

most southerly ranging of the North American species, but it is the only North American species which appears to have its immediate relationships in the continent to the south. *Cryptantha albida* is very closely related to *C. argentinica* Brand of northern Argentina, if indeed it is not the same species.

Ser. IV. MARITIMAE. Nutlets 1-4, tuberculate or muricate, usually dark with pale roughenings, lanceolate to triangular-ovate, with rounded or obtuse sides, decidedly heteromorphous with odd nutlet (sometimes alone developing) axial and larger as well as occasionally less roughened than others; style surpassed by the nutlets or reaching their tips or rarely surpassing them.

Calyx most hirsute on axial side, conspicuously recurved or deflexed.

Ovules 2; nutlet 1, bent; style reaching to about 1/2 height of nutlet.....12. *C. recurvata*.

Ovules 4; nutlets 4, straight; style reaching to about the tips of the nutlets.....13. *C. echinosepala*.

Calyx most hirsute on abaxial side, spreading to strict.

Calyx strictly and closely appressed to the flattened rhachis, gibbous on axial side due to basal prolongation of rough odd nutlet.....14. *C. dumetorum*.

Calyx ascending or spreading, not at all gibbous; odd nutlet rather smooth.

Nutlets triangular-ovate, 0.7-0.9 mm. long; mature calyx subglobose, minute, with lobes scarcely surpassing the nutlets.....15. *C. micromeres*.

Nutlets oblong-lanceolate, 1-2 mm. long; mature calyx oblong, medium-sized, with lobes surpassing the nutlets.

16. *C. maritima*.

12. **C. recurvata** Cov. Ascendingly branched rather slender herb 1-3 dm. high; root frequently dye-stained; stems usually strigose, rarely appressed-hispid; leaves remote, oblanceolate or linear-oblanceolate, 1-2(-3.2) mm. long, 2-4(-5) mm. broad, rounded or obtuse, appressed-hispid, densely and minutely pustulate; spikes naked, slender, loose, 2-10 cm. long, solitary or geminate; corolla inconspicuous, subtubular, ca. 2 mm. long, not exerted, lobes short; fruiting calyces slender, subdistichously biseriate, very asymmetrical, characteristically bent and recurved, 3-4 mm. long, tardily deciduous, sessile; mature calyx-lobes linear, midrib somewhat thickened and hirsute, rarely merely strigose, axial lobe longest thickest and most hirsute; ovules 2; nutlet 1, subpersistent, oblong-lanceolate, inwardly curved, brownish, dull, granulate-muriculate, next the axial calyx-lobe, edges obtusish; groove somewhat oblique, narrow or closed, opening into a small basal areola; gynobase slender, ca. 1/2 length of

the matured nutlet, slightly exceeded by aborted one; style commonly much surpassed by nutlet.—Contr. U. S. Nat. Herb. iv. 165, t. 16 (1893).

Eastern Oregon to Utah and the Inyo Region of California.

OREGON: Alword Desert, 1600 m. alt., *Leiberg 2425* (G, UC). NEVADA: in open sand along water-pipe, *Candelaria*, 1950 m. alt., *Shockley 260* (G); sandy soil, Palmetto Range, 1800-2100 m. alt., *Purpus 5856* (UC). UTAH: sandy places, Grand River Canyon, 1230 m. alt., *Purpus 6488* (UC); Dugway, 1891, *Jones* (UC). CALIFORNIA: Surprise Canyon, Panamint Mts., 800 m. alt., *Coville & Funston 713* (G, UC, ISOTYPES); Silver Canyon in White Mts., east of Laws, *Heller 8221* (G, UC); Silver Canyon, 1913, *K. Brandegee* (G, UC); Fish Lake Valley, 1897, *Purpus*.

One of the most distinct and interesting species in the genus. It may be readily recognized by its biovulate fruit and spreading, recurved fruiting calyces.

13. **C. echinosepala** Macbr. Loosely branched herb 1-2 dm. high; stems usually reddish, strigose as well as somewhat hirsute; leaves 2-4.5 cm. long, 2-5 mm. wide, linear to linear-lanceolate, below pustulate and short villous-hirsute, above subglabrate or minutely strigose; spikes geminate or solitary, usually 2-5 cm. long, naked or rarely with a single bract; corolla inconspicuous, tube shorter than calyx, limb ca. 1 mm. broad; fruiting calyx ovate, 2-3 mm. long, sessile or subsessile, spreading or even reflexed, asymmetrical; mature calyx-lobes very unequal, lance-linear, strigose and usually hirsute along the thickened midrib, axial lobe the longest and most hirsute; nutlets heteromorphous, usually 4, pallid, groove narrow and scarcely dilated below; odd nutlet minutely muriculate-tuberculate, ovate, acute, 1.2-1.5 mm. long, subpersistent, next the axial calyx-lobe, margin angulate; consimilar nutlets ca. 1 mm. long, minutely tuberculate, lance-ovate; gynobase evidently shorter than consimilar nutlets, oblong; style longer than consimilar nutlets, equalling or just surpassed by the odd nutlet.—Contr. Gray Herb. n. s. lvi. 57 (1918); Johnston, Proc. Calif. Acad. Sci. ser. 4, xii. 1147 (1924).

Southern Lower California.

LOWER CALIFORNIA: Santa Agueda, *Palmer 242* (G); Magdalena Bay, *Lung* (UC), *Bryant* (UC), *Brandegee* (UC); Magdalena Island, *Orcutt 15* (G, TYPE); La Paz, *Palmer 26* (G).

At once distinguishable from nearly all other species of the genus by having its fruiting calyces deflexed and most heavily hirsute on the axial side. It is probably most related to *C. angustifolia*.

14. **C. dumetorum** Greene. Laxly branched closely strigose herb; stems at first erect but later commonly much elongated and sprawling

or scrambling among bushes; leaves lanceolate, thickish, 2–4 cm. long, 2–4(–8) mm. wide, sparsely appressed hirsute-villous, closely pustulate below and finely so above; spikes solitary or geminate, usually remotely flowered, 5–10 cm. long, occasionally with foliaceous bracts towards base, rhachis brittle and tortuously flattened; corolla inconspicuous, ca. 1 mm. broad; fruiting calyx closely appressed to rhachis, 2–3 mm. long, very asymmetrical, not at all deciduous, base very oblique and downwardly gibbous on axial side; mature calyx-lobes connivent and reaching about equal height; 3 abaxial lobes lanceolate, somewhat strigose, with the thickened midribs deflexed-hirsute; 2 axial lobes partly united, hirsute only on outer margins; nutlets 4, heteromorphous, granulate and muriculate; odd nutlet persistent, axil, broadly lanceolate, 2–3 mm. long, base much developed and distorting the calyx, groove open and broad; consimilar nutlets 1.5–2 mm. long, deciduous, lanceolate, groove closed or very narrow; gynobase narrow, shorter than consimilar nutlets; style shortly surpassed by nutlets or reaching to their tips.—*Pittonia* i. 112 (1887). *Krynitzkia dumetorum* Greene in Gray, Proc. Am. Acad. xx. 272 (1885).

Deserts from western Nevada to Southern California.

NEVADA: Muddy Valley, 510 m. alt., *Kennedy & Goodding 74* (UC). CALIF, ORNIA: half climbing among bushes at Tehachapi Pass, 1884, *Curran* (G-TYPE); *Kramer, Parish 9810* (UC); *Kramer, K. Brandegee* (G, UC); *Barstow, 1909, K. Brandegee 158* (G, UC); *Lancaster, K. Brandegee* (UC); *Whitewater, 300 m. alt., 1903, Jones* (UC); without locality, *Lemmon* (UC).

An anomalous species very peculiar in habit and in calyx and nutlet developments. Although the tips of the 4 nutlets in each calyx are of equal height, their bases are decidedly not so. The base of the axial one is more developed than that of the others causing the axial side of the calyx to be gibbously distended downwards along the pedicel and thereby making the base of the calyx conspicuously oblique. In habit the species is unique in the genus. It commonly grows about bushes and scrambles up through them, often reaching a meter in height. So sinuous and brittle are the stems that it is commonly quite impossible to disentangle from the supporting bush a perfect specimen of this plant. The pedicels are unquestionably persistent, being as decidedly so as are those of *C. micrantha*. The type of the species is given as having come from Tehachapi Pass. An annotation in the University of California Herbarium gives the type-locality as: Tehachapi Pass, probably at the "Bend," between Mohave and Tehachapi Station.

15. **C. micromeres** (Gray) Greene. Slender usually erect-growing

herb 1–5 dm. tall; stems dull dark-green, short-hirsute throughout; leaves linear to oblong-linear, somewhat hirsute on both surfaces and usually somewhat pustulate beneath, 1.5–4.5 cm. long; spikes commonly ternate, very slender, naked, 2–8 cm. long; corolla inconspicuous, subtubular, ca. 0.5 mm. broad; fruiting calyces very small, 1–2 mm. long, subglobose, fulvous, sessile or nearly so, early deciduous; mature calyx-lobes ovate-lanceolate, decidedly connivent, scarcely surpassing the fruit, margins ciliate, midrib slightly thickened, hirsute and frequently unciniate; nutlets 4, heteromorphous, triangular-ovate, 0.7–0.9 mm. long, margin subangulate; odd nutlet slightly the largest, smooth or sparsely papillate, next the axial calyx-lobe; consimilar nutlets papillate, groove open, gradually dilated into a small open areola; gynobase equalled by consimilar nutlets but somewhat surpassed by odd one; style short, equalling or barely surpassing the odd nutlet.—*Pittonia* i. 113 (1887). *Eritrichium micromeres* Gray, Proc. Am. Acad. xix. 90 (1883). *Krynitzkia micromeres* Gray, Proc. Am. Acad. xx. 274 (1885).

Central California to northwestern Lower California.

CALIFORNIA: Ione, 1886, *K. Brandege* (UC); near Mokelumne Hill, 1885, *Rattan 6* (G); Mokelumne Hill, *Blaisdell* (G); new Coulterville Road, Mariposa Co., 1897, *Congdon 42* (G); Tamalpais, 1910, *K. Brandege* (UC); Antioch, 1889, *K. Brandege* (UC); moist shaded ground, Cerritos Creek near Berkeley, *Tracy 761* (UC); Boswell's, Berkeley Hills, *Tracy 2074* (G); foothills west of Los Gatos, *Heller 7341* (G, UC); Glenwood, 1900, *Eastwood* (G); Ben Lomond, *K. Brandege* (UC); Santa Cruz, *Jones* (G, TYPE); seaside, Monterey, *Eastwood 162* (G); on the Salinas road near Del Monte, *Heller 6698* (UC); Point Sur, 1888, *K. Brandege* (UC); Painted Cave Ranch, Santa Barbara Co., *Eastwood 66* (G, UC); Santa Inez Mts., 1888, *Brandege* (G); Santa Cruz Island, 1888, *Brandege* (UC); chaparral burn, La Jolla, *Clements 109* (G, UC); Point Loma, *Brandege 1622* (G, UC); Point Loma, *Eastwood 2518* (G); Point Loma, 1906, *K. Brandege* (UC). LOWER CALIFORNIA: near Ensenada, 1882, *Jones* (UC).

This species develops the smallest flowering and fruiting parts known in the genus. Its occurrence is sporadic, and in the south at least somewhat determined by the presence of chaparral-burns.

16. ***C. maritima*** Greene. Ascending loosely branched herb becoming 1–3 dm. tall; stems commonly reddish, strigose or frequently hirsute; leaves linear to lanceolate, acutish, usually somewhat contracted at the base, 1–3.5 cm. long, 1–4 mm. wide, commonly hirsute, coarsely pustulate; spikes solitary or geminate, 1–6 cm. long, usually more or less crowded and frequently glomerate, irregularly leafy-bracted throughout; corolla inconspicuous, tubular, 1.4–2 mm. long, 0.5–1 mm. broad; fruiting calyx 1.8–3(–3.5) mm. long, ovate-oblong, stiffly ascending, slightly asymmetrical, tardily deciduous, subsessile;

mature calyx-lobes lance-linear, stiff, connivent, midrib of three abaxial lobes thickened and hirsute, margins appressed short hispid-villous or loosely villous; ovules 2 or 4; nutlets 1-4, heteromorphous; odd nutlet frequently alone developing, smooth, shiny, brownish, oblong-lanceolate, 1-2 mm. long, firmly affixed, next the axial calyx-lobe, groove narrow or closed throughout or opening below into a small areola; consimilar nutlets grayish, minutely tuberculate, readily deciduous, slightly smaller but otherwise like odd nutlet; gynobase subulate, $\frac{1}{2}$ - $\frac{2}{3}$ length of nutlet; style about equalling the height of consimilar nutlets.—*Pittonia* i. 117 (1887).

Var. **genuina**. Ovules 2; nutlets 1 or 2; calyx not conspicuously pilose.—*Krynitzkia maritima* Greene, Bull. Calif. Acad. Sci. i. 204 (Aug. 1885). *C. maritima* Greene, *Pittonia* l. c.; Munz & Johnston, Bull. Torr. Bot. Cl. xlix. 38 (1922). *K. ramosissima* of Greene, Bull. Calif. Acad. Sci. i. 203 (Aug. 1885); not *K. ramosissima* Gray (Jan. 1885). *C. ramosissima* of most recent authors.

Nevada to Lower California.

CALIFORNIA: Mohave Desert, 1884, *Curran* (G); dry sand hills near Barstow, 700 m. alt., *Spencer 1950* (G); Maillard Canyon near Barstow, 700 m. alt., *Spencer 2088* (G); gravelly hillsides 17.6 km. west of Needles, 210 m. alt., *Munz & Harwood 3611* (UC); Needles, *Jones 3824* (G); desert sand, mouth of Tahquitz Canyon, 180 m. alt., *Spencer 1523* (G); sandy places near Palm Springs, 120 m. alt., *Spencer 1528, 2067, 2068* and *2071a* (G); rocks near Indian Wells, 8 m. alt., *Spencer 1520* (G); sandy places, Schaffer's Canyon near Mecca, 48 m. below sea-level, *Spencer 2069* (G) and *Munz & Keck 4755* (G); Signal Mt., *Abrams 3177* (G); Mason's, Colorado Desert, 1899, *Brandege* (UC); in sand, Colorado Desert, *Spencer 195a* and *198* (G); Colorado Desert, 1890, *Wright* (UC); Point Loma, 1884, *Orcutt* (G, UC); windswept arroyos, San Nicolas Island, *Trask 56* and *57* (G); Santa Barbara Island, *Trask* (UC); Catalina Island, 1884, *Lyon* (G); Catalina Island, 1890, *Brandege* (UC). LOWER CALIFORNIA: northern Lower California, *Orcutt 2257* (UC); Lagoon Head, *Palmer 781* (G, UC); Guadalupe Island, *Palmer 879* (G), *Anthony 241* (G, UC), *Palmer 67* (G), *Greene* in 1885 (G, UC, ISOTYPES of *K. maritima*), *Anthony* in 1896 (UC), *Brandege* in 1897 (UC); San Benito Island, *Palmer 912* (G), *Pond 21* (G), *Anthony 276* (UC), *Brandege* in 1897 (UC); Natividad Island, 1897, *Brandege* (UC); Santa Margarita Island, 1889, *Brandege* (UC).

Var. **cedrosensis** (Greene), comb. nov. Ovules 4; nutlets 1-4; otherwise as in preceding variety.—*Krynitzkia cedrosensis* Greene, Bull. Calif. Acad. Sci. i. 204 (1885). *C. cedrosensis* Greene *Pittonia* i. 117 (1887); Brandg. Bot. Gaz. xxvii. 454 (1899).

Endemic to Cedros Island.

LOWER CALIFORNIA: Cedros Island, *Palmer 691* (G), *Greene* in 1885 (G, UC, ISOTYPES), *Veatch* (G), *Anthony 289* (G, UC).

Var. **pilosa** Johnston. Ovules 2; nutlets 1 or 2; calyx conspicu-

ously clothed with long white villous pubescence.—Univ. Calif. Pub. Bot. vii. 445 (1922).

Nevada to Lower California, occurring with var. *genuina* but less common.

NEVADA: Logan, 1909, *Kennedy* (UC). CALIFORNIA: Death Valley, *Coville & Funston 480* (G); Furnace Creek, *Parish 10005* and *10050* (UC); Calico, *Parish 9798* (UC); Inyo County, *Rixford* (UC); Kane Springs, Ord Mts., *Hall & Chandler 6807* (UC); Needles, 1884, *Lemmon* (UC); Signal Mt., 1901, *Brandegee* (UC). ARIZONA: Tempe, 1892, *Ganong & Blaschka* (G). LOWER CALIFORNIA: stony ridges, Los Angeles Bay, *Palmer 551* (UC, TYPE; G, ISOTYPE); Santa Agueda, *Palmer 2142* (UC).

A well defined and common species in the Californian deserts and on the coastal islands. The usual form is readily recognized by being biovulate and having reddish strigose stems. It has generally gone as *C. ramosissima* but that name being based on a renaming of *C. racemosa* properly falls into synonymy.

Ser. V. PTEROCARYAE. Nutlets 1-4, tuberculate or papillate or verrucose, lanceolate, with knife-like or conspicuously winged sides, homomorphous or frequently heteromorphous and with the odd nutlet (sometimes alone developing) axial and usually lacking a thin margin; style reaching to tip of nutlet-body or definitely beyond.

Nutlets solitary or rarely 2, usually with a knife-like margin;

calyx obliquely conical at base.....17. *C. utahensis*.

Nutlets 4; calyx symmetrical.

Corolla conspicuous; mature calyx obviously longer than

broad; nutlets always homomorphous.....18. *C. oxygona*.

Corolla inconspicuous; mature calyx nearly as broad as long;

axial nutlet frequently wingless.....19. *C. pterocarya*.

17. ***C. utahensis*** (Gray) Greene. Erectly branched herb 1-3 dm. high; stems closely strigose or more or less appressed short-hirsute; leaves not numerous, strongly reduced above, linear to oblance-linear, 1-5(-7) cm long, 1-4 mm. wide, rounded at apex, commonly pustulate and short-hirsute especially beneath; spikes geminate or sometimes solitary, commonly 0.8-2.5(-5) cm. long, dense, naked; corolla evident, 2-3 mm. broad; fruiting calyces ovate or ovate-oblong, 2-3(-4) mm. long, quite asymmetrical, sessile by a broadly conic oblique base, spreading or somewhat recurved, deciduous, usually densely appressed-hirsute and notably silky; mature calyx-lobes lanceolate, strongly connivent, midrib thick and usually brownish and infrequently bearing spreading or recurved hairs; ovules 4; nutlets 1 or rarely 2, next the abaxial calyx-lobe, 1.7-2.5 mm. long, 1-1.5 mm. broad, pale, broadly lanceolate, granulate, muricate-