyon Natural History Association, Grand Canyon.
- Phillips, B.G., A.M. Phillips, III, and M.A. Schmidt Bernzott. 1987. Annotated Checklist of the Vascular Plants of Grand Canyon National Park. Monograph No. 7, Grand Canyon Natural History Association, Grand Canyon.

- Pohl, R.W. 1978. How to know the grasses. Third Edition. Wm. C. Brown Company Publishers, Dubuque.
- Welsh, S.L., N.D. Atwood, S. Hoodrich, and L.C. Higgins. (Editors) 1993. A Utah Flora. Brigham Young University Press, Provo.

For the location of place names used in this guide, please consult:

- Barnes, W.C. 1988. Arizona Place Names. The University of Arizona Press, Tucson.
- Belknap, B. and L. Belknap Evans. 1989. Grand Canyon River Guide. Westwater Books, Evergreen.
- Brian, N.J. 1992. River to Rim: A guide to place names along the Colorado River in Grand Canyon from Lake Powell to Lake Mead. Earthquest Press, Flagstaff.
- Stevens, L. 1983. The Colorado River in Grand Canyon: A Comprehensive Guide to its Natural and Human History. Red Lake Books, Flagstaff.

CODES, DEFINITIONS, AND ABBREVIATIONS |

FEDERAL STATUS (from the Federal Register 6184, Feb. 21, 1990)

- E** Endangered - Taxa formally listed as endangered
- T** Threatened - Taxa formally listed as threatened
- CI** Notice of Review, Category I - Substantial biological information on file to support the appropriateness of proposing to list as endangered or threatened.
- SSC** Species of Special Concern - Formerly known as Category 2. Current information indicates that proposing to list as endangered or threatened is possible. Appropriate, but substantial biological information is not on file to support an immediate rulemaking.
- 3a** Taxa for which the U.S. Fish and Wildlife Service has persuasive evidence of extinction.
- 3b** Names that, on the basis of current taxonomic understanding, do not represent taxa meeting the Endangered Species Act's definition of 'species.'
- 3c** Taxa that have proven to be more abundant or widespread than was previously believed, and/or those that are not subject to any identifiable threats.

NON-FEDERAL STATUS

- RARE** New, endemic, sensitive, unusual, or single collections of plants in Grand Canyon National Park

ABBREVIATIONS USED IN THE FIELD GUIDE

- BLM** Bureau of Land Management
- CRM** Colorado River Mile as measured downstream from Lee's Ferry. "L" means left bank and "R" means right bank, when looking downstream.
- FWS** Fish and Wildlife Service
- NP** National Park
- SSP.** Subspecies
- VAR.** Variety

PLANT LIST BY HABITAT TYPE

Aquatic

Beckmannia syzigachne
Epipactis gigantea
Imperata brevifolia
Ranunculus uncinatus

Aspen - Spruce

Calypto bulbosa var. *americana*
Galium bifolium
Penstemon pseudoputus
Penstemon rydbergii

Bog-seeps

Calypto bulbosa var. *americana*

Breccia Pipes

Rosa stellata ssp. *abyssa*

Creosote Bush

Mortonia scabrella var. *utahensis*
Tricardia watsonii
Yucca whipplei

Desert Shrub or Scrub

Agave utahensis ssp. *kaibabensis*
Agave sp. *nova*
Allium bigelovii
Amsonia tomentosa var. *tomentosa*
Antirrhinum kingii
Anulocaulis leisolenus var. *leisolenus*
Arctomecon californica
Argemone arizonica
Camissonia confertiflora
Crossosoma parviflorum
Encelia frutescens var. *resinosa*
Erigeron lobatus
Eriogonum heermannii var. *subracemosum*
Euphorbia aaron-rossii
Hesperodoria scopulorum var. *scopulorum*
Opuntia basilaris var. *longiareolata*
Opuntia phaeacantha var. *mojavensis*
Rosa stellata ssp. *abyssa*
Tricardia watsonii
Yucca whipplei

Disturbed Areas

Castilleja kaibabensis

Hymenoxys subintegra
Penstemon pseudoputus

Great Basin Conifer Woodland

Rosa stellata ssp. *abyssa*

Douglas Fir

Draba asprella var. *kaibabensis*

Ephedra

Amsonia tomentosa var. *tomentosa*

Hanging Gardens

Boehmeria cylindrica
Carex scirpoidea var. *curatorum*
Epipactis gigantea
Flaveria mcdougallii
Hesperodoria scopulorum var. *scopulorum*
Ostrya knowltonii
Primula specuicola
Thelypteris puberula var. *sonorensis*

Juniper

Rosa stellata ssp. *abyssa*

Meadow

Castilleja kaibabensis
Galium bifolium
Hymenoxys subintegra
Machaeranthera mucronata
Penstemon rydbergii
Penstemon pseudoputus
Ranunculus uncinatus

Mountain Brush

Cryptantha capitata
Draba asprella var. *stelligera*
Galium bifolium
Hesperodoria scopulorum var. *scopulorum*
Paronychia sessiliflora
Selaginella watsonii

Pinyon-juniper

Aletes macdougallii
Arabis gracilipes
Astragalus cremnophylax var. *cremnophylax*
Cryptantha capitata

Eriogonum heermannii var. *subracemosum*
Eriogonum zionis var. *coccineum*
Haplopappus cervinus
Hesperodoria scopulorum var. *scopulorum*
Ostrya knowltonii
Paronychia sessiliflora
Pteryxia petraea
Sclerocactus parviflorus var. *intermedius*
Silene rectiramea
Talinum validulum

Ponderosa Pine

Arabis gracilipes
Asclepias viridiflora var. *lanceolata*
Calypto bulbosa var. *americana*
Draba asprella var. *kaibabensis*
Draba asprella var. *stelligera*
Galium bifolium
Haplopappus cervinus
Hesperodoria scopulorum var. *scopulorum*
Hymenoxys subintegra
Penstemon pseudoputus
Selaginella watsonii

Riparian

Beckmannia syzigachne
Calypto bulbosa var. *americana*
Erigeron lobatus

Rocks, Crevices, and Ledges

Amsonia tomentosa var. *tomentosa*
Astragalus cremnophylax var. *cremnophylax*
Camissonia specuicola ssp. *specuicola*
Cheilanthes villosa
Fraxinus cuspidata var. *macropetala*
Phacelia filiformis
Selaginella watsonii
Thelypodopsis purpusii

Sagebrush

Antirrhinum kingii
Cryptantha capitata
Galium bifolium
Penstemon rydbergii

Spruce-fir

Betula occidentalis
Calypto bulbosa var. *americana*
Galium bifolium
Hymenoxys subintegra
Machaeranthera mucronata
Penstemon rydbergii

Wash Areas

Antirrhinum kingii
Camissonia specuicola ssp. *hesperia*
Euphorbia aaron-rossii

PLANT LIST BY SOIL TYPE |

Alluvium Substrates

Agave sp. nova
Allium bigelovii
Euphorbia aaron-rossii

Aquatic Substrates

Beckmannia syzigachne
Epipactis gigantea
Imperata brevifolia
Ranunculus uncinatus

Duff Substrates

Calypso bulbosa var. americana
Draba asprella var. kaibabensis
Draba asprella var. stelligera

Granitic Substrates

Yucca whipplei

Gravelly Loam

Arctomecon californica
Tricardia watsonii

Limestone Substrates

Agave utahensis ssp. kaibabensis
Arabis gracilipes
Astragalus cremnophylax var. cremnophylax
Arctomecon californica
Camissonia specuicola ssp. specuicola
Camissonia specuicola ssp. hesperia
Castilleja kaibabensis
Crossosoma parviflorum
Eriogonum heermannii var. subracemosum
Eriogonum zionis var. coccineum
Rosa stellata ssp. abyssa
Talinum validulum
Thelypodopsis purpusii

Loam

Cryptantha capitata
Machaeranthera mucronata
Penstemon rydbergii
Silene rectiramea

Rocky Talus

Anulocaulis leisolenus var. leisolenus
Encelia frutescens var. resinosa
Opuntia basilaris var. longiareolata
Opuntia phaeacantha var. mojaviensis
Phacelia filiformis
Yucca whipplei

Saline Substrates

Flaveria mcdougallii

Sandstone Substrates

Agave utahensis ssp. kaibabensis
Argemone arizonica
Camissonia specuicola ssp. specuicola
Eriogonum heermannii var. subracemosum
Eriogonum zionis var. coccineum
Hesperodoria scopulorum var. scopulorum
Sclerocactus parviflorus var. intermedius
Thelypodopsis purpusii
Yucca whipplei

Sandy Substrates

Amsonia tomentosa var. tomentosa
Cryptantha capitata
Euphorbia aaron-rossii
Rosa stellata ssp. abyssa
Sclerocactus parviflorus var. intermedius

Shale Substrates

Anulocaulis leisolenus var. leisolenus
Argemone arizonica
Flaveria mcdougallii

Volcanic Substrates

Antirrhinum kingii
Camissonia confertiflora
Encelia frutescens var. resinosa
Yucca whipplei

PLANT LIST BY PLACE NAME

Bass Canyon and Trail

Eriogonum zionis var. *coccineum*
Fraxinus cuspidata var. *macropetala*
Haplopappus salicinus
Hesperodoria scopulorum var. *scopulorum*
Rosa stellata ssp. *abyssa*
Sclerocactus parviflorus var. *intermedius*

Colorado River

Anulocaulis leisolenus var. *leisolenus*
Encelia frutescens var. *resinosa*
Epipactis gigantea
Erigeron lobatus
Euphorbia aaron-rossii
Flaveria mcdougallii
Haplopappus salicinus
Imperata brevifolia
Opuntia basilaris var. *longiareolata*
Opuntia phaeacantha var. *mojavensis*
Yucca whipplei

Grandview Trail

Aletes macdougallii ssp. *macdougallii*
Astragalus cremnophylax var. *cremnophylax*
Cryptantha capitata
Eriogonum heermannii var. *subracemosum*
Haplopappus cervinus
Haplopappus salicinus
Hesperodoria scopulorum var. *scopulorum*
Phacelia filiformis

Granite or Inner Gorge

Anulocaulis leisolenus var. *leisolenus*
Opuntia basilaris var. *longiareolata*
Opuntia phaeacantha var. *mojavensis*

Havasu Canyon

Anulocaulis leisolenus var. *leisolenus*
Camissonia specuicola ssp. *hesperia*
Cheilanthes villosa
Epipactis gigantea
Fraxinus cuspidata var. *macropetala*
Imperata brevifolia
Mortonia scabrella var. *utahensis*
Opuntia phaeacantha var. *mojavensis*
Sclerocactus parviflorus var. *intermedius*

Hermit Canyon and Trail

Camissonia specuicola ssp. *specuicola*
Cryptantha capitata
Eriogonum zionis var. *coccineum*
Ostrya knowltonii
Pteryxia petraea
Silene rectiramea

Kaibab Plateau/North Rim

Calypto bulbosa var. *americana*
Castilleja kaibabensis
Hesperodoria scopulorum var. *scopulorum*
Hymenoxys subintegra
Machaeranthera mucronata
Penstemon pseudoputus
Penstemon rydbergii
Ranunculus uncinatus
Selaginella watsonii

Kanab Canyon

Eriogonum zionis var. *coccineum*
Fraxinus cuspidata var. *macropetala*
Haplopappus cervinus
Rosa stellata var. *abyssa*
Thelypteris puberula var. *sonorensis*

Lower (or Western) Grand Canyon and Rampart Cave

Amsonia tomentosa var. *tomentosa*
Arctomecon californica
Camissonia specuicola ssp. *hesperia*
Crossosoma parviflorum
Eriogonum heermannii var. *subracemosum*
Fraxinus cuspidata var. *macropetala*
Mortonia scabrella var. *utahensis*
Primula specuicola
Tricardia watsonii

Marble Canyon along the Colorado River

Anulocaulis leisolenus var. *leisolenus*
Encelia frutescens var. *resinosa*
Epipactis gigantea
Euphorbia aaron-rossii
Encelia frutescens var. *resinosa*
Haplopappus salicinus
Primula specuicola
Vancelevia stylosa

North Kaibab Trail and Roaring Springs

Aletes macdougali ssp. *macdougali*
Argemone arizonica
Betula occidentalis
Carex scirpoidea var. *curatorum*
Cryptantha capitata
Draba asprella var. *kaibabensis*
Epipactis gigantea
Phacelia filiformis
Pteryxia petraea

South Kaibab Trail

Aletes macdougali
Allium bigelovii
Cryptantha capitata
Ostrya knowltonii
Pteryxia petraea
Phyllodoce empetriformis

South Rim

Asclepias viridiflora
Astragalus cremnophylax var. *cremnophylax*
Hesperodoria scopulorum var. *scopulorum*
Pteryxia petraea
Talinum validulum

Tuweep (or Toroweap)

Antirrhinum kingii
Camissonia confertiflora
Carex scirpoidea var. *curatorum*
Encelia frutescens var. *resinosa*
Epipactis gigantea
Galium bifolium
Ostrya knowltonii
Thelypodopsis purpusii
Yucca whipplei

Walhalla Plateau, North Rim

Arabis gracilipes
Astragalus cremnophylax var. *cremnophylax*
Beckmannia syzigachne
Draba asprella var. *kaibabensis*
Draba asprella var. *stelligera*
Galium bifolium
Paronychia sessiliflora
Penstemon pseudoputus

SCIENTIFIC NAME | *Agave sp. nova* (currently undescribed)

COMMON NAME | To be determined. *Agave* is from the Greek word meaning noble, for its imposing stature.

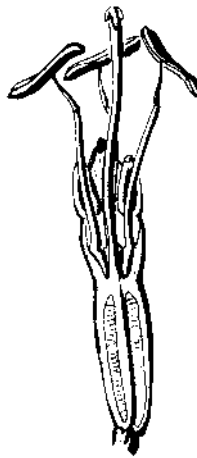
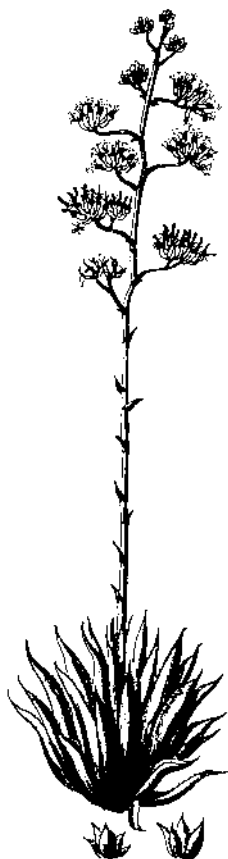
FAMILY (COMMON NAME) | Agavaceae (Agave Family)

SYNONYMS | None

DISTRIBUTION | Endemic to Grand Canyon NP, Coconino County, Arizona. In Grand Canyon NP it is known from upper Deer, Tapeats, and Clear Creeks.

HABITAT | Perennial succulent. Mixed desertscrub at the margin of riparian area and cottonwood gallery forest, found amongst or nearby pre-Columbian archaeological features, 2,400 to 3,400 feet, September. This may be the third documented agave cultivated north of Mexico.

LOOK-ALIKES | Similar in appearance to *A. palmeri* and *A. delamateri* (both known from outside the park), but differs in the later flowering period of September, lack of reddish tepals, larger flowers, and little odor. It is easily distinguished from non-flowering *A. utahensis*, including both of the varieties *utahensis* and *kaibabensis*, by weak, flexuous bayonette leaves that are wider above the middle and flowers in an open panicle, or "candelabra."



- Weak, flexuous leaves wider above the middle
- Flowers in open panicle, inflorescence narrowly paniculate
- Produces off-sets at base of parent plant
- Leaves gray-green
- Flowers large, to 81 mm long





Close up of *Agave sp. nova*.
— BY W. HODGSON

SCIENTIFIC NAME | *Agave utahensis* Engelm. ssp. *kaibabensis* (McKelvey) Breitung

COMMON NAME | None, but called the Kaibab century plant, in reference to the (incorrect) belief that it flowered after a hundred years. *Agave* is from the Greek word meaning noble, from the imposing stature, *utahensis* means of or from Utah, and *kaibabensis* meaning of or from the Kaibab Plateau.

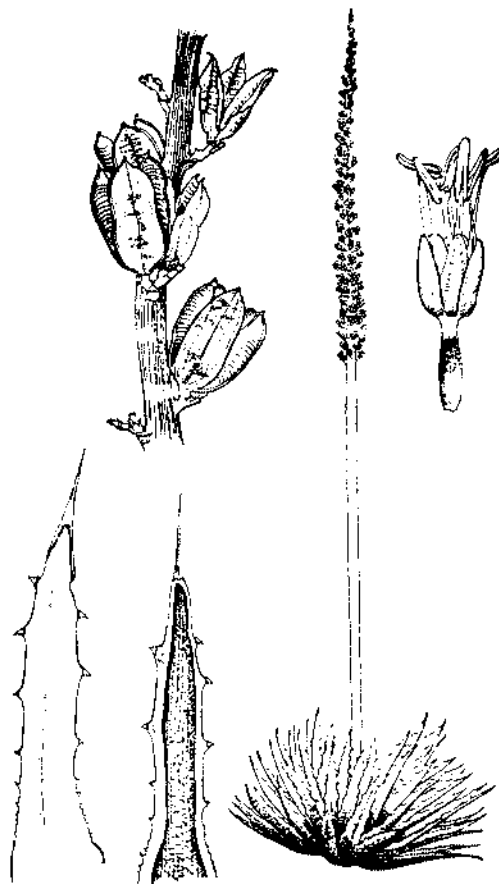
FAMILY (COMMON NAME) | Agavaceae (Agave Family)

SYNONYMS | *Agave kaibabensis* McKelvey

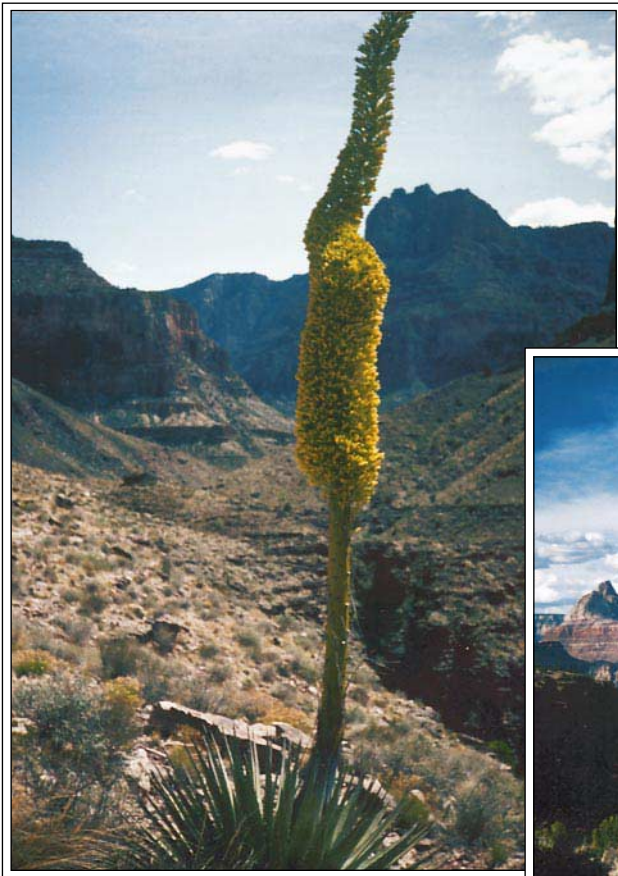
DISTRIBUTION | Endemic to Coconino and Mohave Counties, Arizona. In Grand Canyon NP it is known from eastern Grand Canyon to the Kanab Plateau.

HABITAT | Succulent perennial. Ledges, rims, and level to moderately sloping ledges of limestone and sandstone derived soils in Mohave desertscrub community, 1,200 to 7,200 feet, May to July.

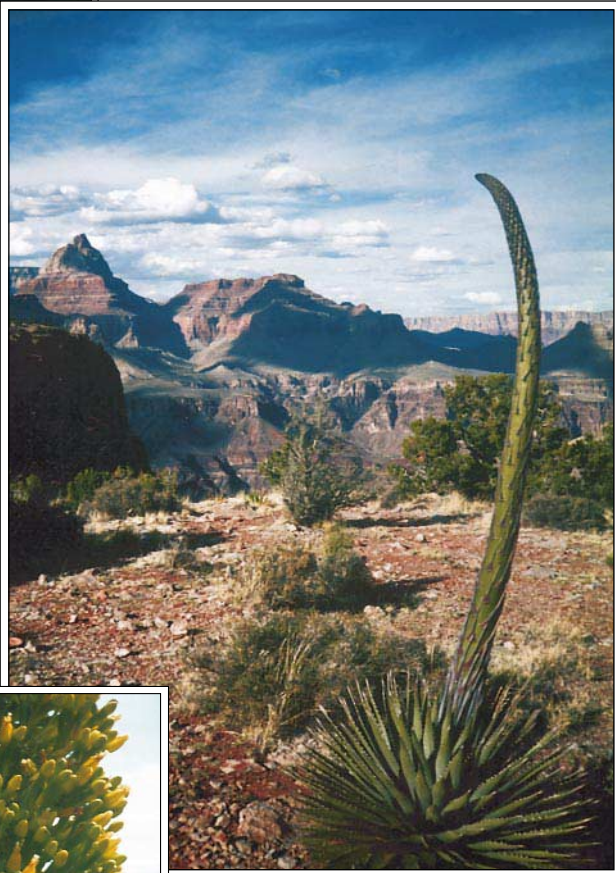
LOOK-ALIKES | Similar to *A. utahensis* var. *utahensis*, but differs in having taller scapes 3-7.5 m, larger leaves 30-50 cm long, and general tendency to not having offsets. However, the populations of both varieties overlap and shared genes give plants shared characteristics.



- Flowering stalks unbranched, 4.5 to 7.5 m
- Flowers born on stalks 2.5 cm or more long
- Flowers yellow
- Large, robust leaves up to 35 cm long
- Plants generally solitary, but may have offsets
- Straight, not curved, leaves



Habitat and flowering stalk emerging from rosette – BY N. BRIAN



Flowering rosette and habitat – BY N. BRIAN



Closeup of *Agave utahensis* ssp. *kaibabensis* – BY N. BRIAN

SCIENTIFIC NAME | *Aletes macdougalii* Coult. & Rose ssp. *macdougalii* Coult. & Rose

COMMON NAME | None, but sometimes called vagabond parsnip or MacDougal's aletes. *Aletes* is a Greek word signifying wanderer, stroller, or vagabond and *macdougalii* honors Dr. Daniel Trembly MacDougal, 1865-1958, a noted American botanist and plant physiologist.

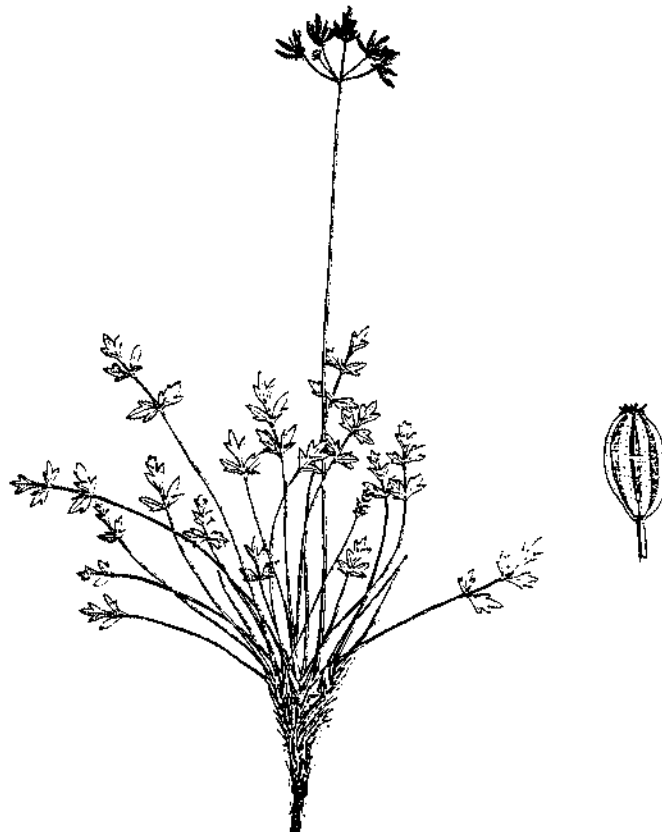
FAMILY (COMMON NAME) | Umbelliferae or Apiaceae (Parsley Family)

SYNONYMS | *Oreoxis macdougalii* (Coult. & Rose) Rydb. and *Cymopterus macdougalii* (Coult. & Rose) Tidestrom

DISTRIBUTION | Subspecies *macdougalii* is endemic to Coconino County, Arizona. In Grand Canyon NP it is reported from North and South Kaibab Trails, and the Grandview Trail.

HABITAT | Perennial herb. Rocky ledges and crevices, rocky slopes, sometimes in dry margins of seeps, and sandy soil usually in pinyon-juniper woodland, but also found in Douglas fir and mixed-conifer forests between the Kaibab Limestone and Redwall/Muav contact, 5,200 to 7,500 feet, April to June.

LOOK-ALIKES | Somewhat similar to other *Cymopterus* or *Lomatium* species, but differs by having leaves all basal or nearly so and leaf blades once or twice pinnately compound, i.e., divided into three parts, each part three times.



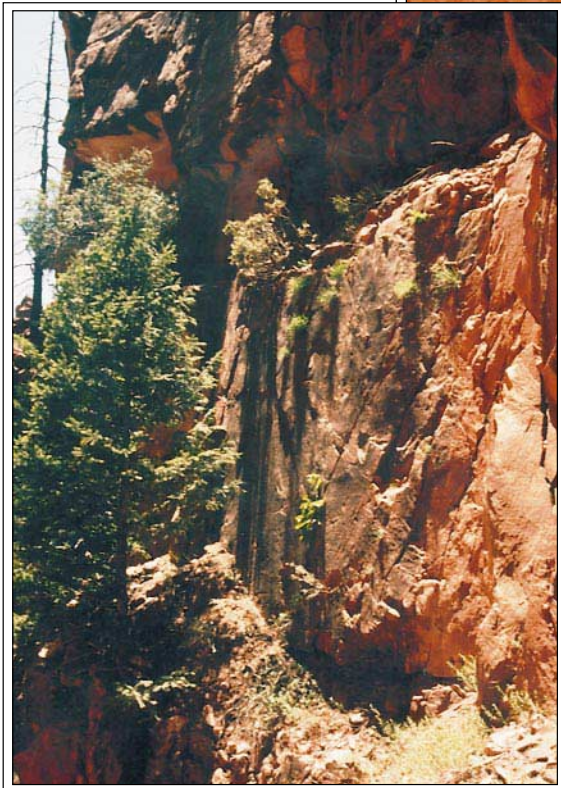
- Yellow flowers
- Plants 7-20 cm tall
- Leaves generally pinnate
- Some leaflets pinnatifid and nearly bipinnate
- Ultimate divisions of leaves ovate
- Fruits mostly less than 1/4 inch long and ribs corky-winged



Close up of *Aletes macdougalii* ssp. *macdougalii*
— BY K. WARREN



General view — BY K. WARREN



Habitat — BY K. WARREN

SCIENTIFIC NAME | *Allium bigelovi* Wats.

COMMON NAME | None, but sometimes called Bigelow's onion. *Allium* is from the Latin word for garlic and *bigelovii* honors John Milton Bigelow, 1804-1878, a botanist and surgeon with the Mexican Boundary Survey in 1853.

FAMILY (COMMON NAME) | Liliaceae (Lily Family)

SYNONYMS | None

DISTRIBUTION | Southwestern New Mexico, and Coconino, Mohave, Gila, Yavapai Counties, Arizona. In Grand Canyon NP it was collected once (Stockert in 1965) between Indian Garden and Pipe Spring in open dry soil. It is also reported from Mormon Flats, on the South Kaibab Trail.

HABITAT | Perennial herb. Open, dry soil in desertscrub community, 1,500 to 5,000 feet, April and May.

LOOK-ALIKES | Similar to *A. biseptum* var. *palmeri* and *A. nevadense*, but differs by having leaves two or more per stem, flat, and channeled, and flowering stems short, and flowers pink or white with a pink midrib (not purple). It might be confused with *Calochortus* species, but differs by the six perianth segments composed of calyx and corolla being nearly all alike, none bearing glands, and having the odor of an onion.

- *Bulbs oval, outer bulb coat brown and netted, and inner bulb coat white and thin*
- *Leaves 1 or 2, often longer than flowering stalk*
- *Leaf blades 1-2 mm wide, flat or involute*
- *Flowers pink or white with pink midrib*
- *Seed capsule prominently crested*



Plant sample from
herbarium sheet.

SCIENTIFIC NAME | *Amsonia tomentosa* Torr. & Frem. var. *tomentosa* Torr. & Frem.

COMMON NAME | None, but sometimes called narrowleaf blue star. *Amsonia* honors Charles Amson, an 18th century Virginian physician and *tomentosa* means densely pubescent with matted wool in reference to the hairiness of the leaves.

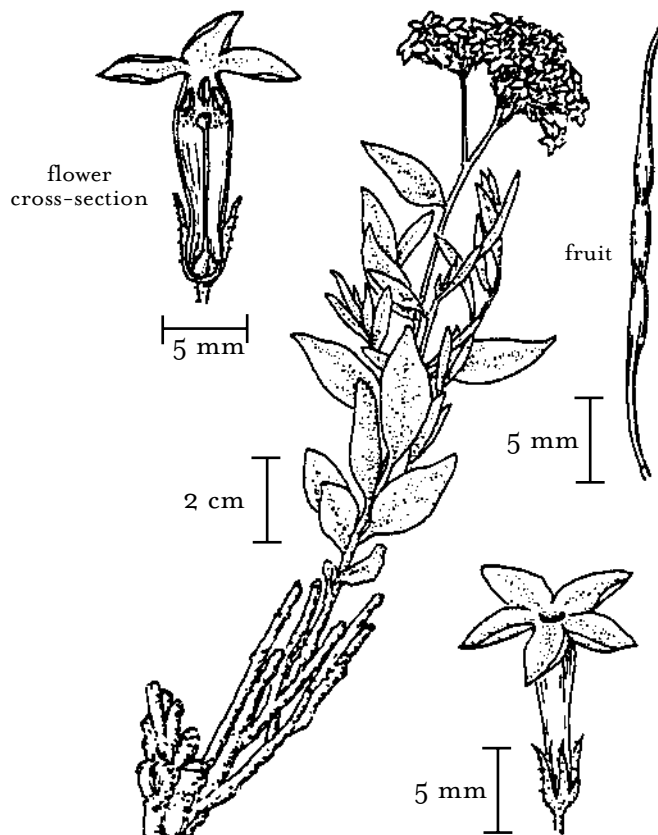
FAMILY (COMMON NAME) | Apocynaceae (Dogbane Family)

SYNONYMS | None

DISTRIBUTION | Utah, Nevada, California, New Mexico, Texas, Mexico, and Mohave, Yavapai, and Coconino Counties, Arizona. In Grand Canyon NP it is recorded from Vulture Canyon (CRM 274.5 L) and Thunder River Trail, but is probably more widely distributed.

HABITAT | Perennial herb. Dry slopes in saltbush, blackbrush, ephedra, and desert shrub communities, among shrubs, in the open, in crevices, or sandy soil, 1,500 to 2,500 feet, April.

LOOK-ALIKES | Similar to the more common *A. tomentosa* var. *stenophylla*, but differs by being densely pubescent with matted, wooly hairs. However, hairiness may be a simple, genetically recessive trait. Both varieties can be found together at the same site.



- Leaves alternate and lance-shaped
- Stems 20-40 cm tall
- Pale, lead-blue flowers
- Corolla a narrow, funnel-shaped tube with spreading lobes
- Fruits more or less cylindrical and constricted at intervals

SCIENTIFIC NAME | *Antirrhinum kingii* Wats.

COMMON NAME | King snapdragon. *Antirrhinum* is from the Greek word meaning nose-like, from the snout-like shape of some of the flowers and also a plant name used by Pliny, while *kingii* honors Clarence Rivers King, 1842-1901, geologist and explorer, surveyor of the 40th parallel, and head of the U.S. Geological Survey in 1879.

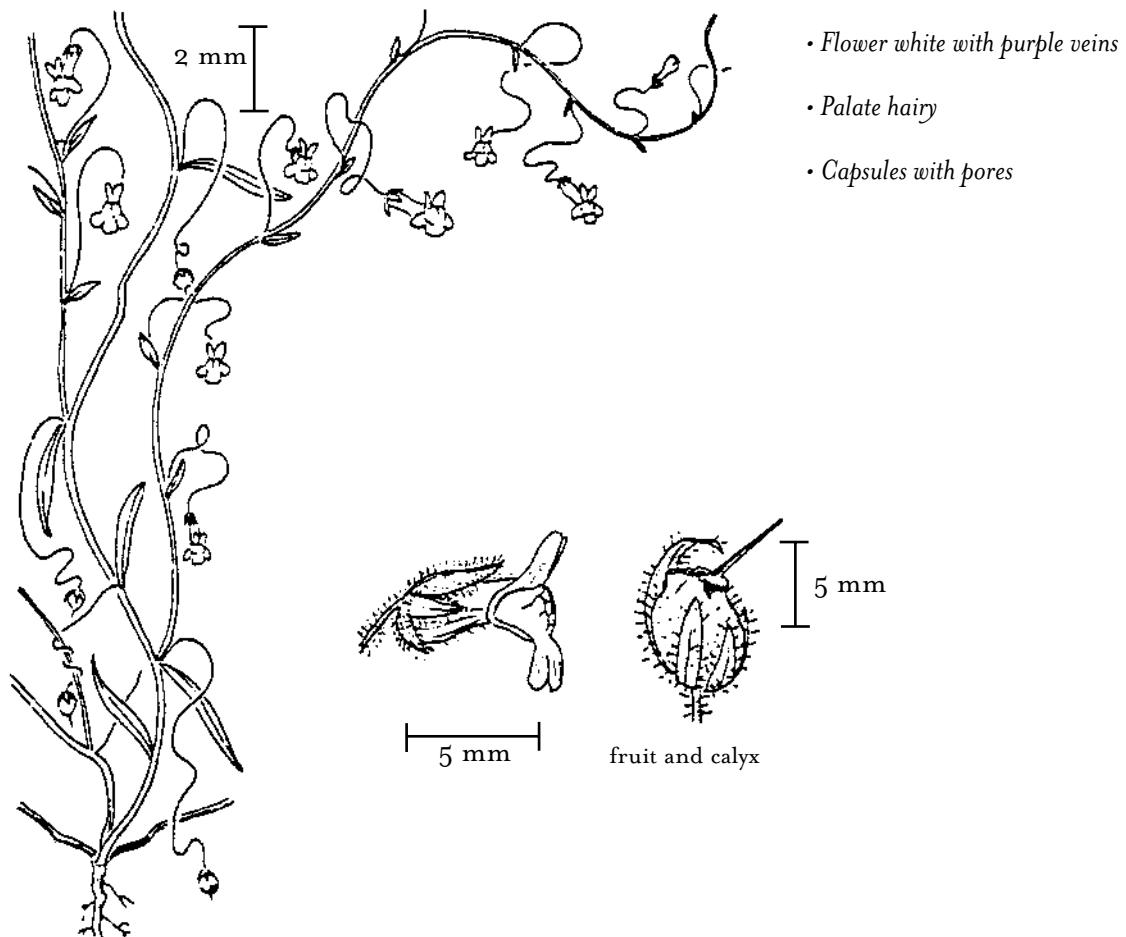
FAMILY (COMMON NAME) | Schrophulariaceae (Figwort Family)

SYNONYMS | None

DISTRIBUTION | Oregon, Nevada, California, Utah, and Mohave County, Arizona. In Grand Canyon NP it is known only from Vulcan's Throne at Tuweep.

HABITAT | Annual herb. Washes, wash banks, scree, gravelly slopes, and flats in creosote bush, Joshua tree, other warm desert shrub, sagebrush, and shadscale communities, 5,000 to 6,400 feet, April.

LOOK-ALIKES | Similar to *A. filipes*, but differs in pedicels not prehensile or clasping and not entangled in shrubbery, capsules with pores, and white flowers with purple veins.





Plant sample from
herbarium sheet.

SCIENTIFIC NAME | *Anulocaulis leisolenus* (Torr.) Standl. var. *leisolenus* (Torr.) Standl.

COMMON NAME | None, but sometimes called ringstem. *Anulocaulis* is from the Latin word meaning ring stem, in reference to the sticky internodal rings. The meaning of *leisolenus* is obscure, but *lei* means smooth.

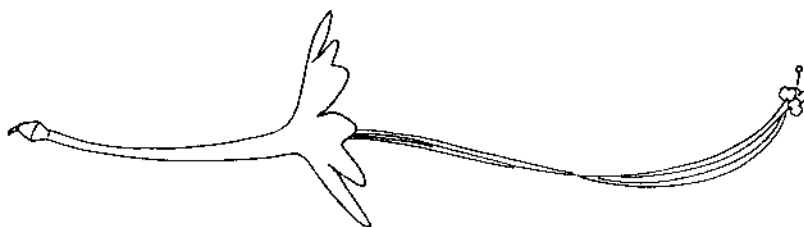
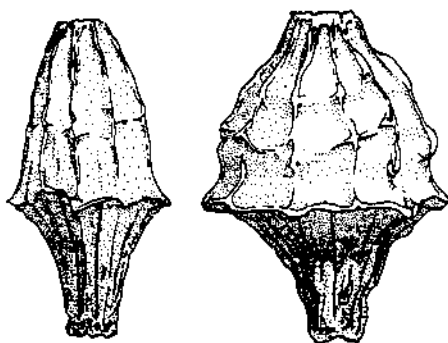
FAMILY (COMMON NAME) | Nyctaginaceae (Four O'Clock Family)

SYNONYMS | *Acleisanthes nummularia* M. E. Jones, *Boerhavia nummularia* (M. E. Jones) M. E. Jones

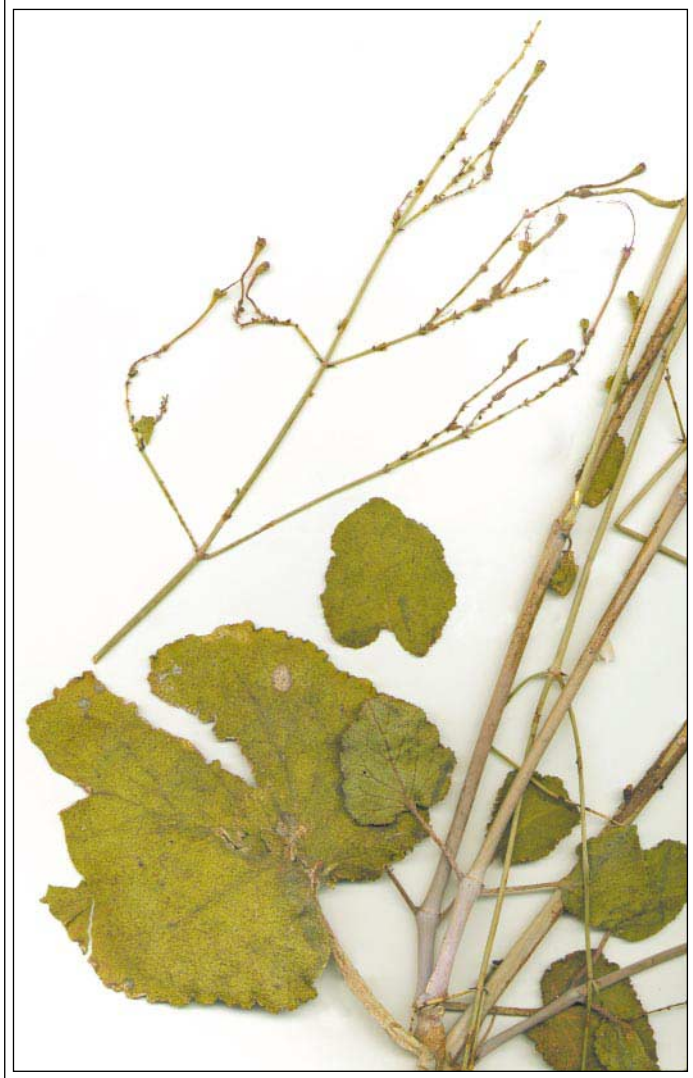
DISTRIBUTION | Nevada, New Mexico, Texas, Chihuahua, Mexico; and Coconino, Mohave, and Yavapai Counties, Arizona. In Grand Canyon NP it is reported from localities between CRM 18 and 175, and from Havasu Canyon on Supai Tribal lands.

HABITAT | Perennial herb. Calcareous shales and clays, alkaline clay bluffs, gypsum soils, and loose talus. In Grand Canyon NP it is found on soils within the Supai Sandstone, Muav Limestone, Bright Angel Shale, Hakatai Shale, and Vishnu Schist, 1,700 to 4,000 feet, June to October.

LOOK-ALIKES | None



- Gnarled woody root
- Broad, sticky band on each internode
- Leaves mostly basal, upper most much reduced and subtending branches
- Leaves dull green with irregularly crenulate margins
- Flowers greenish-bronze on tube, white or pale pink on limb
- Three stamens with purple filaments
- Seeds secrete mucilage when wetted
- Flowers open about sunset and close by mid-morning
- Flowers ephemeral and fragile



Plant sample from
herbarium sheet.

SCIENTIFIC NAME <i>Arabis gracilipes</i> Greene
COMMON NAME None, but sometimes called rock cress. <i>Arabis</i> is a Latin word meaning of Arabia, while <i>gracilipes</i> means slender.
FAMILY (COMMON NAME) Cruciferae or Brassicaceae (Mustard Family)
SYNONYMS <i>Arabis arcuata</i> (Nutt.) Gray var. <i>longipes</i> Wats.
DISTRIBUTION Endemic to Coconino and Mohave Counties, Arizona. In Grand Canyon NP it is reported from Kanab Plateau, western North Rim; Grand Canyon Lodge, Tiyo Point, Cape Final on the Walhalla Plateau, and South Rim.
HABITAT Perennial herb. Coniferous forests with ponderosa pine or pinyon-juniper woodland in limestone soil, 5,700 to 7,800 feet, April to June.
LOOK-ALIKES Similar to <i>A. fendleri</i> , but differs by its more stout stem, larger and more numerous stem leaves, and longer fruits.

- 30 or more stem leaves
- Stout stems
- Fruits not hairy
- Flowers purple



Plant sample from
herbarium sheet.

SCIENTIFIC NAME | *Arctomecon californica* Torr. & Frem.

COMMON NAME | None, but called California bearclaw-poppy, bear poppy, golden bear poppy, and yellow-flowered desert poppy. *Arctomecon* is from either the Greek word *arktos* meaning bear or the Latin word *arcto* meaning close or tight and the Greek word *mecon* meaning poppy.

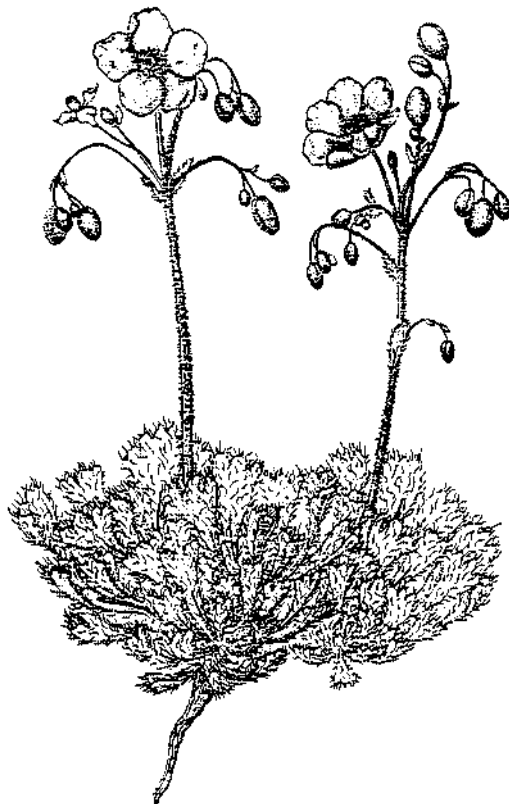
FAMILY (COMMON NAME) | Papaveraceae (Poppy Family)

SYNONYMS | None

DISTRIBUTION | The typical variety (var. *californica*) is found in Nevada. This entity is endemic to Grand Canyon NP and may be described as a new variety. It is known from park lands near Rampart Cave (CRM 274.5 L), CRM 275 R, and on the Hualapai Tribal lands at CRM 272 to 272.5 L.

HABITAT | Perennial herb. The typical variety from Nevada grows in barren, gravelly desert flats, hummocks and slopes, often in gypsum deposits of the Muddy Creek Formation. The Grand Canyon entity is found in strongly calcareous, gravelly loam, and limestone chips on narrow gravelly shelves high on the slopes of side canyons on limestone substrates derived from and unnamed dolomitic member of the Muav Formation. Both are members of the Mohave desertscrub community, 1,600 to 2,200 feet, April to May.

LOOK-ALIKES | Closely resembles *A. merriami* (from Nevada) and *A. humilis* (from Utah), but is easily separated by presence of yellow (not white) flowers that are clustered at the top of the flowering stalks.



- Six, yellow petals
- Numerous, mostly basal leaves up to 60 cm tall
- Leaf blades wedge-shaped and shallowly 3-toothed
- Perennial with stout taproot



Closeup of *Arctomecon californica*
— BY A. M. PHILLIPS, III



Habitat — BY A. M. PHILLIPS, III



Arctomecon californica — BY A. M. PHILLIPS, III

SCIENTIFIC NAME | *Argemone arizonica* G.B. Ownbey

COMMON NAME | None, but called Roaring Spring prickly poppy. *Argemone* is from the Greek word for ocular cataract, supposedly remedied by sap of other plants with this name, and *arizonica* means of or from Arizona.

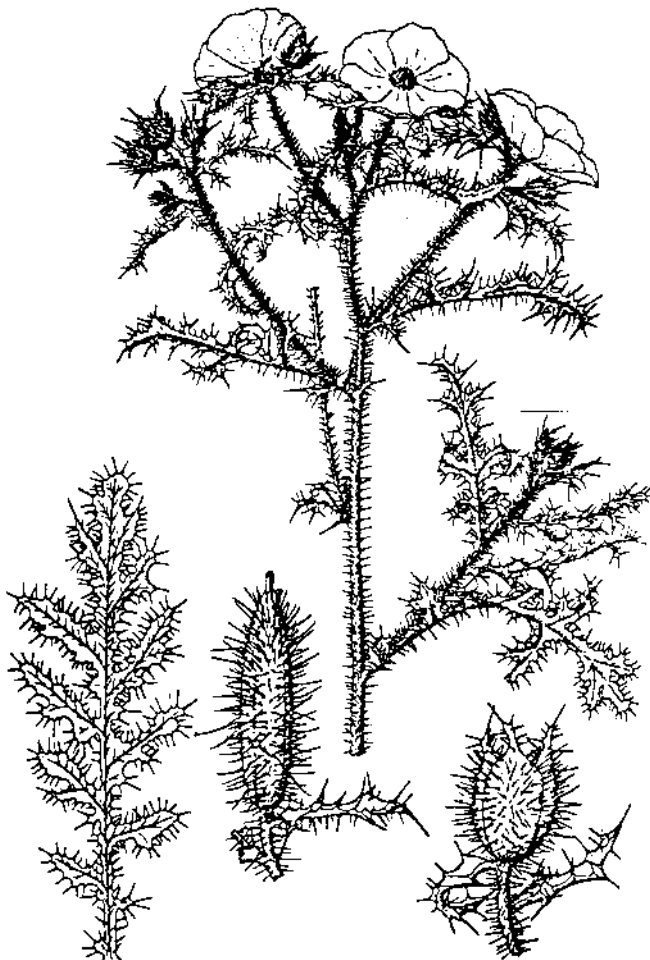
FAMILY (COMMON NAME) | Papaveraceae (Poppy Family)

SYNONYMS | *Argemone platyceras* Fedde (in part)

DISTRIBUTION | Endemic to North Kaibab Trail in Roaring Springs Canyon, North Rim, Grand Canyon NP.

HABITAT | Perennial herb. Precipitous slopes of unstable talus of the lower two members of the Supai Formation in pinyon-juniper habitat, 6,000 to 6,800 feet, April to August.

LOOK-ALIKES | Similar to *A. munita*, which has erect and sparingly prickly stems, leaf prickles on and between veins, half-clasping upper leaves, rounded tips to the leaf lobes, and yellow latex.



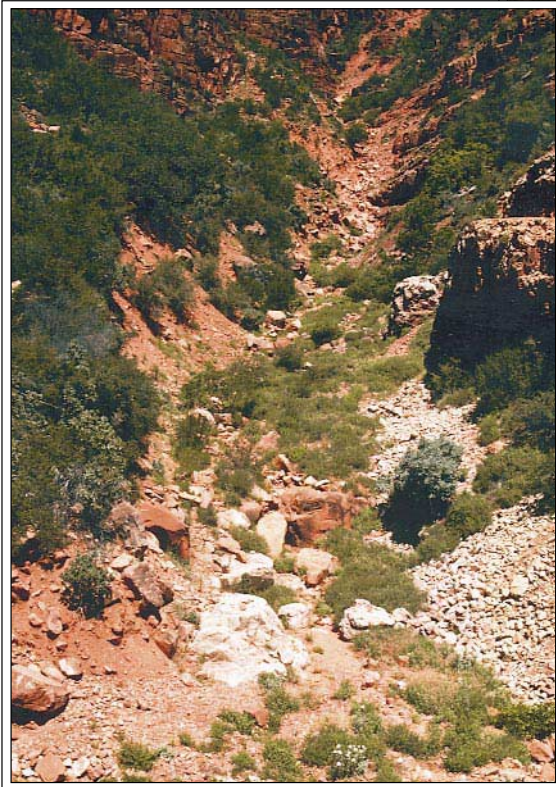
- Diffusely branched, often decumbent and very prickly
- 150 yellow stems and 6 white petals
- Latex reported to be very pale lemon-yellow, but observed to be clear
- Upper leaves not half-clasping
- Fruit a many-seeded spindle-shaped three-lobed capsule
- 3 subterminal horns on flower buds
- Angular shape to top or apex of leaf lobe
- Leaf prickles only on primary and secondary veins



Flowers and leaves of *Argemone arizonica*
— BY KAREN WARREN



Plant group — BY K. WARREN



Habitat — BY K. WARREN

SCIENTIFIC NAME | *Asclepias viridiflora* Raf. var. *lanceolata* (Ives) Torr.

COMMON NAME | None. *Asclepias* honors Asklepios, an ancient Greek physician and *viridiflora* means green flowered.

FAMILY (COMMON NAME) | Asclepiadaceae (Milkweed Family)

SYNONYMS | *Acerates viridiflora* Eaton

DISTRIBUTION | Saskatchewan, Massachusetts, Florida, Mexico, and Coconino and Yavapai Counties, Arizona. In Grand Canyon NP known from one collection (Whiting in 1941) taken two miles west of El Tovar on South Rim.

HABITAT | Perennial herb. Ponderosa pine community, 5,500 to 7,000 feet, June and July.

LOOK-ALIKES | None

- *Plants erect, decumbent, or ascending*
- *Leaves mostly opposite, long, and narrow*
- *Hoods of flowers yellowish-green, often tinged with purple*
- *Hairy pods 5-10 cm long on deflexed pedicels*

SCIENTIFIC NAME | *Astragalus cremnophylax* Barneby var. *cremnophylax* Barneby

COMMON NAME | Sentry milk-vetch. *Astragalus* is either from a Greek word meaning ankle-bone or dice, perhaps in reference to the rattling of the seeds within the fruit, or it may be derived from *astro* meaning *star* and *gala* meaning milk in reference to the belief that its use in pasture land improves livestock milk yield. The specific epithet *cremnophylax* is from the words *cremno* meaning gorge and *phylax* meaning watchman.

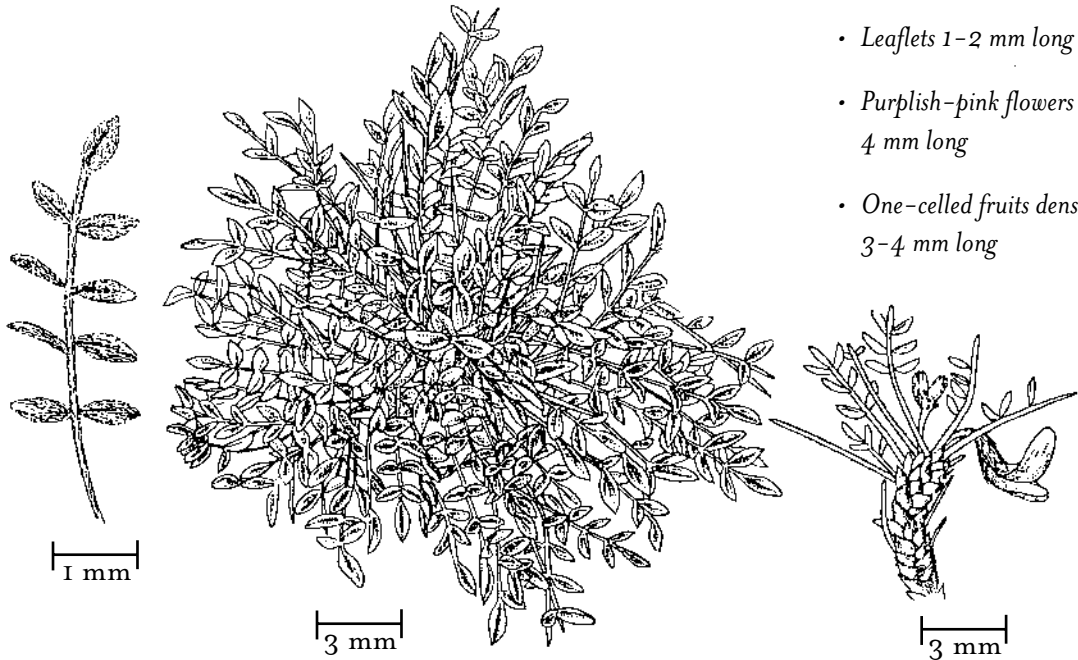
FAMILY (COMMON NAME) | Leguminosae or Fabaceae (Pea Family)

SYNONYMS | None

DISTRIBUTION | Endemic to Grand Canyon NP, Coconino County, Arizona. The locations for this variety are not included here. The variety was listed by FWS without critical habitat, meaning that site locations cannot be disclosed. It should be looked for on both North and South Rims.

HABITAT | Perennial, mat-forming herb. Crevices and rimrock, pinyon-juniper woodland in Kaibab Limestone at 7,000 to 7,900 feet, March to June.

LOOK-ALIKES | Variety *cremnophylax* superficially resembles *A. calycosus*, which has larger leaflets, two celled fruits, and stems exerted from the body of the plant. It is similar to the other two varieties of the species (var. *myriorrhaphis* and var. *hevronii*), known only from outside Grand Canyon, which have old leaf bases persisting, becoming stiff and upright, giving the plants a spiny look and feel, and larger, brighter flowers.





Flowers and leaves of *Astragalus cremnophylax* var. *cremnophylax* – BY KAREN WARREN



Habitat – BY K. WARREN



Close-up of plant mat. – BY P. ROWLANDS

SCIENTIFIC NAME | *Beckmannia syzigachne* (Steud.) Fern.

COMMON NAME | American sloughgrass. *Beckmannia* honors Johann Beckmann, 1739-1811, a professor at Goettingen, Germany, while *syzigachne* means scissors-like in reference to the glumes or lowermost bracts of the grass flower.

FAMILY (COMMON NAME) | Gramineae (Grass Family)

SYNONYMS | *Panicum syzigachne* Steudel, *B. eruciformis* of American authors, not (L.) Host. ssp. *syzigachne* Breit.

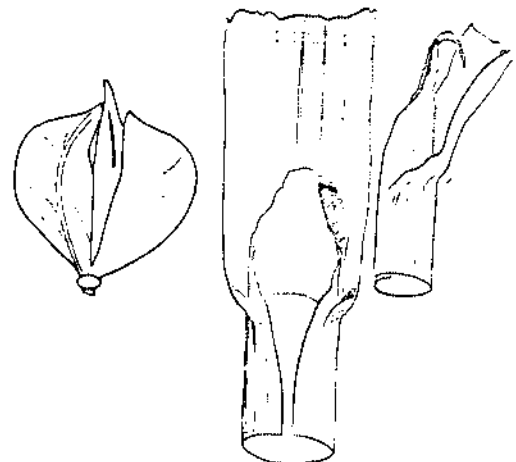
DISTRIBUTION | North America and Eurasia. In Arizona, known from Apache and Coconino counties. In Grand Canyon NP known only from Greenland Lake, on North Rim's Walhalla Plateau.

HABITAT | Annual grass. Wet, cool, marshes, ditches, streams, and edges of ponds and lakes, and rarely saline meadows, 7,500 to 8,500 feet, July and August.

LOOK-ALIKES | None



- Spikelets laterally compressed, closely overlapping in two rows along one side of a continuous rachis
- Spikelets detach below the glumes
- Glumes equal, inflated, and transversely wrinkled with a deep keel
- Leaf blades rough to the touch
- Robust, stout, often stoloniferous





Habitat of *Beckmannia syzigachne* – BY N. BRIAN

SCIENTIFIC NAME | *Betula occidentalis* Hook.

COMMON NAME | Water birch, also called abedul, and black, red, canyon, or Rocky Mountain birch. *Betula* is a Latin word for birch and *occidentalis* means of or from the West or western hemisphere.

FAMILY (COMMON NAME) | Betulaceae (Birch Family)

SYNONYMS | *Betula fontinalis* Sarg.

DISTRIBUTION | Saskatchewan, British Columbia, south to Nebraska, New Mexico, California, and Apache, Navajo and Coconino Counties, Arizona. In Grand Canyon NP recorded from North Rim at Big Spring Canyon, Bright Angel Spring (no longer in existence), and Roaring Springs.

HABITAT | Perennial, deciduous shrub to small tree. Moist canyons with pinyon pine, ponderosa pine, or spruce, 5,000 to 9,000 feet, June.

LOOK-ALIKES | Similar to *Ostrya knowltonii*, the Knowlton hop hornbeam but differs by floral parts, the calyx and corolla, present in the male flowers and absent in the female flowers, female catkins solitary, and winged nutlets not enclosed in a bladder-like bract.



- Leaf margins once or twice toothed
- Separate male and female flowers (catkins) on the same plant
- Bark generally smooth and dark copper-colored with large lenticels
- Nutlets winged
- Young twigs with resinous glands

SCIENTIFIC NAME <i>Boehmeria cylindrica</i> (L.) Swartz
COMMON NAME Bog-hemp. <i>Boehmeria</i> is named for George Rudolph Boehmer, 1723-1803, a professor at Wittenberg, Saxony and <i>gylindrica</i> means cylindrical.
FAMILY (COMMON NAME) Urticaceae (Nettle Family)
SYNONYMS Unknown.
DISTRIBUTION Typically found east of the 100th meridian from Florida to Texas, north to Maine, Canada, with disjunct populations in the West Indies, but it is recorded from Utah, New Mexico, and Gila, Cochise, and Coconino Counties, Arizona. In Grand Canyon NP collected once (Stevens in 1993) at CRM 37.4 R.
HABITAT Perennial herb. Moist or shady ground and seeps in riparian or marshy areas, August through September.
LOOK-ALIKES Other stinging nettles like <i>Urtica</i> , but differs by not having stinging hairs.

- *Opposite leaves with serrate margins*
- *Leaves three-nerved*
- *Male and female flowers on separate plants*
- *Rootstalk or prostrate stem on or just below the ground surface*

SCIENTIFIC NAME | *Calypso bulbosa* (L.) Oakes var. *americana* (R. Br.) Luer.

COMMON NAME | None, but commonly called Western fairy slipper. *Calypso* is from the Greek word Kalypso, sea nymph in Homer's *Odyssey*, in reference to her beauty and secretive behavior, *bulbosa* means with a bulb, and *americana* means of or from America.

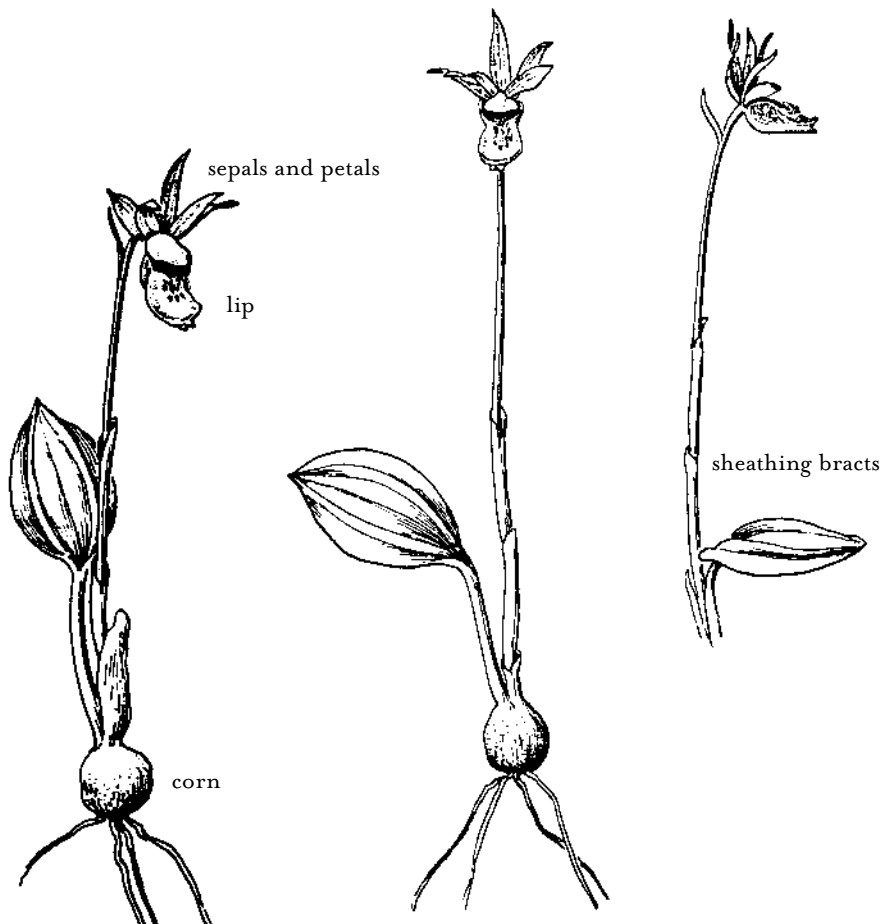
FAMILY (COMMON NAME) | Orchidaceae (Orchid Family)

SYNONYMS | *Calypso americana* R. Br.

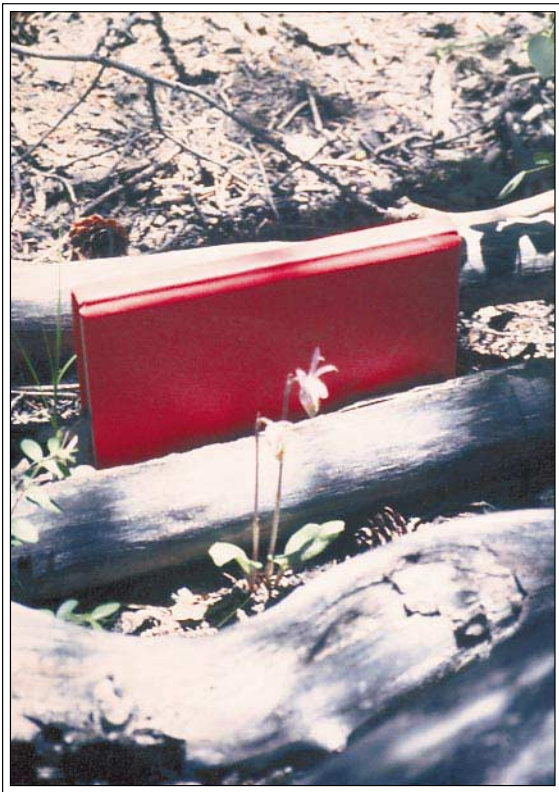
DISTRIBUTION | North America. In Arizona, known from Coconino, Apache, and Greenlee Counties. In Grand Canyon NP found on North Rim in Thompson Canyon, Robber's Roost, Point Sublime, Walhalla Plateau near Farview Point, and Fawn Spring.

HABITAT | Perennial herb. Mossy places in cool, moist to dry, shaded coniferous forests with ponderosa pine, aspen, or spruce-fir, bogs, and along streams, in rich organic soil, 7,400 to 10,000 feet, June to August.

LOOK-ALIKES | None. Could be confused with *Epipactis gigantea*, but differs by having only one leaf and one flower per flowering stem.



- Stem from a corm or bulb
- One leaved and one flowered
- Leaf broadly ovate
- Flower pinkish to lavender and mottled with darker color
- Petal bearded with bright yellow hairs



General view of *Calypso bulbosa* var. *americana*
— BY N. BRIAN

SCIENTIFIC NAME | *Camissonia confertiflora* (Raven) Raven

COMMON NAME | None. *Camissonia*, sometimes called sun cup or bunch flower evening primrose, is named for L. A. Von Chamisso, French-born German botanist, 1781-1838, while *confertiflora* literally means crowded flowers.

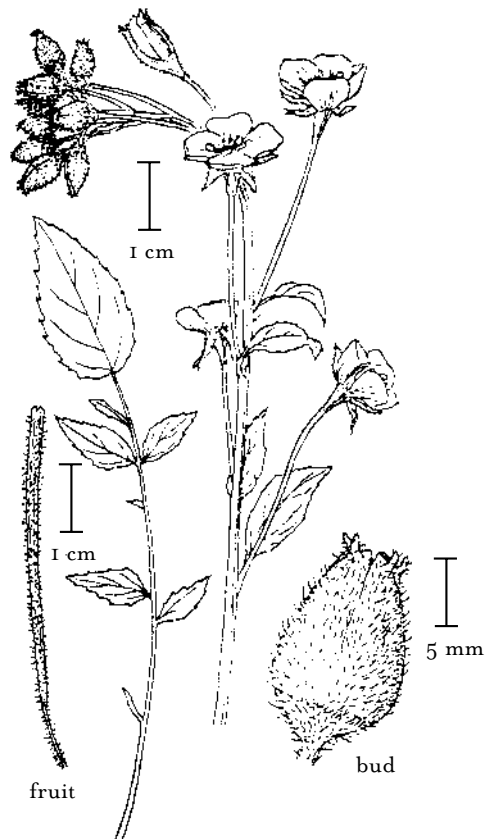
FAMILY (COMMON NAME) | Onagraceae (Evening Primrose Family)

SYNONYMS | *Oenothera confertiflora* Raven

DISTRIBUTION | Endemic to Grand Canyon NP, Mohave County, Arizona. In Grand Canyon NP found at Vulcan's Throne in Toroweap Valley, Tuweep.

HABITAT | Annual herb. Slopes of volcanic cones in cinder soils, Mohave desertscrub, 4,200 feet, April.

LOOK-ALIKES | Similar to *C. multijuga* and *C. brevipes*, but differs in having glands on the sepals, nodding buds, and free tips at the ends of the sepals. Taxonomic revision may submerge *C. confertiflora* into *C. brevipes*, which has a range from Nevada, western Arizona, and southeastern California.



- Nodding buds
- Free tips at the end of the sepals
- Glands on sepals



Habitat – BY K. WARREN

SCIENTIFIC NAME | *Camissonia specuicola* (Raven) Raven ssp. *hesperia* Raven

COMMON NAME | None. *Camissonia*, sometimes called sun cup or Western cave dweller evening primrose, is named for L. A. Von Chamisso, French-born German botanist, 1781-1838. The species name *specuicola* means cave dwelling (from *specui* meaning covered watercourse ditch, drain, pit, mine, sewer, hollow cavity, or cavern and *cola* meaning dweller); and *hesperia* meaning western.

FAMILY (COMMON NAME) | Onagraceae (Evening Primrose Family)

SYNONYMS | *Oenothera specuicola* Raven ssp. *hesperia* Raven

DISTRIBUTION | Endemic to Coconino and Mohave Counties, Arizona. In Grand Canyon NP known from Havasu and Hualapai Canyons, Separation Canyon, Meriwhitica Canyon, and 2.5 miles below Spencer Canyon (CRM 242).

HABITAT | Perennial herb. Washes and dry stream beds, often in limestone derived soils, 2,300 to 3,500 feet, May.

LOOK-ALIKES | Similar to *C. multijuga* and *C. walkeri* ssp. *walkeri*, but differs in being less densely tufted and not woody, and pubescent leaves and style. *C. specuicola* ssp. *specuicola* grows elsewhere in the park on more stable limestone debris slides and crevices of the Redwall Limestone at higher elevations.

- *Leaves pubescent*
- *Style pubescent, 5-7 mm long*
- *Not woody*

SCIENTIFIC NAME | *Camissonia specuicola* (Raven) Raven var. *specuicola* Raven

COMMON NAME | None, but sometimes called cave dweller or ditch evening primrose. *Camissonia*, sometimes called sun cup or evening primrose, is named for L. A. Von Chamisso, French-born German botanist, 1781-1838, while *specuicola* means cave dweller or dwelling (from *specui* meaning covered watercourse ditch, drain, pit, mine, sewer, hollow cavity, or cavern, and *cola* meaning dweller). Evening primrose is the common name for *Oenothera*, an earlier name for the genus.

FAMILY (COMMON NAME) | Onagraceae (Evening Primrose Family)

SYNONYMS | *Oenothera specuicola* (Raven) Raven ssp. *specuicola* Raven

DISTRIBUTION | Endemic to Grand Canyon NP in Coconino and Mohave Counties, Arizona, where it is found in Saddle Horse Canyon at Tuweep, Kaibab Trail, and Hermit Camp.

HABITAT | Perennial herb. Debris slides and crevices of Redwall Limestone and the Toroweap Formation, 3,100 to 5, 400 feet, April to June.

LOOK-ALIKES | Other species of *Camissonia*, but differs in glabrous leaves and stems.

- *Large basal rosette*
- *Glabrous leaves and stems*
- *Dark green, shining bipinnate leaves*
- *Oil glands present on veins of underside of leaves*
- *Small, bright yellow flowers on erect, tall inflorescences*