

The New Mexico Botanist

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San Juan College Herbarium (SJNM)

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The San Juan College Herbarium (acronym SJNM) is located in the Mathematics/Science/Health Careers Building on the beautiful San Juan College campus in Farmington, New Mexico. The SJC herbarium was instituted and developed by Ken Heil. After many years of occupying the edges of the Geology-Plant Systematics Laboratory, the college graciously and extensively renovated the old radio station suite of rooms into a modern, technology-accessed facility with plenty of space to accommodate even the cabinets donated by the Smithsonian Institution. As the herbarium gets quite a bit of use, both by academic workers and surveyors for environmentally based agencies and businesses, this change is most welcome.

With over 25,000 mounted specimens, and many more thousands in processing, SJNM is the third largest herbarium in New Mexico and the largest in the Four Corners area. Significant collections include part of the Vassey collection and extensive collections from area national parks and monuments, as well as collections from the Navajo Reservation and other under-collected areas of the Four Corners region, including alpine and subalpine areas. The majority of specimens are from the Four Corners region, with large collections from New Mexico, California, and Baja California. The Reeves collection, which is in processing, includes many ferns and orchids of the Southwest and northern Mexico. An extensive Heil Cactaceae collection is a major and important feature. The herbarium has many specimens in the Polemoniaceae and a number of significant type collections, including *Asclepias sanjuanensis*.

Several projects are on-going, including the San Juan Basin Flora project, in conjunction with Rancho Santa Ana Botanic Garden, Claremont, California and Fort Lewis College in Durango, Colorado. San Juan College is coordinating the effort and the three institutions have pledged publishing costs and support for student workers. Additional support is supplied and expected to be supplied by government agencies and private industry. An interesting and unusual feature of the flora will be approximately 50 color drawings by renowned artist Carolyn Crawford and about 500 black and white line drawings by Linda Reeves. Contributors come from major institutions throughout the western and midwestern U.S., including the institutions mentioned, Arizona State University,

University of New Mexico, New Mexico State University, Brigham Young University, University of Michigan, New York Botanical Garden, and many others. Contributors are still needed in a few areas, especially for Convolvulaceae, Lamiaceae, Malvaceae, Onagraceae, Salicaceae, and Solanaceae. Anyone who is interested in participation is invited to contact the authors at the address above. Since the area has been so poorly known botanically, the San Juan Basin Flora will prove to be an important regional flora.

Other on-going projects include work by Ken Heil on *Sclerocactus* and *Pediocactus*, including treatments for the new Vascular Plants of Arizona and Flora of North America, Orchidaceae of Arizona and reproductive biology of *Malaxis* by Linda and Timothy Reeves, and flora of the Grenadiers by Cyndie Holmes.

The Genus *Cryptantha* in New Mexico

by Robert C. Sivinski
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CRYPTANTHA Lehm. ex G. Don

Annual, biennial, or perennial herbs, strigose (rarely glabrate) and often hirsute or hispid-setose; leaves narrowly oblanceolate, spatulate, or occasionally linear; flowers in most species borne in a series of helicoid, naked or bracteate false racemes or false spikes (modified cymes) usually elongating with maturity or often short and aggregated into a terminal thyrses or capitate cluster; calyx cleft to the base or nearly so; corolla white or ochroleucous (bright yellow in *C. flava*), salverform with a spreading or rotate limb and fornices at the throat (these often yellow); anthers included in the corolla tube; usually homostylous, but heterostylous in a few perennial species; stigma capitate; ovules usually 4 (*C. recurvata* is exceptional with only 2 ovules); nutlets (mericarps) 4, or 1-3 by abortion, triangular, ovate to lanceolate, smooth to variously roughened, heteromorphic or all similar, affixed to an elongate gynobase, the ventral scar either closed, narrowly open, or forming a triangular areola.

A diverse genus of about 150 species in the western half of North America and arid regions of South America (23 in New Mexico). A few authors prefer to maintain the biennial and perennial species in the genus *Oreocarya*. There are, however, no exclusive characteristics to separate annual species from the perennials (Subgenus *Oreocarya*). The single-species Section *Eremocarya* is represented by *C. micrantha*. All other New Mexico annuals belong to Section *Krynitzkia*.

Cryptantha is especially interesting for its complex reproductive strategies ranging from autogamy to out-crossing reinforced by heterostyly. Various forms of nutlet abortion are evident to some degree in almost all our species. Abortion rates can be relatively mild

and random, or taken to an extreme where only one nutlet at a genetically fixed location is matured in each flower. This has led to nutlet heteromorphy in some annual species where a single (always matured) nutlet is larger and/or more firmly attached to the gynobase while the three consimilar nutlets are deciduous and randomly matured at various rates, or always aborted. The persistent odd nutlet is dispersed as a unit with the calyx.

Nutlet shape and surface ornamentation are often important diagnostic criteria for *Cryptantha*. Species determinations will usually require mature specimens. (Greek *cryptos* - hidden, and *anthos* - flower, for the cleistogamous flowers of the original South American species.)

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Key to *Cryptantha* Species in New Mexico

- 1. Plants biennial or perennial; corolla conspicuous (limb 4 mm or greater in diameter) 2
- Plants annual; corolla limb usually 0.5-3.0 mm broad (up to 6 mm in *C. crassisepala*) 12

- 2(1) Dorsal surface of mature nutlets smooth and shiny 3
- Dorsal nutlet surface roughened with tubercles, murications, or wrinkles (rugose) 5

- 3(2) Entire corolla yellow; nutlets straight-lanceolate, usually maturing 1/calyx (rarely 2) *C. flava*
- Corolla limb white (tube and fornicies often yellowish); nutlets ovate-lanceolate, decidedly curved inward towards the style, usually maturing 4/calyx (sometimes fewer by abortion) 4

- 4(3) Interior base of corolla tube ringed with small (<1 mm) antrorse scales; plants evidently perennial

- *C. cinerea*
 -- Corolla tube lacking basal scales; plants biennials or short-lived perennials
 *C. palmeri*
- 5(2) Corolla tube elongate, usually exceeding the calyx by at least 2 mm
 6
 -- Corolla tube about equal to, or barely surpassing the calyx
 9
- 6(5) Nutlets muricate (the murications sometimes setulose-tipped), usually maturing
 1/calyx (sometimes 2)

 .. *C. fulvocanescens*
 -- Nutlets rugose or tuberculate; usually maturing 4/calyx (sometimes fewer by abortion)
 7
- 7(6) Nutlets lance-ovate, straight, scar narrowly open for nearly entire length,
 northwestern NM *C. paradoxa*
 -- Nutlets ovate, decidedly curved toward the style, scar closed for entire length, southern
 and east-central NM

 8
- 8(7) Flowers heterostylous; corolla limb 10-14 mm in diameter, fornices bright yellow
 *C. paysonii*
 -- Flowers homostylous; corolla limb 6-10 mm in diameter, fornices white or pale yellow
 *C. oblata*
- 9(5) Nutlet margins conspicuously papery-winged; plants coarse, 4-10 dm tall
 *C. setosissima*
 -- Nutlet margins not papery-winged; plants smaller, <5 dm tall
 10
- 10(9) Corolla tube 6-10 mm long; nutlets decidedly bent toward the style
 *C. oblata*
 -- Corolla tube 6 mm or less; nutlets straight
 11
- 11(10) Mature inflorescence densely-flowered and broad (>1 dm broad); northeastern
 NM *C. thyrsoflora*
 -- Inflorescence fewer-flowered and narrower; northwestern NM
 *C. bakeri*
- 12(1) Nutlet margins decidedly winged
 *C. pterocarya*

- Nutlet margins rounded or sharply angled, never winged
..... 13

- 13(12) Taproot charged with red-purple dye, gynobase elongate, surpassing the nutlets and terminated by a sessile stigma, without a differentiated style; fruiting calyx persistent
..... *C. micrantha*
- Taproot without red dye (sometimes dye-stained in *C. recurvata*); gynobase shorter than the nutlets and topped by a definite style that may or may not surpass the nutlets; fruiting calyx deciduous 14

- 14(13) Usually a solitary nutlet matured in each calyx
..... 15
- Nutlets normally 4/calyx (often fewer by abortion)
..... 16

- 15(14) Calyx lobes and nutlet decidedly recurved or deflexed; nutlet muriccate
..... *C. recurvata*
- Calyx and nutlet not curved or bent; nutlet smooth
..... *C. gracilis*

- 16(14) Nutlets in each calyx all smooth surfaced
..... *C. fendleri*
- Nutlets all rough
.....
17

- 17(16) Nutlets decidedly heteromorphic, 1 larger and/or differently ornamented than the others 18
- Nutlets all alike in size and surface ornamentation
..... 20

- 18(17) Odd nutlet <1.5 mm long; nutlet margins angled; style surpassing odd nutlet; midrib of fruiting calyx lobes moderately thickened but not noticeable expanded and hard
..... *C. angustifolia*
- Odd nutlet 2-3 mm long; nutlet margins rounded; style subequal to odd nutlet; midrib of fruiting calyx lobes conspicuously thickened and bony
..... 19

- 19(18) Cymes bracteate (most flowers subtended by small, leafy bracts)
..... *C. minima*
- Cymes naked (may have 1 or 2 small bracts near the base)
..... *C. crassisepala*

- 20(17) Style surpassing the mature nutlets
 21
 -- Style subequal to the mature nutlets tips
 23
- 21(20) Cymes bractless or nearly so; nutlet scar subulate and expanded at the base to a small, shallow triangular opening

 .. *C. pusilla*
 -- Cymes bracteate throughout; entire nutlet scar a deeply excavated, triangular opening
 22
- 22(21) Plants low (5-15 cm), stems dichotomously branching from the base outward; spring- flowering

 *C. mexicana*
 -- Plants taller (15-40 cm), stems initially straight and erect, forming a central axis and producing dichotomously branching laterals; late summer-flowering
 *C. albida*
- 23(20) Stems erect, spreading hirsute, branches erect or ascending
 *C. barbiger*
 -- Stems strigose, erect, or often flexuous and laxly branched
 *C. nevadensis*

Cryptantha albida (H.B.K.) I.M. Johnst. Branched cryptantha [*C. ramosa* (Lehm.) Greene, *Myosotis albida* H.B.K.]. Annual; STEMS 1-few from the base, forming a central axis, then paniculately branching above with dichotomously branching laterals, 15-40 cm tall, becoming somewhat woody below with age, antrorsely strigose and sparingly hispid; LEAVES spatulate to linear spatulate, usually folded, abundant along the stems, dorsal surface hirsute, ventral surface sparsely strigose to nearly glabrous; INFLORESCENCE terminating the main stem and lateral branches with single (rarely paired), bracteate cymes; FLOWERS nearly sessile; fruiting calyx to 3 mm long, segments lanceolate, conivent, unequal, pungent-hispid; corolla white, small (<2.5 mm wide); style surpassing mature nutlets; nutlets usually 4, all alike, triangular-ovate, about 1 mm, tuberculate, scar triangular, occupying much of the ventral surface, excavated.

Rarely collected in New Mexico (Chaves, Eddy and Otero Counties) on desert limestones; Mexico and s. Ariz. to w. Tex., and amphitropically distributed to nw. Argentina. Aug-Oct.

Cryptantha angustifolia (Torr.) Greene Narrowleaf cryptantha [*Eritrichium angustifolium* Torr., *Krynitzkia angustifolia* (Torr.) A. Gray]. Annual; STEMS diffusely branched from the base, 5-20 cm tall, strigose and spreading hispid; LEAVES scattered, linear, strigose and spreading hispid with pustulate hairs; INFLORESCENCE terminating the branches, cymes usually paired, naked or sparsely bracteate at the base; FLOWERS nearly sessile;

fruiting calyx 2.5-4 mm long, segments subequal, moderately thickened and spreading hispid; corolla white, small, <2.5 mm wide; style usually surpassing all the nutlets; nutlets lanceolate, usually 4, heteromorphic, the nutlet in the abaxial position more firmly attached and slightly larger (<1.5 mm long) than the other 3 (about 1 mm), all finely tuberculate, odd nutlet margins sharply angled, well defined by a raised edge (but not winged), scar subulate, closed or narrowly open. Occasional in Larrea desert of Doña Ana, Hidalgo, Luna and Otero Counties; s. Calif. and s. Nev. to w. Tex. and n. Mexico. Mar-May.

Cryptantha bakeri (Greene) Payson Baker's cryptantha [*Oreocarya bakeri* Greene]. Biennial or short-lived perennial; STEMS simple, 1-few from the base, 1-4 dm tall, spreading hispid and softer, finer under-pubescent; LEAVES oblanceolate or spatulate, spreading hirsute and sericeous strigose or long-spreading villous, cauline leaves ascendingly reduced; INFLORESCENCE elongate-cylindric in flower (interrupted below), setose-hirsute, somewhat spreading in fruit, foliar bracts evident, often longer than the individual cymules; FLOWERS homostylis; short-pedicled (1-3 mm); fruiting calyx strigose-hirsute, 6-9 mm long; corolla white with yellow fornications, tube equal or subequal to tips of calyx lobes, limb 7-10 mm wide; nutlets usually 4, rugose-tuberculate on both surfaces, scar closed with conspicuously raised margins.

Sandstones or sandy clay soils in piñon-juniper and *Artemisia* zones along the northern borders of Rio Arriba and San Juan Counties; w. Colo. and e. Utah. May-Jun. n=12.

Cryptantha barbigera (A. Gray) Greene Bearded cryptantha [*Eritrichium barbigerum* A. Gray, *Krynitzkia barbiger*a A. Gray]. Annual; STEMS erect, 1-4 dm tall, freely branched from the base and above when well developed, bristly-hirsute with some of the shorter hairs being appressed; LEAVES oblong to lance-linear, hirsute and obviously pustulate; INFLORESCENCE terminating the branches with naked, paired cymes (rarely solitary or ternate); FLOWERS nearly sessile, fruiting calyx 5-8 mm long, segments lance-linear, subequal with recurved tips and white-villose margins, midrib hirsute; corolla inconspicuous, 1-2 mm wide; style nearly equal to mature nutlet tips; NUTLETS 1-4 maturing/calyx, lanceolate, all alike, 1.5-2.5 mm long, densely verrucose-muricate, scar closed above, gradually dilated towards the basal triangular areola.

Sandy soils or rocky areas in desert scrub of Doña Ana, Grant, Hidalgo and Luna Counties; s. Calif. and s. Nev. to Baja Calif. and nw. Chihuahua. Mar-May. n=12.

Cryptantha cinerea (Torr.) Cronq. Bow-nut cryptantha [*C. jamesii* (Torr.) Payson]. Perennial (rarely appearing biennial) STEMS 1-several from a branching, often woody caudex, simple or branched, strigose (sometimes loosely villose), with or without varying amounts spreading bristly hairs, or glabrate; LEAVES oblanceolate to lance-linear, obtuse to acute, strigose to villose-puberulent or glabrate; INFLORESCENCE narrow or somewhat broad, foliar bracts subtending individual cymules (at least below), cymules often elongating at maturity; FLOWERS homostylis; pedicels 1-3 mm long; calyx segments ovate-lanceolate, tomentose to strigose-hirsute, 5-7 mm long in fruit; corolla white with yellow (rarely white or pale green) fornications, limb 4-8 wide, tube equal to

calyx and ringed with short (<1 mm) antrorse scales at the interior base; NUTLETS 1-4 maturing, 1.8-2.5 mm long, smooth and shiny (often minutely papillate-velvety on the ventral surfaces), deeper than wide, dorsal surface narrowly ovate, bowed outward from the base and inward to the tip, scar closed and discontinuous with a small basal pocket.

This species is related (by nutlet form) to *C. palmeri*, *C. paysonii* and *C. oblata*. At one time, all were collectively placed into the genus *Hemisphaerocarya* A. Brand. The later two are distinguished by longer corollas and rugose nutlets. All three lack the interior basal tube scales that are present in *C. cinerea*.

Cryptantha cinerea is a variable and complex species that occurs in most dry habitats from ponderosa pine forest down to grasslands and desert scrub. The only well marked and consistent variation here is var. *pustulosa*, which if based upon just the New Mexico populations, could legitimately be considered a separate species. Several authors have unsuccessfully tried to correlate a number of characteristics into recognizable varieties. Few of these are consistent or regionally well circumscribed, and do not account for much of the variation seen here. A thorough review of this species is needed. With some reluctance, the following varieties are recognized in New Mexico:

1. Upper leaf surface glabrous, plants entirely restricted to gypsum habitats var. *pustulosa*
-- Upper leaf surface pubescent, plants not usually on gypsum 2
2. Stems simple, not branched above the base var. *cinerea*
-- Stems branched from the base as well as above 3
3. Leaves basal and cauline, oblanceolate or spatulate .. var. *jamesii*
-- Leaves entirely cauline, acute and nearly linear var. *laxa*

Var. cinerea [*Oreocarya cinerea* (Torr.) Greene, *C. jamesii* var. *cinerea* (Torr.) Payson, *C. jamesii* var. *setosa* (Jones) Johnst. ex Tidestr., *O. multicaulis* (Torr.) Greene, *C. jamesii* var. *multicaulis* (Torr.) Payson,]. A distinctly heterogenous taxon loosely held together by the characteristic of simple stems arising from basal leaves. Pubescence is quite variable. The tall plants with spreading-hirsute stems have been transferred here from *C. jamesii* var. *multicaulis*. There is a very short, caespitose form with a thick, woody caudex and finely strigose leaves on central New Mexico limestones that could be placed in a variety *setosa*. However, it grades into taller plants with similar leaves from other sedimentary and igneous substrates. Variety *cinerea* is common in some form throughout most New Mexico counties; Utah to Okla. then s. to n. Chihuahua. Apr-Oct. n=12.

Var. jamesii Cronq. [*C. jamesii* (Torr.) Payson var. *jamesii*, *Eritrichium jamesii* Torr., *Krynitzkia jamesii* (Torr.) A. Gray, *Oreocarya disticha* Eastw., *C. jamesii* var. *disticha* (Eastw.) Payson, *Myosotis suffruticosa* Torr., *O. suffruticosa* (Torr.) Greene]. Also a variable taxon distinguished only by its branched stems and relatively broad basal and

cauline leaves. Occasional throughout most counties in the northern half of New Mexico and sporadic in the southeastern plains; Nev. to Ariz. and Colo. May-Sep. n=12.

Var. laxa (Macbr.) Higgins [C. jamesii var. laxa (Macbr.) Higgins, Oreocarya suffruticosa var. laxa Macbr.] This is the branched-stem form that replaces var. jamesii in the central and southeastern parts of the state, and adjacent w. Tex and n. Chihuahua. It is distinguished by its slender-acute cauline leaves with uniform strigose pubescence, and lacks basal leaves. The type collection (from northern Chihuahua) has elongate, lax cymules. This form occurs in Doña Ana County, but plants with similar foliage and shorter cymules are common on sandy soils through central and southeastern New Mexico. Jun-Oct.

Var. pustulosa (Rydb.) Higgins [C. pustulosa (Rydb.) Payson, C. jamesii var. pustulosa (Rydb.) Harrington, Oreocarya pustulosa Rydb.]. This unique variety has dark green herbage and is nearly glabrous, except in the inflorescence. It usually lacks a basal leaf tuft. The New Mexico populations are confined to gypsum substrates in Cibola, Sandoval, Santa Fe, Socorro, and Valencia Counties. Also distributed to the Four-Corners area of ne. Ariz., sw. Colo., and se. Utah, where it reported to occur on sandy soils. May-Oct. n=12.

Cryptantha crassisepala (Torr. & Gray) Greene Thicksepal cryptantha. Annual; STEMS branched from the base, 5-15 cm long, spreading or erect without a strong central axis, spreading- hirsute; LEAVES basal and cauline, linear to narrowly oblanceolate, finely strigose and stiffly hispid, pustulate; inflorescence terminating the branches, cymes naked, solitary (rarely paired); FLOWERS nearly sessile; fruiting calyx 4-6.5 mm long, segments narrowly lanceolate, hirsute and spreading pungent-hispid, midribs becoming thick and hard at maturity; corolla white, limb 1-6 mm wide; style surpassed by odd nutlet; NUTLETS lance-ovate, usually 4, heteromorphic, one evidently larger (2-2.5 mm) and more firmly attached to the gynobase, minutely granulate or muricate; the 1-3 consimilar nutlets are readily deciduous, 1.2 -1.8 mm long and granulate- tuberculate, scar open and commonly excavated.

- 1. Corolla limb 3.5-6.0 mm in diameter var. crassisepala
- Corolla limb <3.5 mm in diameter var. elechantha

Var. crassisepala [Eritrichium crassisepalum Torr. & Gray, Krynitzkia crassisepala (Torr. & Gray) A. Gray]. This variety has an evident corolla and slightly larger anthers than var. elechantha, which may indicate it is not entirely reliant on autogamous reproduction. Endemic to sandy soils in the Pecos River counties of west Texas and barely enters southeastern New Mexico (Eddy County). Mar-May.

Var. elechantha I.M. Johnst. The corolla of this variety is typically minute (1-2 mm in diameter). There are, however, sporadic populations in Rio Arriba and McKinley Counties (and possibly elsewhere) that have larger, evident corolla limbs up to 3.5 mm broad, which tends to obscure the distinction between varieties. The small-flowered var. elechantha is our common form occurring throughout the plains and deserts in the

western and central two-thirds of New Mexico, and is sporadic in some eastern counties; s. Utah and s. Colo. to Ariz., w. Tex. and n. Chihuahua. Mar-May.

Cryptantha fendleri (A. Gray) Greene Fendler's cryptantha [*Krynitzkia fendleri* A. Gray - Type from near Santa Fe, C. *pattersonii* (A. Gray) Greene]. Annual; stem solitary or occasionally branching from the base, 1-4 dm tall, erect and forming a central axis that is paniculately branched above with rigid ascending branches, strigose and spreading-hirsute; LEAVES mostly cauline, linear-acute, hirsute and spreading-hispid, pustulate; inflorescence broad, cymes naked, terminating the stem and branches; FLOWERS sessile or nearly so, fruiting calyx 4-6 mm long, subciliate strigose and pustulate hispid, corolla minute (1 mm wide), white; style subequal to mature nutlets; NUTLETS all alike, usually 4 maturing, narrowly lanceolate, smooth and shining, scar closed except at the small basal areola.

Irregularly distributed on deep sandy soils from juniper savanna up to ponderosa pine forest in north-central to west-central counties; Utah, Colo., then n. to Sask. and Alta. Jul-Sep.

Cryptantha flava (A. Nels.) Payson Yellow cryptantha [*Oreocarya flava* A. Nels., *O. lutescens* Greene]. Caespitose perennial; STEMS several, simple, 1-4 dm tall, arising from the branches of a woody caudex, spreading hirsute; LEAVES linear-oblongate to spatulate, mostly basal and silvery strigose, but cauline leaves usually well developed and spreading hispid; INFLORESCENCE typically elongate and thyrsoid-cylindric, conspicuously yellow setose, foliar bracts inconspicuous above; FLOWERS heterostylic; short pedicled (3-5 mm at maturity); fruiting calyx 9-12 mm long, lobes linear; corolla entirely yellow, tube 9-12 mm long and surpassing the calyx; limb 7-11 mm wide; NUTLETS lance-ovate, 3.4-4.2 mm long smooth and glossy, usually only 1 (sometimes 2) maturing per calyx.

This yellow-flowered plant should not be confused with any other New Mexico species. Sporadic on sandstones and sandy shales in northwestern counties (including Socorro). Common in San Juan County; ne. Ariz., w. Colo., e. Utah, and s. Wyo. Apr-Jun. n=12.

Cryptantha fulvocanescens (S. Wats.) Payson Tawny cryptantha. Caespitose perennial; STEMS few-several, simple, 5-30 cm tall, spreading hispid; LEAVES mostly basal and silvery strigose, cauline leaves usually narrower and spreading hispid; INFLORESCENCE narrow- cylindric to somewhat open at maturity, rarely sub-capitate, conspicuously tawny-setose or (rarely) silvery strigose, foliar bracts inconspicuous; FLOWERS hetero-stylic; pedicles 1-8 mm long at maturity; fruiting calyx 6-13 mm long, lobes linear, hispid to strigose; Corolla limb white, 6-9 mm wide, reflexed after anthesis, fornices yellow, tube white or pale yellow and surpassing the calyx; NUTLETS lance-ovate, 3.1-4.4 mm long, both surfaces muricate often with sharp, setose tips terminating some or all of the murications, usually only 1 (sometimes 2) maturing per calyx, scar closed or only slightly open.

1. Calyx densely hispid-strigose; interior calyx lobe faces strigulose, the green surface partly visible var. *fulvocanescens*
-- Calyx densely strigose and sparsely hispid, interior calyx lobe faces obscured by dense, silvery pubescence var. *nitida*

Var. *fulvocanescens* [Eritrichium glomeratum var. *fulvocanescens* S. Wats. - Type from Santa Fe, E. *fulvocanescens* (S. Wats.) A. Gray, *Oreocarya fulvocanescens* (S. Wats.) Greene, O. *echinoides* M.E. Jones, C. *echinoides* (M.E. Jones) Payson, C. *fulvocanescens* var. *echinoides* (M.E. Jones) Higgins, C. *flavocolata* sensu Martin & Hutchins non (A. Nels.) Payson]. This variety occurs in piñon-juniper woodland down to sagebrush and desert scrub. Common on shales, clayey sands and gypsum in the northwestern counties. Sporadic out-lying populations occur on gypsum habitats as far south as White Sands (Doña Ana & Otero Counties) and as far east as Guadalupe and De Baca Counties; n. Ariz. and s. Utah. Apr-Jun. n=12.

Var. *nitida* (Greene) Sivinski [*Oreocarya nitida* Greene]. The inflorescence of this variety is more silvery strigose and less hispid than var. *fulvocanescens*. On average, it also has shorter pedicles, longer calyx, more flowers/cymule, and is less likely to have setose tips on the nutlet murications. Artemisia and piñon-juniper zones on sandstones or sandy gypsum of San Juan County; ne. Ariz., e. Utah and w. Colo. May-Jun. n=12.

Cryptantha gracilis Osterh. Slender cryptantha. Annual; STEMS branching when well developed, 1-3 dm tall, strigose and spreading hirsute; LEAVES basal and scattered along the stem, linear or narrowly spatulate, hispid-hirsute, pustulate on lower surface; INFLORESCENCE of few to several naked, compact cymes terminating the branches, not much elongating at maturity; FLOWERS nearly sessile, fruiting calyx 2-3 mm long, densely white or tawny appressed hispid-villose, segments lanceolate; corolla white, minute (about 1 mm wide); mature nutlet surpassing the style; NUTLETS lanceolate, 1.4-2.0 mm long, smooth and shining, maturing 1 per calyx (rarely 2-3, then unequally developed), scar closed except for small basal areola.

Sandstone ledges or very sandy soils in piñon-juniper and Artemisia zones of northern San Juan County; w. Colo. to se. Calif. then n. to Idaho and Oreg. May-Jun.

Cryptantha mexicana (Brandeg.) I.M. Johnst. Mexican cryptantha [*Krynitzkia mexicana* Brandeg.]. Annual; STEMS several, branching from the base then repeatedly dichotomously branched outward, lax or ascending, 5-20 cm tall, hispid and sparingly strigose-villose; LEAVES oblong-ob lanceolate, ascending hispid and pungent setose, pustulate, gradually reduced up the stem; INFLORESCENCE of completely bracteate, single or paired cymes; FLOWERS nearly sessile; fruiting calyx 3-4 mm long, segments hispid and villose; corolla white, minute (1-2 mm wide); style barely surpassing the nutlets; NUTLETS all alike, usually 4, triangular-ovate, about 1 mm, tuberculate, scar triangular and occupying much of the ventral surface, excavated.

This species is closely related to *C. albida*, but differs by its spring blooming period. It is further distinguished by its short, rounded growth form that branches from the base and

lacks an extended central axis. Occasional on limestone in Chihuahuan Desert scrub of Chaves, Doña Ana, Eddy, Luna, Otero and Sierra Counties; w. Tex, Coahuila and Nuevo León. Mar-May.

Cryptantha minima Rydb. Least cryptantha. Annual; STEMS several branching from the base and above, erect and ascending, without a strong central axis; 5-15 cm tall, finely strigose and coarsely hirsute; LEAVES basal and cauline, narrowly oblanceolate, gradually reduce up the stem, finely strigose and stiffly hispid; INFLORESCENCE cymes continuously or interruptedly bracteate and terminating the branches; FLOWERS with short pedicles (0.5-1.5 mm); fruiting calyx 4-7 mm long, segments narrowly lanceolate, hirsute and spreading pungent-hispid, midribs becoming thick and hard at maturity; corolla inconspicuous, 1-2 mm wide; style surpassed by odd nutlet; NUTLETS usually 4, lance-ovate, heteromorphic, odd nutlet 2-3 mm long, finely granulate, consimilar nutlets 1.2-1.5 mm long, tuberculate, scar open especially at the base.

This species is very similar to *C. crassisepala*, but easily distinguish by its bracteate cymes. Occasional on sandy or calcareous soils of dry valleys and ridges in the eastern counties of Eddy, Guadalupe, Harding, Mora, Quay, Roosevelt and Torrance, then w. to Bernalillo County; w. Tex. to Sask. (east of the Rocky Mts.). Apr-Jun.

Cryptantha nevadensis Nels. & Kennedy Nevada cryptantha. Annual; STEMS branching from base and above, 1-4 dm tall, erect or lax, branches often curved or flexuous and spreading, strigose with few spreading hairs; LEAVES linear or nearly so, strigose to sparsely spreading hispid, pustulate; INFLORESCENCE terminating the branches with naked, paired cymes (often ternate or single); FLOWERS nearly sessile, fruiting calyx 6-10 mm long, segments lance-linear, subequal with recurved tips, white ciliate margined, midrib pungent-hispid; corolla white, minute (<2 mm wide); style about equal to or barely surpassing nutlet tips; NUTLETS 1-4 matured/calyx, all alike, lanceolate, 2.0-2.4 mm long, densely verrucose-muricate, scar closed above, gradually dilated towards the basal triangular areola.

This species is closely related to *C. barbiger*, but is distinguished by its narrower linear leaves, and curved, flexuous stems with strigose pubescence. Occasional on rocky, sandy areas in the Larrea desert of Grant and Hidalgo Counties; to n. Baja Calif., s. Calif., s. Nev, and s. Utah. Mar-May.

Cryptantha oblata (M.E. Jones) Payson Rough cryptantha [*Krynitzkia oblata* M.E. Jones, *Oreocarya oblata* (M.E. Jones) Macbr., *O. hispidissima* sensu Woot. & Standl. non (Torr.) Rydb.]. Perennial; STEMS few to several from base, 1-3 dm tall, simple, strigose and spreading hirsute; LEAVES mostly basal, oblanceolate to lance-linear, strigose and coarsely appressed setose; INFLORESCENCE short-cylindric to subcapitate, somewhat broadening at maturity; FLOWERS homostylic, short pedicled (1-3 mm); fruiting calyx

8-10 mm long, segments lance- linear, densely setose; corolla white, limb 6-10 mm wide, fornices often white or sometimes pale yellow, tube 6-10 mm long, exceeding or (rarely) subequal to the calyx tips, lacking interior basal scales; NUTLETS usually 4 maturing, 2.5-3.0 mm long, dorsal surface narrowly ovate, bowed outward from the base and inward to the tip, rugose-tuberculate on dorsal surface, slightly roughened on ventral surface, scar closed.

The longer corolla tube lacking basal scales and roughened nutlets serve to distinguish this species from *C. cinerea*. The only consistent difference from *C. paysonii* is the smaller, homostylic flowers of *C. oblata* (stamens always in middle of corolla tube). Widely disjunct populations are found on gravelly limestone or caliche soils in De Baca, Doña Ana, Grant, Guadalupe, Hidalgo, Otero, Socorro and Valencia Counties; w. Tex., n. Chihuahua. Apr-Jun. n=12.

Cryptantha palmeri (A. Gray) Payson Palmer's cryptantha [*Krynitzkia palmeri* A. Gray, *Oreocarya palmeri* (A. Gray) Greene]. Biennial or short-lived perennial; STEMS simple, 1 to few from the base, 1.5-4.0 dm tall, spreading setose; LEAVES basal and cauline, lanceolate to lance- linear, strigose and subtomentose; INFLORESCENCE cylindric to broad ovate, cymules elongating at maturity, foliar bracts somewhat conspicuous; FLOWERS homostylic, short pedicled (1-3 mm); fruiting calyx 8-10 mm long, segments lanceolate, setose-hispid; corolla white, fornices yellow, tube 4-6 mm long, equal to calyx, lacking interior basal scales; NUTLETS usually 4 maturing, 2.5-2.8 mm long, narrowly ovate, bowed outward from the base and inward to the tip, smooth and glossy, margins sharply angled, scar closed.

This species is best distinguished from *C. cinerea* by its larger calyx and lack of scales in the interior base of the corolla tube. Limestone and gypsum breaks of lower Pecos River basin in Chaves and Eddy Counties; w. Tex., Coahuila and Nuevo Leon. May-Jun.

Cryptantha paradoxa (A. Nels.) Payson Paradox cryptantha [*Oreocarya paradoxa* A. Nels.]. Caespitose perennial; STEMS few to several from a branching caudex, simple, 5-15 cm tall, spreading hirsute; LEAVES mostly basal with fine-strigose pubescence, cauline leaves reduced, more loosely villose; INFLORESCENCE short-cylindric to subcapitate, foliar bracts inconspicuous; FLOWERS heterostylic; short-pedicled; fruiting calyx 6-8 mm long; corolla white, limb 9-12 mm wide, fornices yellow, tube prominently surpassing the calyx; NUTLETS usually 4 maturing, lance-ovate, 2.0-2.8 mm long, rugose-tuberculate, scar narrowly open.

Rare on shaley or silty sandstone with *Atriplex* in northwestern San Juan County; e. Utah and more frequent in w. Colo. where it is often associated with gypsum habitats. Apr-Jun.

Cryptantha paysonii (Macbr.) I.M. Johnst. Payson's cryptantha [*Oreocarya paysonii* Macbr. - Type from limestone hills near Berenda Creek, Sierra County]. Perennial; STEMS simple, few to several from base, 1-3 dm tall, strigose and spreading hirsute; LEAVES mostly basal, oblanceolate, strigose and appressed setose; INFLORESCENCE short cylindric or subcapitate, cymules not much elongating at maturity, foliar bracts

inconspicuous; FLOWERS heterostylic, short pedicled (1-3 mm), fruiting calyx 8-10 mm long, segments linear-lanceolate, densely setose; corolla surpassing the calyx, limb white and 10-14 mm wide, fornices broad and bright yellow, tube yellow at throat, 12-14 mm long, lacking basal scales; NUTLETS usually 4 maturing, dorsal surface narrowly ovate, 2.5-3.0 mm long, bowed outward from base and inward to tip, finely rugose-tuberculate on both dorsal and ventral surfaces, scar closed.

A very showy species. It is similar to *C. oblata*, but has larger heterostylic flowers. Widely disjunct populations are found on gravelly-calcareous or gypsum soils from juniper savanna down to desert scrub in De Baca, Doña Ana, Eddy, Lincoln, Otero, Sierra, Socorro and Valencia Counties; adjacent w. Tex. Apr-Jun. n=12.

Cryptantha pterocarya (Torr.) Greene Wing-nut cryptantha. Annual; STEMS freely branching when well developed, erect, 1-4 dm tall, strigose; LEAVES scattered, linear or nearly so, hirsute, pustulate; INFLORESCENCE terminating branches with naked, paired cymes (rarely solitary or ternate); FLOWERS nearly sessile; fruiting calyx 4-5 mm long, segments lanceolate-ovate, strigose and often sparsely hispid; corolla white, minute (0.5-2 mm wide); style subequal to nutlet tips; NUTLETS usually 4, all alike or heteromorphic, 2.2-3.2 mm long, all (or only 3) conspicuously wing-margined, body surface verrucose-muricate, scar narrowly open above and dilated below to an excavated areola.

1. Nutlets decidedly heteromorphic: 3 winged, 1 lanceolate and wingless
..... var. *pterocarya*
-- Nutlets alike: all 4 winged var. *cycloptera*

Var. *cycloptera* (Greene) Macbr. [*C. cycloptera* Greene, *Krynitzkia cycloptera* Greene]. This is the common variety of *Larrea* zones in the southwestern counties of Doña Ana, Grant, Hidalgo, Luna, Sierra and Socorro, but rare in northwestern New Mexico (San Juan County); s. Calif., s. Nev. s. Utah and n. Mexico. Mar-May.

Var. *pterocarya* [*Eritrichium pterocaryum* Torr., *Krynitzkia pterocarya* (Torr.) A. Gray]. The winged nutlets are deciduous, while the wingless nutlet is more firmly attached to the gynobase and dispersed with the calyx. Sandy soils beneath juniper trees or desert scrub in San Juan County, sporadic in southern New Mexico (Doña Ana and Grant Counties); w. Colo., Ariz., s. Calif., Utah to e. Wash. and sw. Idaho. Apr-May.

Cryptantha pusilla (Torr. & Gray) Greene Low cryptantha [*Eritrichium pusillum* Torr. & Gray, *Krynitzkia pusilla* (Torr. & Gray) A. Gray]. Annual; STEMS few to several from the base, slender, spreading to ascending, 3-15 cm long, strigose to spreading hirsute; LEAVES mostly basal, scattered above, linear-spatulate, hispidulous and pustulate; INFLORESCENCE terminating branches, cymes solitary or geminate with few (if any) minute bracts, elongating at maturity; FLOWERS nearly sessile, fruiting calyx 2-2.5 mm long, broadly ovate, segments lance-ovate; corolla white, minute (<1 mm wide); style usually surpassing nutlets; NUTLETS all alike, usually 4 maturing, about 1 mm long,

triangular-ovate, bent, tuberculate, margins sharply angled, scar subulate and dilated at base into a triangular areola.

Desert scrub on rocky, gravelly slopes in Doña Ana, Hidalgo, Luna and Sierra Counties; s. Ariz, w. Tex., Chihuahua, Durango and Sonora. Mar-May. n=9.

Cryptantha recurvata Coville Bent-nut cryptantha. Annual; STEMS freely branching when well developed, lax and spreading or ascending, 1-4 dm long, strigose; LEAVES scattered, linear to lance-oblong, appressed-hispid and minutely pustulate; INFLORESCENCE terminating branches with naked, usually paired cymes, elongating at maturity; FLOWERS sessile; fruiting calyx 2.5-3.5 mm long, asymmetrical, bent and recurved, strigose and usually sparsely spreading hispid; corolla white, minute (about 1 mm wide); style surpassed by nutlet tip; NUTLETS only 1 matured/calyx, somewhat recurved-bent in alignment with the calyx, finely granulate-muricate, scar closed or narrowly open.

Immediately distinguishable from other species by its recurved-bent calyx. Infrequent in piñon-juniper, Artemisia or Atriplex communities in San Juan County; adjacent Ariz., Colo. and Utah to s. Calif., Nev. and Oregon. Apr-Jun.

Cryptantha setosissima (A. Gray) Payson Bristly cryptantha [*Eritrichium setosissimum* A. Gray, *Oreocarya setosissima* (A. Gray) Greene]. Biennial; stem simple and solitary from a stout taproot, 4-10 dm tall, finely puberulent and coarsely spreading-setose with long (2-4 mm) bristles; LEAVES basal and cauline, oblanceolate, villose-tomentose with pustulate subappressed setae, gradually reduced above; INFLORESCENCE densely setose, narrow-cylindric and interrupted below when in flower, open in fruit with cymules elongating at maturity, foliar bracts evident at least below; FLOWERS homostylic; fruiting calyx 6-13 mm long, hispid; corolla white with yellow fornices, limb 7-10 mm wide, tube equal with calyx; NUTLETS usually 4 maturing, 4.5- 6.0 mm long, margins decidedly papery-winged, dorsal body surface finely muricate; scar narrowly open.

This tall, coarse biennial with winged nutlets is easily recognizable, but rarely seen in New Mexico. Dry meadows and open slopes in the montane forests of Catron and San Juan Counties; adjacent Ariz. to c. Utah and s. Nev. Jul-Aug.

Cryptantha thyrsoflora (Greene) Payson Plains cryptantha [*Oreocarya hispidissima* (Torr.) Rydb. pro parte, *O. urticacea* Woot. & Standl. - Type from Cañoncito, Santa Fe County]. Biennial or short-lived perennial (usually monocarpic); STEMS stout, 1-few from basal rosette, 2-4 dm tall, densely spreading hispid; LEAVES mostly basal, oblanceolate, hispid and pustulate; INFLORESCENCE broad (1-2.5 dm wide) at maturity, dense and diffuse with numerous elongating cymules, hispid, foliar bracts evident; FLOWERS monostylic, fruiting calyx 7-9 mm long, segments linear, tawny-setose; corolla white, fornices yellow, limb 4-8 mm wide, tube equal to calyx, interior basal scales present; NUTLETS 1-4 maturing/calyx, lanceolate, 2.5-3.5 mm long, dorsal surface rugose-tuberculate, ventral surface less so, margins angled, scar narrowly open.

Dry canyons and rocky outcrops from ponderosa pine forest down to short-grass prairie in the northeastern counties of Colfax, Harding, Mora, San Miguel, Santa Fe and Union; Okl.-Tex. panhandles to w. S. Dak. and w. to the Rocky Mts. Jul-Aug. n=12.

New Plant Distribution Records

New records for New Mexico are documented by the county of occurrence and the disposition (herbarium) of a specimen.

— Thomas Adams (Range Science Herbarium, Box 3-I, New Mexico State University, Las Cruces, NM 88003)

Aira elegans Willd. ex Kunth (Poaceae): Doña Ana Co. (NMCR) [weakly adventive].

— Kelly Allred (Range Science Herbarium, Box 3-I, New Mexico State University, Las Cruces, NM 88003)

Catapodium rigidum (L.) C.E. Hubb. (Poaceae): Doña Ana Co. (NMCR) [weakly adventive].

— David Lee Anderson (DES-E, Bldg T-150, White Sands Missile Range, NM 88002)

Machaeranthera gypsopila B.L. Turner (Asteraceae): Socorro Co. (TEX, WSMR).

— Adam Forbes (Range Science Herbarium, Box 3-I, New Mexico State University, Las Cruces, NM 88003)

Cardamine hirsuta L. (Brassicaceae): Doña Ana Co. (NMCR) [weakly adventive].

Briza minor L. (Poaceae): Doña Ana Co. (NMCR) [weakly adventive].

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Rare, Threatened, and Endangered Plants:

[There are numerous reports and discussions concerning rare New Mexico plants on the New Mexico Rare Plant Technical Council web site:
<http://biology.unm.edu/~chelo/nmrptc1.html>]

Colorado Rare Plant Field Guide available from Susan Spackman, Colorado Natural Heritage Program, 254 General Services Bldg., Fort Collins, CO 80534. (970) 491-1309 [donation requested for shipping costs]

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Native Plant Society of New Mexico Newsletter. Tim McKimmie, 1105 Circle Drive, Las Cruces, NM 88005.

New Mexico Naturalist's Notes. P. Knight & R. Sivinski, eds. Sponsored by Marron & Associates, Inc. 7809 Fourth St. NW, Albuquerque, NM 87107. (505) 898-8848. [New journal devoted to New Mexico checklists, field observations, ecologic notes, habitat descriptions, and other valuable information that normally would not be published in the usual botanical journals. Available in all state libraries, or from Paul Knight while supplies last.]

The Plant Press. Department of Botany and the U.S. National Herbarium. Gratis. Contact Shirley Maina, National Museum of Natural History, Smithsonian Institution, Dept. Botany, NHB 166, Washington, DC 20560. email: maina.shirley@nmnh.si.edu v