

**STREPTANTHUS** Nuttall, J. Acad. Nat. Sci. Philadelphia 5: 143. 1825  
Ihsan A. Al-Shehbaz

Tribe: Thelypodieae Prantl in Engler & Prantl, Nat. Pflanzenfam. III. 2: 155. 1891.

Name derivation: Greek *streptos*, twisted, and *anthos*, flower, in reference to the crisped petal margin.

Type species: *Streptanthus maculatus* Nuttall.

*Agianthus* Greene, Leafl. Bot. Observ. Crit. 1: 228. 1906. Type species: *A. bernardinus* Greene.

*Cartiera* Greene, Leafl. Bot. Observ. Crit. 1: 226. 1906. Type species: *C. cordata* (Nuttall) Greene (based on *Streptanthus cordatus* Nuttall).

*Disaccanthus* Greene, Leafl. Bot. Observ. Crit. 1: 225. 1906. Type species: *D. carinatus* (C. Wright) Greene (based on *Streptanthus carinatus* C. Wright).

*Euclisia* Greene, Leafl. Bot. Observ. Crit. 1: 83. 1904. Type species: *E. glandulosa* (W. J. Hooker) Greene (based on *Streptanthus glandulosus* W. J. Hooker).

*Euklisia* Rydberg ex Small, Fl. SE U.S. 486. 1903. Type species: *E. hyacinthoides* (W. J. Hooker) Small (based on *Streptanthus hyacinthoides* W. J. Hooker).

*Icianthus* Greene, Leafl. Bot. Observ. Crit. 1: 197. 1906, nom. superfl. Type species: *I. hyacinthoides* (W. J. Hooker) Greene (based on *Streptanthus hyacinthoides* (W. J. Hooker)).

*Mesoreanthus* Greene, Leafl. Bot. Observ. Crit. 1: 88. 1904. Type species: *M. barbiger* (Greene) Greene (based on *Streptanthus barbiger* Greene).

*Microsemia* Greene, Leafl. Bot. Observ. Crit. 1: 89. 1904. Type species: *M. polygaloides* (A. Gray) Greene (based on *Streptanthus polygaloides* A. Gray).

*Mitophyllum* Greene, Leafl. Bot. Observ. Crit. 1: 88. 1904, non O. E. Schulz, Notizbl. Bot. Gart. Berlin-Dahlem 11: 872. 1933. Type species: *M. diversifolium* (S. Watson) Greene (based on *Streptanthus diversifolius* S. Watson).

*Pleiocardia* Greene, Leafl. Bot. Observ. Crit. 1: 85. 1904. Type species: *P. tortuosa* (Kellogg) Greene (based on *Streptanthus tortuosus* Kellogg).

**Herbs**, annual, biennial, or short-lived perennial; caudex poorly developed, rarely woody. **Trichomes** absent or simple. **Multicellular glands** absent. **Stems** simple or branched, often glabrous and glaucous above, leafy. **Basal leaves** petiolate or sessile, rosulate or not, simple, entire or dentate to lyrate-pinnatifid; middle cauline leaves usually auriculate-clasping, rarely petiolate, entire or dentate. **Racemes** several to many flowered, ebracteate or bracteate basally or rarely throughout, simple or branched, with or without a terminal cluster of sterile flowers, elongated in fruit; rachis straight or flexuous; fruiting pedicels erect to divaricate or rarely reflexed, persistent. **Sepals** ovate, lanceolate, or rarely suborbicular, free or connivent, erect, caducous, equal or unequal, often brightly colored, forming urceolate or campanulate and actinomorphic or zygomorphic calyx, glabrous or with apical trichomes or callosities, often saccate basally. **Petals** white, yellow, pink, rose, purple, violet, brownish, or greenish, erect at base, longer or shorter than sepals; blade linear, oblong, obovate, or suborbicular, narrow and crisped or channeled or broad and neither crisped nor channeled, equal or drastically unequal, apex obtuse to rounded; claw poorly differentiated or distinct and narrow, shorter than sepals, glabrous, unappendages, entire; stamens 6, often exserted, erect or recurved, in 3 pairs of unequal length with adaxial pair longest and lateral pair shortest, rarely tetradynamous; filaments wingless, unappendages, glabrous, free or those of median or adaxial pair connate; anthers oblong or linear, not apiculate, sometimes adaxial pair sterile; nectar glands 1, confluent, subtending bases of all stamens; median nectaries present. **Ovules** 10–120 per ovary; placentation parietal. **Fruits** dehiscent capsular siliques, linear, latiseptate or rarely subterete, not inflated, unsegmented; valves subleathery, with a distinct or obscure midvein, glabrous or

rarely pubescent, torulose or smooth, wingless, unappendaged; gynophore obsolete or to 5 mm; replum rounded, visible; septum complete, membranous, veinless; style 0.1–3.5 mm long, cylindrical, persistent; stigma entire or 2-lobed, lobes opposite valves, unappendaged. **Seeds** uniseriate, winged or rarely wingless, oblong to suborbicular, flat or rarely plump; seed coat smooth or minutely reticulate, not mucilaginous when wetted, smooth or minutely reticulate; cotyledons accumbent or rarely obliquely so.

About 35 species; United States and adjacent northern Mexico.

References: Al-Shehbaz and Mayer (2008), Clifford and Buck (2007), Dolan (1995), Dolan and LaPrè (1989), Hoffman (1952), Howell (1965), Kruckeberg (1957, 1958), Kruckeberg and Morrison (1983) Kruckeberg and Reeves (1995), Kruckeberg et al. (1982), Mayer and Soltis (1994, 1999), Mayer et al. (1994), Morrison (1938), O'Donnell and Dolan (2005), Reeves et al. (1981), Rodman et al. (1981), Rollins (1963).

[SEE INTERACTIVE KEY TO THE SPECIES](#)

1. barbatus
2. barbiger
3. batrachopus
4. bernardinus
5. brachiatus
6. bracteatus
7. breweri
8. callistus
9. campestris
10. carinatus
11. cordatus
12. cutleri
13. diversifolius
14. drepanoides
15. farnsworthianus
16. fenestratus
17. glandulosus
18. gracilis
19. hesperidis
20. hispidus
21. howellii
22. hyacinthoides
23. insignis
24. longisiliquus
25. maculatus
26. morrisonii
27. oblanceolatus
28. oliganthus
29. petiolaris
30. platycarpus
31. polygaloides
32. squamiformis
33. tortuosus
34. vernalis
35. vimineus

**1. *Streptanthus barbatus*** S. Watson, Proc. Amer. Acad. 25: 125. 1890; *Cartiera barbata* (S. Watson) Greene, Leaflet Bot. Observ. Crit. 1: 226. 1906. TYPE: United States, California, sandy bottoms along upper Sacramento, July 1879, *J. G. Lemmon 1447* (holotype, GH!).

**Herbs**, perennial, with few-branched caudices, glabrous except for sepals and leaf apices. **Stems** 1.5–8(–9.2) dm, erect to ascending, simple or few branched. **Basal leaves** in juvenile plants subrosulate, short petiolate, obovate, 1–2.7 x 0.5–1.4 cm, apically dentate, teeth with short, bristly trichomes at tips; middle cauline leaves fleshy, overlapping, broadly ovate to orbicular, 0.7–3.5 x 0.5–2.4 cm, glabrous or rarely with few hairs apically, sessile and auriculate to amplexicaul at base, usually entire, apex obtuse; upper leaves similar in size, not overlapping. Racemes ebracteate, lax in fruit, without a terminal cluster of sterile flowers; fruiting pedicels erect to ascending, straight, 3–8 mm. **Flowers**: sepals forming campanulate calyx, yellowish green in bud, purple in flower, ovate, 4–7 mm, not keeled, ascending, apex with short, bristly, flattened trichomes; petals purplish with darker veins, 5–9 mm; blade oblong to ovate, 0.5–3 x 0.3–0.7 mm, slightly crisped; claw oblanceolate, 4–7 mm, wider than blade; filaments in 3 pairs of unequal length, free; adaxial pair 5–7 mm; abaxial pair 4–6 mm; lateral pair 3–5 mm; anthers of all stamens fertile, 2.5–3.5 mm. **Fruit** 2–7(–8.2) cm x 2–3 mm, erect to ascending, distinctly flattened, often strongly recurved, not torulose; valves glabrous, with obscure midvein except sometimes for base, margins somewhat thickened; gynophore 1–3 mm; replum straight; style 0.4–1 mm; stigmas entire; ovules and seeds 16–30 per fruit. **Seeds** oblong to broadly ovate, 3–4 x 1.7–2 mm; wing absent or 0.1–0.25 mm wide at seed apex, narrower at margin.  $2n = 28, 56$ . Flowering: Jun–Aug.

Habitat: dry open Jeffrey-pine woods, gravelly serpentine grounds in forest openings.

Elevation: 800–2200 m.

Distribution: United States (N California).

**2. *Streptanthus barbiger*** Greene, Pittonia 1: 217. 1888; *Mesoreanthus barbiger* (Greene) Greene, Leaflet Bot. Observ. Crit. 1: 89. 1904. TYPE: United States, California, Lake Co., Highland Springs, June 1888, *A. B. Simonds s.n.* (holotype, NDG!).

**Herbs**, annual, glabrous throughout except sometimes for sepals, not mottled. **Stems** (0.7–)1–6.7(–8) dm, erect, branched above base. **Basal leaves** not rosulate, petiolate, soon withered, oblanceolate or oblong to lanceolate, 2–5(–7) x 0.5–1.5 cm, remotely dentate; middle cauline leaves linear to linear-lanceolate, (1.5–)3–9(–10) cm x 0.5–2 mm, sessile, not auriculate, entire; upper leaves similar, reduced. **Racemes** ebracteate, often secund, lax, without a terminal cluster for sterile flowers; fruiting pedicels ascending to divaricate, 1–2.5(–4) mm. **Flowers**: sepals forming urceolate calyx, green to purplish, ovate, 4–6 mm, slightly keeled, erect, recurved at apex, glabrous or hirsute with retrorse trichomes; petals white, 6–9 mm, not crisped, abaxial pair with purplish veins; blade 2–4 x 1.5–2.5 mm; claw 4–6 mm, narrower than blade; filaments in 3 pairs of unequal length; adaxial pair completely united, strongly recurved, purplish, 7–9 mm; abaxial pair united to about middle, 4.5–5.5 mm; lateral pair 2.5–3.5 mm; anthers of adaxial stamens sterile, 0.4–1 mm; anthers of abaxial and lateral stamens fertile, 1.5–2.2 mm. **Fruits** 2–6(–7) cm x 1.2–1.5 mm, divaricate-ascending to reflexed, slightly flattened, curved or rarely straight, slightly torulose; valves glabrous, with obscure midvein; gynophore 0.3–1 mm; replum straight; style 0.1–0.7 mm; stigma entire; ovules and seeds 22–38 per fruit. **Seeds** narrowly oblong, 1.3–1.8 x 0.6–0.8 mm, flattened; wing 0.1–0.25 mm wide distally, narrower or absent at margin, rarely seeds wingless.  $2n = 28$ .

Flowering: May–Aug.

Habitat: serpentine ridges and barrens, openings in chaparral and cypress or pine-oak woodlands.

Elevation: 200–1500 m.

Distribution: United States (NC California).

**3. *Streptanthus batrachopus*** J. L. Morrison, Madroño 4: 204. 1938. TYPE. United States, California, Marin Co., Mt. Tamalpais, North Side Trail, 0.5 mi NE of Rifle Camp, 8 Jun 1937, *John L. Morrison 2493* (holotype, UC!).

**Herbs**, annual, glabrous throughout, glaucous. **Stems** 0.3–1.7(–2.8) dm, erect, simple or branched near base. **Basal leaves** not rosulate, shortly petiolate, soon withered, obovate to oblanceolate, 0.5–2 cm, coarsely dentate, succulent, mottled; middle cauline leaves, lanceolate, 0.5–2.5 x 0.1–0.7 cm, sessile, auriculate, entire or dentate, not overlapping; upper leaves similar, reduced, entire. **Racemes** ebracteate, sometimes secund, lax, without a terminal cluster of sterile flowers; fruiting pedicels divaricate-ascending, 1–2.5(–4) mm. **Flowers**: sepals forming urceolate calyx, reddish-purple, ovate, 3–5 mm, keeled, erect, apex spreading; petals whitish with purple veins in adaxial pair, purplish in abaxial pair, 5–8 mm, not crisped; blade 2–3 x 1–1.5 mm; claw 3–4 mm; filaments in 3 pairs of unequal length; adaxial pair completely united, not recurved, 5–6 mm; abaxial pair united to about middle, 3–4 mm; lateral pair 1.5–2.5 mm; anthers of adaxial stamens sterile, 0.3–0.5 mm; anthers of abaxial and lateral stamens fertile, 1.4–1.7 mm. **Fruits** 1.3–3 cm x 1–1.5 mm, divaricate-ascending, slightly flattened, straight to slightly curved, slightly torulose; valves glabrous, with obscure midvein; gynophore 0.3–0.7 mm; replum straight; style 0.2–0.8 mm; stigma entire; ovules and seeds 12–22 per fruit. **Seeds** oblong, 1.3–2 x 0.8–1.2 mm, flattened; wing 0.1–0.3 mm wide distally, narrower at margin, rarely absent. **2n** = 28.

Flowering: May–Jun.

Habitat: serpentine barrens and outcrops in chaparral.

Elevation: 100–600 m.

Distribution: United States (California/Marin Co.).

**4. *Streptanthus bernardinus*** (Greene) Parish, Pl. World 20: 216. 1917; *Agianthus bernardinus* Greene, Leaf. Bot. Observ. Crit. 1: 228. 1906; *Streptanthus campestris* S. Watson var. *bernardinus* (Greene) I. M. Johnston, Pl. World 22: 89. 1919. TYPE: United States, California, San Bernardino Co., San Bernardino Mts., Bear Valley, 25 June 1894, 6500 m, *Samuel B. Parish 3035* (lectotype here designated, NDG; isolectotype, MO!).

*Agianthus jacobaeus* Greene, Leaf. Bot. Observ. Crit. 1: 229. 1906; *S. campestris* var. *jacobaeus* (Greene) Jepson, Fl. Calif. 2: 28. 1936. TYPE: United States, California, San Diego Co., Cuyamaca Mts., Jul 1889, *C. R. Orcutt 1507* (holotype, US).

**Herbs**, perennial, with woody, often elevated, simple or few-branched caudex, glabrous throughout except for petioles and sepal apex, glaucous. **Stems** 2.5–8.6 dm, erect, simple or few branched. **Basal leaves** not rosulate, with ciliate petioles, oblanceolate to spatulate, 2–8 x 0.7–2.5 cm, remotely dentate above middle; middle cauline leaves ovate to lanceolate, 2–10 x 0.5–2.8 cm, sessile, amplexicaul, entire, acute to acuminate, not overlapping; upper leaves smaller in size, reduced. **Racemes** ebracteate, lax, without a terminal cluster of sterile flowers; fruiting pedicels divaricate-ascending, straight, 4–7.5 mm. **Flowers**: sepals forming campanulate calyx, pale yellow to white, broadly oblong to ovate, 5–9 mm, not keeled, ascending, subapically with few stiff trichomes; petals white, 7–11 mm; blade 2–4 x 1–1.3 mm, not crisped; claw white, 6–9 mm, wider than blade; stamens nearly tetradynamous; median filament pairs free, 6.5–8.5 mm; lateral pair 4.5–5.5 mm; anthers of all stamens fertile, 3.5–4.5 mm. **Fruits** 5–12.7 cm x 1.5–3 mm, ascending to spreading, flattened, straight or curved, not torulose; valves glabrous, with obscure midvein at least distally; gynophore 0.5–1.5 mm; replum straight; style 0.8–2.5 mm;

stigma subentire; ovules and seeds 36–56 per fruit. **Seeds** oblong, 2–3 x 1.4–2 mm; wing 0.1–0.2 mm wide at seed apex. **2n** = 28.

Flowering: Jun–Aug.

Habitat: dry open pine or cypress woods, chaparral.

Elevation: 1200–2500 m.

Distribution: Mexico (Baja California), United States (S California/San Bernardino and San Diego counties).

**5. *Streptanthus brachiatus*** F. W. Hoffman, *Madroño* 11: 230. 1952. TYPE: United States, California, Sonoma Co., serpentine ridge near Contact Mine, E of Pine Flat, 300 ft, 5 Jun 1949, *A. Arthur R. Kruckeberg & Freed W. Hoffman 2905* (holotype, UC!; isotypes, 2GH!, MO!, NY!, UC!).

*Streptanthus brachiatus* subsp. *hoffmanii* R. Dolan & LaPré, *Madroño* 36: 36. 1989. TYPE: United States, California, Lake Co., near Sonoma Co. line on Bear Ridge rd, ¼ mi. S of three-way jct. with Ridge Rd and Davies Rd, 2 May 1985, *Lawrence LaPré s.n.* (holotype, UC!; isotypes, CAS!, RSA!, UC!).

**Herbs**, biennial, glabrous throughout, somewhat glaucous. **Stems** 1.4–5(–6) dm, branched about base or rarely simple. **Basal leaves** rosulate, soon withered, shortly petiolate, broadly obovate to suborbicular, 1.5–4 cm, coarsely dentate, fleshy, mottled; middle cauline leaves ovate to cordate, 0.7–3.7 x 0.3–1.5 cm, sessile, auriculate to amplexicaul, serrate-dentate to entire; upper leaves similar, reduced. **Racemes** ebracteate, sometimes secund, lax, without a terminal cluster of sterile flowers; fruiting pedicels divaricate-ascending, straight, 1–2 mm. **Flowers**: sepals forming urceolate calyx, rose-purple to yellowish at base, ovate, 5–7 mm, keeled, erect, apex recurved; petals whitish, 7–10 mm, adaxial pair faintly purple-veined, abaxial pair with a purple spot; blade 1.5–3 x 1–1.5 mm, not crisped; claw 5–7 mm, as wide as or wider than blade; staminal filaments in 3 pairs of unequal length; adaxial pair completely united, usually recurved, 8–10 mm; abaxial pair united below middle, 4–7 mm; lateral pair 2–4 mm; anthers of adaxial stamens sterile, 0.7–1.2 mm; anthers of abaxial and lateral stamens fertile, 2–2.5 mm. **Fruits** 4–6 cm x 1–1.3 mm, divaricate-ascending, flattened, nearly straight, torulose; valves glabrous, with obscure midvein; gynophore 0.3–0.7 mm; replum constricted between seeds; style 0.1–0.4 mm; stigma subentire; ovules and seeds 22–30 per fruit. **Seeds** oblong, 1.8–2.5 x 0.7–0.9 mm; wing distal, ca. 0.1 mm wide, or absent. **2n** = 28.

Flowering: Jun–Jul.

Habitat: serpentine barrens in chaparral, pine-oak or cypress woodland openings.

Elevation: 600–950 m.

Distribution: United States (California/Lake and Sonoma counties).

**6. *Streptanthus bracteatus*** A. Gray, *Gen. Amer. Bot.* 146. 1848; *Erysimum bracteatum* (A. Gray) Kuntze, *Revis. Gen. Pl.* 2: 933. 1891, non W.W. Smith, *Notes Roy. Bot. Gard. Edinburgh* 8: 185. 1914. TYPE: United States, Texas, New Braunfels, May 1846, *F. J. Lindheimer 15* (holotype, GH!; isotype, MO!).

**Herbs**, annual or perhaps biennial, glabrous throughout except sometimes for pedicels, glaucous. **Stems** (2.3–)4.5–12 dm, erect, often branched above. **Basal leaves** not rosulate, long petiolate, oblanceolate to spatulate, 5–25 cm, lyrate-lobed to irregularly dentate; middle cauline leaves oblong to ovate, 3–15 x 1.5–8 cm, sessile, auriculate to amplexicaul, entire to shallowly dentate; upper leaves smaller, all bracts. **Racemes** bracteate throughout, without a terminal cluster of sterile flowers; lowermost bracts leaflike, uppermost much reduced; fruiting pedicels divaricate-ascending, 0.7–1.9 cm, glabrous or puberulent. **Flowers**: sepals forming campanulate

calyx, nonsaccate, 8–12 mm, not keeled, ascending to suberect, inner pair apiculate; petals purplish, 14–19 mm; blade 7–12 x 5–7 mm; claw 6–8 mm, slender, much narrower than blade; stamens tetradynamous; median filament pairs free, 6–8 mm; lateral filaments 4–6 mm; anthers of all stamens fertile, 4–6 mm. **Fruits** 8–14.5 cm x 2.5–4 mm, divaricate-ascending, flattened, straight, not torulose; valves glabrous, with a prominent midvein; gynophore 1–2 mm; replum straight; style 1–3.5 mm; stigma 2-lobed; ovules and seeds 48–80 per fruit. **Seeds** oblong, 3–4 x 2–3 mm, flattened; wing continuous, 0.5–0.7 mm wide at apex.

Flowering: Apr–Jun.

Habitat: openings in oak-juniper woodlands, shallow, well-drained, gravelly clay-loam areas derived from limestone, dry rock hills, bluffs.

Distributions: United States (Texas).

**7. *Streptanthus breweri*** A. Gray, Proc. Calif. Acad. Sci. 3: 101. 1864; *Pleiocardia breweri* (A. Gray) Greene, Leaf. Bot. Observ. Crit. 1: 86. 1904. TYPE: United States, California, [Stanislaus Co.], Diablo Mt., towards head of Arroyo del Puerto Cañon, 3200 ft., [13 June 1962], W. H. Brewer 1268 (lectotype here designated, GH!; isolectotypes, CAS!, MO!, NY!).

**Herbs**, annual, glaucous green, glabrous throughout except sometimes for sepals. **Stems** (0.5–)1.5–6.5(–8) dm, simple or branched about base. **Basal leaves** not rosulate, short petiolate, soon withered, broadly ovate to obovate, 1.5–4 cm, entire to coarsely dentate; middle cauline leaves ovate, 1.5–10 x 0.3–4.5 cm, sessile, amplexicaul, not overlapping; upper leaves narrowly lanceolate, much reduced, entire. **Racemes** ebracteate, without a terminal cluster of sterile flowers, sometimes secund, rachis straight; fruiting pedicels divaricate-ascending to suberect, 1.5–5(–6) mm. **Flowers**: sepals forming urceolate calyx, purple or white, ribbed, ovate, 5–7 mm, keeled, erect, glabrous or puberulent, apex recurved; petals recurved, white with purple veins or adaxial pair white, 8–12 mm, not crisped; blade 2–5 x 1–2 mm; claw 5–7 mm, about as wide as blade; filaments in 3 pairs of unequal length; adaxial pair united, recurved or not, 7–10 mm; abaxial pair united below, 5–6 mm; lateral pair 3–4 mm; anthers of adaxial stamens sterile, 0.6–1.3 mm; anthers of abaxial and lateral stamens fertile, 2–3 mm. **Fruits** 3–9 cm x 1–1.5 mm, erect to ascending, slightly flattened, strongly arcuate recurved or rarely straight; valves glabrous, with obscure midvein; gynophore 0.2–0.5 mm; replum straight; style 0.2–0.5 mm; stigma entire; ovules and seeds 24–54 per fruit. **Seeds** broadly oblong, 1–1.5 x 0.7–1 mm, flattened; wing absent or distal and ca. 0.1 mm wide. **2n** = 28.

Flowering: May–Jul.

Habitat: serpentine barrens in chaparral, oak and pine woodlands.

Elevation: 300–2100 m.

Distribution: United States (California).

**8. *Streptanthus callistus*** J. L. Morrison, Madroño 4: 205. 1938. TYPE: United States, California: Santa Clara Co., Arroyo Bayo, Mt. Hamilton Range, 6.8 mi ESE of Isabel Creek on road to San Antonio Valley, 2000 ft, 5 May 1935, C. W. & H. K. Sharsmith 3074 (holotype, UC!; isotype, GH!).

**Herbs**, annual, hirsute, somewhat glaucous. **Stems** 2–9 cm, simple or branched, bristly especially below. **Basal leaves** not rosulate, short petiolate, soon withered, oblong-ovate to obovate, 0.7–1.5 cm, dentate; middle cauline leaves broadly ovate to obovate, 0.8–1.7 x 0.4–1.3 cm, sessile, amplexicaul, hirsute, dentate; upper leaves similar, reduced. **Racemes** ebracteate, not secund, with a terminal cluster of sterile flowers; fruiting pedicels divaricate, 2–3 mm, hirsute. **Flowers**: sepals forming narrowly campanulate calyx, green to purplish, narrowly ovate, 3–5 mm, keeled and saccate basally, sparsely hirsute; sterile sepals lilac-purple, linear-lanceolate, not

keeled, 8–13 mm, glabrous; petals 8–11 mm, purple with darker purple veins; blade flaring, 4–6 x 2.5–3.5 mm; claw 4–5 mm, narrower than blade; filaments in 3 pairs of unequal length, purple; adaxial pair united nearly to apex, 5–6.5 mm; abaxial pair united, 4–5 mm; lateral pair 2–3 mm; anthers of adaxial stamens sterile, 0.4–0.8 mm; anthers of abaxial and lateral stamens fertile, 1.4–1.8 mm. **Fruits** 1.3–2.5 cm x 2.5–3.5 mm, divaricate, slightly flattened, curved upwards; valves hispid with setose trichomes 0.5–0.8 mm, with a prominent midvein; gynophore 0.1–0.3 mm; replum straight; style 0.2–0.5 mm; stigma slightly 2-lobed; ovules and seeds 46–60 per fruit. **Seeds** ovoid, 1.2–1.5 x 0.6–0.8 mm, plump; wing absent.  $2n = 28$ .

Flowering: Apr–May.

Habitat: gravelly sedimentary scree and lag-barrens in chaparral-oak woodlands.

Elevation: 500–900 m.

Distribution: United States (California/Santa Clara Co.).

**9. *Streptanthus campestris*** S. Watson, Proc. Amer. Acad. Arts 25: 125. 1890. TYPE: United States, California: San Diego Co., near Campo, June 1880, S. B. & W. F. Parish 449 (lectotype here designated, GH!).

**Herbs**, short-lived perennial, without elevated woody caudex, glabrous throughout except for basal leaf margin and sometimes sepals. **Stems** 6–15(–18) dm, glaucous, simple to few branched. **Basal leaves** often rosulate, petiolate, oblanceolate to obovate, 3.5–21 cm, fleshy, dentate, teeth and petiole or all margin bristly ciliate; middle cauline leaves lanceolate to narrowly ovate, 3.5–11(–15) x 0.6–1.4 cm, sessile, auriculate to amplexicaul, entire to undulate or rarely dentate, not overlapping; upper leaves smaller in size, reduced. **Racemes** ebracteate, with densely clustered buds, later lax, without a terminal cluster of sterile flowers; fruiting pedicels divaricate-ascending, straight, 5–18 mm. **Flowers**: sepals forming campanulate calyx, purple, broadly ovate or oblong, 7–10 mm, not keeled, suberect, apically bristly or not; petals with pale yellow claws and light purple blades, 9–12 mm; blade 2–3.5 x 0.5–1 mm, not crisped; claw 6–9 mm, wider than blade; stamens tetradynamous; median filament pairs, free, 6–8 mm; lateral pair 4–6 mm; anthers of all stamens fertile, 3–4 mm. **Fruits** 6–14 cm x 2–3.5 mm, spreading to ascending, flattened, slightly curved to straight, not torulose; valves glabrous, with obscure midvein; gynophore 0.5–1.5 mm; replum straight; style 1–3 mm; stigma 2-lobed; ovules and seeds 50–102 per fruit. **Seed** oblong, 2–3 x 1.4–2 mm; wing 0.1–0.2 mm wide at seed apex.

Flowering: May–Jun.

Habitat: rocky openings in chaparral, open conifer forests, openings and after fires in chaparral-oak woodlands.

Elevation: 900–2300 m.

Distribution: Mexico (Baja California), United States (S California).

**10. *Streptanthus carinatus*** C. Wright ex A. Gray, Pl. Wright. 2: 11. 1853.

**Herbs**, annual or perhaps biennial, glabrous throughout, glaucous. **Stems** (2.1–)3–6.5(–7.5) dm, branched above base and/or upward. **Basal leaves** rosulate, pinnatifid, oblanceolate, 3.5–15(–30) cm, runcinate-pinnatifid, dentate, or entire; middle cauline leaves ovate to lanceolate, 2.5–14 x 0.4–5.5 cm, sessile, auriculate to amplexicaul; upper leaves similar, reduced. **Racemes** ebracteate, lax, without a terminal cluster of sterile flowers; fruiting pedicels divaricate-ascending, straight or curved upwards, 0.7–2.2(–3.5) cm. **Flowers**: sepals forming urceolate or campanulate calyx, deep purple or yellowish to nearly white, keeled, 8–11 mm; petals creamy white with purple veins or purple with white margins, recurved, 14–18 mm; blade 5–8 x 1–1.5 mm, crisped; claw 9–12 mm, about as wide as blade; filaments in 3 pairs of unequal length, free; adaxial pair exerted, 9–12 mm; abaxial pair 6–10 mm; lateral pair 4–7 mm; anthers of all

stamens fertile, 4–5 mm. **Fruits** 3–8 cm x 4.5–6 mm, ascending, strongly flattened, straight, not torulose; valves glabrous, with obscure midvein; gynophore 0.5–2 mm; replum straight; style 0.5–2 mm; stigmas strongly 2-lobed; ovules and seeds 26–54 per fruit. **Seeds** orbicular, 3–5 mm diam.; wings continuous, 0.6–1.1 mm wide. **2n** = 28.

Flowering: Feb–Apr.

Habitat: well-drained sandy or rocky soils, gravelly slopes, canyons, gravelly roadsides, desert scrub, sandy grasslands, cliff bases, talus, limestone, gravelly slopes, brushy areas, canyons and isolated in washes.

Elevation: 600–1700 m.

Distribution: Mexico (Baja California, Chihuahua, Coahuila), United States (Arizona, New Mexico, Texas).

Two subspecies.

KEY TO THE SUBSPECIES OF *STREPTANTHUS CARINATUS*

1. Sepals ochroleucous or yellowish; petals white with purplish veins; lowest leaves entire to runcinate-pinnatifid .....10a. subsp. *arizonicus*
1. Sepals purple; petals purple with white margin; lowest leaves runcinate-pinnatifid .....10b. subsp. *carinatus*

**10a. *Streptanthus carinatus* C. Wright subsp. *arizonicus* (S. Watson) Kruckeberg, Rodman & Worthington, Syst. Bot. 7: 298. 1982; *Streptanthus arizonicus* S. Watson, Proc. Amer. Acad. Arts 25: 125. 1890; *Disaccanthus arizonicus* (S. Watson) Greene, Leafl. Bot. Observ. Crit. 1: 225. 1906. TYPE: United States, Arizona, Santa Catalina Mts., 1881, C. G. Pringle s.n. (holotype, GH!).**

*Streptanthus lemmonii* S. Watson, Proc. Amer. Acad. Arts 25: 125. 1890. TYPE: United States, Arizona, Santa Catalina Mts., 1880, J. G. Lemmon s.n. (holotype, GH!).

*Streptanthus arizonicus* S. Watson var. *luteus* Kearney & Peebles, J. Wash. Acad. Sci. 29: 478. 1939. TYPE: United States, Arizona, Pima Co.: Ajo Mts., Kearney 10813 (holotype, US!; isotype, CAS!).

*Disaccanthus luteus* Greene, Leafl. Bot. Observ. Crit. 1: 225. 1906. TYPE: United States, New Mexico, Black Range, 7000 ft., 2 May 1905, O. B. Metcalfe 1593 (holotype, NDG!; isotypes, CAS!, MO!).

*Disaccanthus mogollonicus* Greene, Leafl. Bot. Observ. Crit. 1: 225. 1906. TYPE: United States, New Mexico, foothills of Mogollones, 30 Mar 1881, E. L. Greene s.n. (holotype, not seen). The only material of *Streptanthus* collected by Greene (NDG!, GH!) on that date was from Canyon of the Gila, which is part of the Mogollones range. This material was identified by Greene as *S. carinatus*. In the absence of collections named *Disaccanthus mogollonicus*, the above material may be designated at the lectotype.

**Basal leaves** and lower cauline leaves entire or dentate to runcinate-pinnatifid at margin.

**Flowers:** sepals ochroleucous to yellowish; petals white with purple veins. **2n** = 28.

Flowering: Feb–Apr.

Habitat: well-drained sandy or rocky soils, gravelly bajada slopes, canyons, in scrub or open woodland, gravelly roadsides, desert scrub, sandy grasslands.

Elevation: 600–1700 m.

Distribution: Mexico (Baja California, Chihuahua), United States (Arizona, New Mexico).

**10b. *Streptanthus carinatus* C. Wright subsp. *carinatus*; *Disaccanthus carinatus* (C. Wright) Greene, Leafl. Bot. Observ. Crit. 1: 225. 1906. TYPE: United States, New Mexico, stony hills**

in canyon on road to Texas, about 60 miles below El Paso, March 1852, *C. Wright 1312* (holotype, GH!; isotypes, GH!, MO!).

*Disaccanthus validus* Greene, Leaf. Bot. Observ. Crit. 1: 225. 1906; *Streptanthus validus* (Greene) Cory, Rhodora 38: 406. 1936. TYPE: United States, Texas: El Paso, 18 Apr. 1884, *M. E. Jones 3723* (holotype, not seen; isotype, GH!).

**Basal leaves** and lower cauline leaves runcinate-pinnatifid. **Flowers:** sepals purple; petals purple with white margin.  $2n = 28$ .

Flowering: Mar–Apr.

Habitat: cliff bases, talus, limestone, gravelly slopes, brushy areas, canyons and isolated in washes.

Elevation: 750–1500 m.

Distribution: Mexico (Chihuahua, Coahuila), United States (Arizona, New Mexico, Texas).

### 11. *Streptanthus cordatus* Nuttall in Torrey & A. Gray, Fl. N. Amer. I: 77. 1838.

**Herbs**, perennial, glabrous throughout except for petioles of basal leaves and sometimes sepals, glaucous; caudex simple or few branched. **Stems** (1–)3–9(–11) dm, simple or few branched. **Basal leaves** rosulate, with broadly winged, setose-ciliate petioles, spatulate to obovate, rarely narrowly oblanceolate, 1.5–8(–11) cm, dentate at least distally; middle cauline leaves broadly oblong to ovate or suborbicular to lanceolate, 2–9 x 0.7–4.5(–6) cm, sessile, auriculate to amplexicaul, entire or few-toothed, rounded or acute to acuminate at apex, not overlapping; upper leaves smaller in size, reduced. **Racemes** ebracteate, lax, without a terminal cluster of sterile flowers; fruiting pedicels divaricate-ascending, straight, 3–11(–14) mm.

**Flowers:** sepals forming campanulate calyx, greenish brown to purple, lateral pair basally subsaccate, broadly oblong, 5–12 mm, not keeled, glabrous or subapically bristly; petals purple to brownish, 9–15 mm; blade 2–6 x 0.7–1 mm, recurved or not, not crisped; claw purplish, 7–10 mm, wider than blade; filaments in 3 pairs of unequal length, free; adaxial pair 7.5–10 mm; abaxial pair 5–7 mm; lateral pair 4–5 mm; anthers of all stamens fertile, 2.5–5 mm. **Fruits** 5–10.5(–14.5) cm x (2.5–)3–6(–7) mm, ascending to divaricate-ascending, flattened, straight, not torulose; valves glabrous, with a distinct midvein; gynophore 0.5–1.5 mm; replum straight; style 0.2–3 mm; stigma slightly to prominently 2-lobed; ovules and seeds 20–38(–46) per fruit. **Seeds** broadly oblong to suborbicular, 2.5–5 x 2.2–5 mm; wing continuous, 0.1–0.9 mm wide.

Flowering: Apr–Jul.

Habitat: dry stony slopes, sandy draws, limestone ledges, gravelly knolls, pinyon-juniper woodlands, sagebrush, open pine forests; open chaparral, cypress woodland.

Elevation: 500–3100 m.

Distribution: United States (Arizona, California, Colorado, Idaho, New Mexico, Nevada, Oregon, Utah, Wyoming).

Two varieties, W United States.

#### KEY TO THE VARIETIES OF *STREPTANTHUS CORDATUS*

1. Middle cauline leaves ± rounded to obtuse at apex, broadly oblong to ovate or suborbicular; basal leaves obovate to spatulate, obtuse or rounded at apex.....11a. var. *cordatus*
1. Middle cauline leaves acuminate or acute at apex, lanceolate; basal leaves narrowly oblanceolate, acuminate at apex .....11b. var. *piutensis*

### 11a. *Streptanthus cordatus* Nuttall var. *cordatus*; *Cartiera cordata* (Nuttall) Greene, Leaf.

Bot. Observ. Crit. 1: 226. 1906; *Erysimum cordatum* (Nuttall) Kuntze, Revis. Gen. Pl. 2: 933.

- 1891; *Euklisia cordata* (Nuttall) Rydberg, Bull. Torrey Bot. Club 33: 142. 1906. TYPE: United States, “forests of the Rocky Mountains,” *Thomas Nuttall s.n.* (holotype, BM!).
- Streptanthus argutus* Greene, Pittonia 3: 227. 1897; *Cartiera arguta* (Greene) Greene, Leafl. Bot. Observ. Crit. 1: 226. 1906. TYPE: United States, Colorado, clay cliffs, W bank of the Muddy River, W. Middle Park, 27 Jul 1875, *H. N. Petterson s.n.* (lectotype designated by Weber and Wittmann (Cat. Colorado Fl. 1992: 75), NDG!; isolectotype, GH!).
- Streptanthus coloradensis* A. Nelson in Coulter & A. Nelson, New Man. Rocky Mt. Pl. 211. 1909. TYPE: United States, Colorado, Garfield Co., Glenwood Springs, 6 Jun 1902, *G. E. Osterhout 2586* (holotype, RM).
- Streptanthus crassifolius* Greene, Pittonia 3: 227. 1897; *Cartiera crassifolia* (Greene) Greene, Leafl. Bot. Observ. Crit. 1: 226. 1906; *Euklisia crassifolia* (Greene) Rydberg, Bull. Torrey Bot. Club 33: 142. 1906. TYPE: United States, California, Tehachapi, 24 Jun 1889, *E. L. Greene s.n.* (lectotype here designated, NDG). Greene (1897) did not cite any specimens in his original description of this entity and indicated (p. 227) that it is “frequent in the mountain districts of eastern California southward, and in adjacent Nevada and Arizona.” The only Californian collection at NDG that carries Greene’s handwriting is the above and is taken herein as the lectotype.
- Cartiera cuneata* Rydberg, Fl. Rocky Mts., ed. 2. 1123. 1923. TYPE: United States, Utah, Sanpete Co. Manti, 26 Jun 1920, *A. O. Garrett 2938* (holotype, NY!).
- Cartiera leptopetala* Greene, Leafl. Bot. Observ. Crit. 1: 226. 1906. TYPE: United States, Oregon, Stein’s Mt., Jul 1898, *W. C. Cusick 2002* (holotype, US!; isotypes, GH!, MO!, NDG!, UC!).
- Cartiera multiceps* Greene, Leafl. Bot. Observ. Crit. 1: 226. 1906. TYPE: United States, Oregon, Harney Co.: Guano Ranch, 24 Jul 1896, *F. V. Coville & J. B. Leiberg 2* (holotype, US!).
- Streptanthus cordatus* var. *duranii* Jepson, Fl. Calif. 2: 29. 1936. TYPE: United States, California, Mono Co., cottonwood Creek, White Mts, R34E, T5S, Sec. 7, 37°32’N, 10,000 ft., 29 Jun 1926, *Victor Duran 1647* (holotype, JEPS!).

**Basal leaves** obovate to spatulate, obtuse to rounded at apex; middle cauline leaves rounded to obtuse at apex. **Fruits** 2.5–6(–7) mm wide; stigma subentire to prominently 2-lobed. **2n** = 28, 56.

Flowering: Apr–Jul.

Habitat: dry stony slopes, sandy draws, limestone ledges, gravelly knolls, pinyon-juniper woodlands, sagebrush, open pine forests.

Elevation: 500–3100 m.

Distribution: United States (Arizona, California, Colorado, Idaho, New Mexico, Nevada, Oregon, Utah, Wyoming).

- 11b. *Streptanthus cordatus* Nuttall var. *piutensis*** J. T. Howell, Leafl. W. Bot. 10: 31. 1963. TYPE: California: Kern Co., Piute Mts., along Saddle Springs-Claraville Rd, on ridge N of Liepel Peak, 0.9 mi. SW of Bodfish-Havilah rd, 4000 ft., 14 July 1962, *Dennis E. Breedlove 3840* (holotype, CAS!; isotype, NY!).

**Basal leaves** narrowly oblanceolate, acuminate at apex; middle cauline leaves lanceolate, acuminate or acute at apex. **Fruits** 3–4.5 mm wide; stigma subentire.

Flowering: Jun–Jul.

Habitat: open chaparral, cypress woodland.

Elevation: 1200–1700 m.

Distribution: United States (California/Kern Co.).

**12. *Streptanthus cutleri*** Cory, *Rhodora* 45: 259. 1943. TYPE: United States, Texas, Brewster Co., ca. 50 mi S of Marathon, 4 mi NE of Black Gap, 2500 ft., 28 Feb 1937, *Hugh Cutler* 677 (holotype, GH!; isotype, CAS!).

**Herbs**, annual, glabrous throughout. **Stems** 2–7 dm, single, usually branched above. **Basal leaves** subrosulate, petiolate, oblanceolate, 2.5–20 cm, runcinate-pinnatifid; middle cauline leaves petiolate, not auriculate at base, oblanceolate, 4–20 x 1–7 cm, runcinate-pinnatifid; upper leaves undivided, usually entire, reduced. **Racemes** ebracteate, lax, without a terminal cluster of sterile flowers; fruiting pedicels divaricate-ascending, (0.5–)1–2.7 cm. **Flowers** strongly zygomorphic; sepals forming campanulate calyx, ascending, dark purple, 8–12 mm, not keeled; petals lavender to purple-lavender, in 2 strikingly unequal pairs; adaxial pair 15–26 mm, blade 8–15 mm, not crisped, claw 7–11 mm, crisped, narrower than blade; abaxial pair undifferentiated into blade and claw, 5–6 mm, crisped; filaments in 3 pairs of unequal length; adaxial pair 8–12 mm; abaxial pair 6–7 mm; lateral pair 3–5 mm; anthers of adaxial stamens fertile, 3–3.5 mm; anthers of abaxial and lateral stamens 4–5 mm. **Fruits** 3.2–7.5 cm x 4–5 mm, ascending, strongly flattened, straight, not torulose; valves glabrous, with a distinct midvein; gynophore 0.2–0.5 mm; replum straight; style 0.2–0.5 mm; stigma 2-lobed; ovules and seeds 30–46 per fruit. **Seeds** orbicular, 3–4 mm diam.; wing continuous, 0.5–1 mm wide.

Flowering: Feb–Apr.

Habitat: talus slopes, rocky hillsides, gravelly and dry stream beds, sand flats, limestone slopes, open scrub or woodland.

Elevation: 450–650 m.

Distribution: Mexico (Coahuila), United States (Texas/Brewster Co.).

**13. *Streptanthus diversifolius*** S. Watson, *Proc. Amer. Acad. Arts* 17: 363. 1882; *Mitophyllum diversifolium* (S. Watson) Greene, *Leafl. Bot. Observ. Crit.* 1: 88. 1904. TYPE: United States, California, Consumne River, *V. Rattan* [223] (holotype, GH!; isotypes, CAS!, MO!). *Streptanthus linearis* Greene, *Pittonia* 3: 225. 1897. TYPE: U.S.A. California: Mariposa Co., Pea Ridge rd., 25 Apr. 1895, *J. W. Congdon s.n.* (holotype, NDG!).

**Herbs**, annual, glabrous throughout, somewhat glaucous. **Stems** (1–)2–9(–10.5) dm, erect, branched above. **Basal leaves** not rosulate, petiolate, pinnatisect to pectinate into filiform segments, 2–8 cm; middle cauline leaves petiolate, not auriculate, 2–12 cm, pectinate or pinnatisect into filiform segments 0.4–2.7 cm x 0.5–1.5 mm; upper cauline leaves linear-lanceolate to ovate or cordate, sessile, amplexicaul, entire, becoming bracts. **Racemes** bracteate below or between lowermost 1 or 2 flowers, without a terminal cluster of sterile flowers; fruiting pedicels divaricate to divaricate-ascending, straight, 2–10 mm. **Flowers**: sepals forming urceolate calyx, yellow or purplish, 5–7 mm, keeled, recurved at apex; petals pale yellow to whitish with purple veins, recurved, 8–16 mm; blade 3–6 x 1.5–3.5 mm, undulate; claw 5–10 mm, narrower than blade; filaments in 3 pairs of unequal length, free; adaxial pair 4–8 mm; abaxial pair 2.5–6 mm; lateral pair 1.5–4 mm; anthers of adaxial stamens partially fertile, 1.5–2.3 mm; anthers of abaxial and lateral stamens fertile, 3.5–4 mm. **Fruits** 3–9 x 1–1.5(–2.2) mm, geniculately reflexed from gynophore, straight, flattened, not torulose; valves glabrous, with obscure midvein; gynophore 0.5–1.5 mm; replum straight; style 0.2–1 mm; stigma obscurely 2-lobed; ovules and seeds (22–)38–80 per fruit. **Seeds** oblong, 1–1.5(–2.2) x 0.6–1(–1.5) mm; wing absent or distal, 0.05–0.1(–0.4) mm wide. **2n** = 28.

Flowering: Apr–Jul.

Habitat: dry rock outcrops, granitic domes, adjacent road cuts and disturbed areas; open oak woodlands.

Elevation: 200–1900 m.

Distribution: United States (California).

**14. *Streptanthus drepanoides*** Kruckeberg & J. L. Morrison, *Madroño* 30: 230. 1983. TYPE: United States, California, Tehama Co., serpentine outcrops on the Paskenta-Covelo road, 8-10 mi. [12.8 km] from Paskenta, 500-600 m, 21 May 1940, *John L. Morrison & Charles M. Belshaw 3215* (holotype, UC!).

**Herbs**, annual, glabrous except sometimes for sepals, glaucous. **Stems** 0.4–3.5(–4.5) dm, erect, simple or divaricately branched about base. **Basal leaves** not rosulate, subsessile or short petiolate, orbicular, soon withering, with few blunt teeth; middle cauline orbicular or orbicular-ovate, 1.3–9 x 1–7.5 cm, strongly overlapping, succulent, sessile, auriculate-cordate at base, entire to shallowly dentate; upper leaves similar, reduced. **Racemes** ebracteate, dense, without a terminal cluster of sterile flowers; fruiting pedicels divaricate-ascending, straight, 1.5–4 mm. **Flowers**: sepals forming urceolate calyx, greenish yellow, ovate, 5–7 mm, keeled, reflexed at apex, glabrous or pilose; petals ochroleucous, with brownish purple veins, recurved at apex, 7–10 mm; blade 2–3 x 1–1.5 mm, crisped; claw 5–7 mm, wider than blade; filaments in 3 pairs of unequal length; adaxial pair united to apex, 8–10 mm; abaxial pair united to middle, 5–6 mm; lateral pair 3–4 mm; anthers of adaxial stamens sterile, 0.7–1 mm; anthers of abaxial and lateral stamens fertile, 1.8–2.5 mm. **Fruits** 3–9 cm x 1–1.2 mm, divaricate-ascending, slightly flattened, strongly falcate, not or rarely slightly torulose; valves glabrous, with obscure midvein; gynophore 0.5–1 mm; replum straight; style 0.5–1 mm; stigma entire; ovules and seeds 30–50 per fruit. **Seeds** oblong, 1–1.5 x 0.7–1 mm; wing absent or distal and to 0.1 mm wide. **2n** = 28. Flowering: May–Jul.

Habitat: steep mobile substrate on sedimentary or volcanic slopes, principally on serpentine outcrops and openings in chaparral, pine woodlands.

Elevation: 250–1800 m.

Distribution: United States (California).

**15. *Streptanthus farnsworthianus*** J. T. Howell, *Leafl. W. Bot.* 10: 182. 1965. TYPE: United States, California, Kern Co., high ridge at the head of Lumreau Creek, 5.5 mi. SE of Glennville, 4600 ft, 13 May 1965, *Evalyn L. Farnsworth 477* (lectotype here designated, CAS!; isoelectotypes, GH!, NY!). Howell (1965) cited the above collection and Farnsworth 182 (CAS, GH) as the types for flowering and fruiting material, respectively.

**Herbs**, annual, glabrous, glaucous, usually with a purplish cast. **Stems** 2–10 dm, erect, simple or branched above. **Basal leaves** rosulate, soon withered, petiolate, 2-pinnatifid or 2-pinnatisect, 3.5–15 cm; middle cauline leaves lanceolate, 3–16 x 1–4 cm, sessile, amplexicaul, dentate distally or entire; upper leaves smaller, entire. **Racemes** bracteate below or between lowermost 1 or 2 flowers, without a terminal cluster of sterile flowers; fruiting pedicels divaricate-ascending, straight, 4–15 mm. **Flowers**: sepals forming urceolate calyx, violet-purple, 6–10 mm, slightly keeled or not, recurved at apex; petals white with violet veins, 8–11 mm; blade 3–4 x 1.5–2 mm, undulate, reflexed at apex; claw 6–8 mm, about as wide as blade; filaments in 3 pairs of unequal length, free; adaxial pair 7–9 mm; abaxial pair 4–6 mm; lateral pair 3–4 mm; anthers of adaxial stamens partially fertile, 2.5–3 mm; anthers of abaxial and lateral stamens fertile, 3.5–5 mm. **Fruits** 6–12 cm x 1.7–2.5 mm, ascending, straight to slightly curved, flattened, not torulose; valves glabrous, with a distinct midvein; gynophore 1–2 mm; replum straight; style 0.1–1 mm; stigma slightly 2-lobed; ovules and seeds 60–100 per fruit. **Seeds** broadly ovate to suborbicular, 2–2.5 x 1.5–2 mm; wing on distal half, 0.1–0.3 mm wide. **2n** = 28. Flowering: May–Jun.

Habitat: sparsely vegetated rocky sites (fractured slate, metamorphic gravels, guss deposits), oak-pine woodlands.

Elevation: 400–1400 m.

Distribution: United States (Calif.)

**16. *Streptanthus fenestratus*** (Greene) J. T. Howell, *Leafl. W. Bot.* 9: 184. 1961; *Pleiocardia fenestrata* Greene, *Leafl. Bot. Observ. Crit.* 1: 86. 1904. TYPE: United States, California, Fresno Co., Tehipite Valley, 4000 ft., 6–10 July 1900, *H. M. Hall & H. P. Chandler* 492 (holotype, US!; isotypes, CAS!, MO!).

**Herbs**, annual, glabrous throughout, glaucous. **Stems** (0.5–)1–2(–3.5) dm, erect, simple or branched below middle. **Basal leaves** rosulate, petiolate, 1.5–6 cm, with slender petioles, 1- or 2-pinnatisect; middle cauline leaves ovate to lanceolate, coarsely dentate or entire, rarely pinnatifid but not divided into filiform segments, auriculate; upper leaves amplexicaul, entire. **Racemes** bracteate below or between lowermost 1 or 2 flowers, without a terminal cluster of sterile flowers; fruiting pedicels divaricate-ascending, straight, 2–7 mm. **Flowers**: sepals forming tubular-urceolate calyx, purple, 5–7 mm, slightly keeled or not, recurved at apex; petals rose-purple, 9–15 mm; blade 3–6 x 2.5–3.5 mm, not crisped; claw 6–9 mm, narrower than blade; filaments in 3 pairs of unequal length, free; adaxial pair 5–7 mm, recurved; abaxial pair 3–4 mm; lateral pair 1.5–2.5 mm; anthers of all stamens fertile, 2–2.5 mm. **Fruits** 2–5 cm x 1.2–1.7 mm, ascending to divaricate or rarely reflexed, slightly flattened, not only slightly torulose; valves glabrous, with obscure midvein; gynophore 0.2–2.5 mm; replum straight; style 0.1–1 mm; stigma entire; ovules and seeds 22–38 per fruit. **Seeds** oblong, 1–1.5 x 0.7–0.9 mm; wing absent or distal and 0.05–0.1 mm wide. **2n** = 28.

Flowering: May–Jun.

Habitat: granitic ledges and sand, guss deposits in open pine forest.

Elevation: 1100–1800 m.

Distribution: United States (California/Fresno Co.).

**17. *Streptanthus glandulosus*** W. J. Hooker, *Icon. Pl. I*, plate 40. 1836.

**Herbs**, annual, sparsely to densely hirsute below, sometimes glabrous throughout, usually glaucous distally. **Stems** (0.8–)1.5–9(–12) dm, simple to branched throughout. **Basal leaves** not rosulate, petiolate, soon withered, lanceolate to oblanceolate, 1–15 cm, coarsely dentate to ± lobed, narrowed to ± winged petiole; middle cauline leaves linear-lanceolate to (ob)lanceolate, 1–12 cm x 1–11 mm, entire to coarsely dentate, sessile, auriculate to amplexicaul, not overlapping; upper leaves similar, reduced, often entire. **Racemes** ebracteate, lax, secund or not, without a terminal cluster of sterile flowers; fruiting pedicels ascending to divaricate or spreading, straight or recurved, glabrous or pubescent, 0.2–3.2 cm. **Flowers**: sepals forming zygomorphic calyx, white, yellow, rose, purple, or purple-black, lanceolate to broadly ovate, (3–)5–10(–13) mm, glabrous or sparsely hirsute; petals subequal or adaxial pair distinctly longer and more recurved than abaxial, 7–17 mm; blade 2–7 x 1–3 mm, crisped; claw 5–13 mm, wider than blade; filaments in 3 pairs or unequal length; adaxial pair exerted, united to at least lower 2/3, 5–13 mm; abaxial pair free, 4–9 mm; lateral pair 2.5–7 mm; anthers of adaxial stamens sterile, 0.3–1 mm; anthers of abaxial and lateral stamens fertile, 1–2.5 mm. **Fruits** 3–11 cm x 1.5–2.5 mm, flattened, not torulose, straight or curved upwards or arcuate, ascending to divaricate or spreading; valves with a distinct midvein, glabrous or sparsely to moderately hirsute; gynophore 0.2–1.5 mm; replum straight; style 0.1–2.5 mm; stigma subentire; ovules and

seeds 22–70 per fruit. **Seeds** ovate to oblong, 1.5–2.1 x 1–1.5 mm; wing continuous, 0.1–0.5 mm wide. **2n** = 28.

Flowering: Apr–Jul.

Habitat: rocky open slopes, talus, serpentine slopes and outcrops, forest and chaparral openings, steep slopes in woodland, ultramafic grasslands.

Elevation: 0–1400 m.

Distribution: United States (California, SW Oregon).

Eight subspecies 8.

KEY TO THE SUBSPECIES OF *STREPTANTHUS GLANDULOSUS*

1. Fruiting pedicels 1–3.2 cm; sepals dark purple-black; rachis of raceme flexuous; lower stems and cauline leaves glabrous.....17e. subsp. *niger*
1. Fruiting pedicels 0.2–1.5 cm; sepals white, lilac, lavender, purple, or reddish purple; rachis of raceme straight; lower stems and cauline leaves sparsely to densely hirsute.
  2. Racemes not secund.
    3. Sepals white, greenish white, or pale yellow; Santa Clara County.....17a. subsp. *albidus*
    3. Sepals reddish purple, dark maroon, or lilac-lavender; San Luis Obispo County north into Santa Clara, Lake, and Mendocino counties.....17b. subsp. *glandulosus*
  2. Racemes secund.
    4. Sepals lavender to rose or purple.
      5. Fruiting pedicels 2–5 mm; fruits curved upwards, divaricate to ascending; adaxial filaments 6–8 mm; Marin County..... 17f. subsp. *pulchellus*
      5. Fruiting pedicels 5–15 mm; fruits arcuate, spreading to reflexed; adaxial filaments 7–10 mm; Sonoma County.....17c. subsp. *hoffmanii*
    4. Sepals greenish white, white, cream, or pale yellow.
      6. Petals 7–8 mm; adaxial stamens 5–6 mm; fruits divaricate-ascending, straight or curved inwards; Josephine County, Oregon.....17d. subsp. *josephinensis*
      6. Petals 10–17 mm; adaxial stamens 7–10 mm; fruits spreading to reflexed, arcuate; Marin, Napa, and Sonoma counties, California.
        7. Sepals greenish white with lavender or purplish base; petals with purple veins; Marin and Napa County.....17g. subsp. *secundus*
        7. Sepals cream or pale yellow, without purplish or lavender base; petals without purple veins; Sonoma County.....17h. subsp. *sonomensis*

**17a. *Streptanthus glandulosus* W. J. Hooker subsp. *albidus* (Greene) Al-Shehbaz, M. Mayer and D. W. Taylor. Novon 18: 280. 2008; *S. albidus* Greene, Pittonia 1: 62. 1887; *S. glandulosus* var. *albidus* (Greene) Jepson, Man. Fl. Pl. Calif. 419. 1925; *Euclisia albida* (Greene) Greene, Leaflet Bot. Observ. Crit. 1: 83. 1904. TYPE: United States, California, Santa Clara Co., hills 4 mi. S of San Jose, 30 Apr. 1887, V. Rattan s.n. (holotype, NDG!).**

**Stems** 3–12 dm, sparsely pubescent below, glabrous above. **Cauline leaves** glabrous, upper ones conduplicate, entire. **Racemes** not secund; rachis straight; fruiting pedicels 4–8 mm, glabrous. **Flowers:** sepals greenish white to white or pale yellow, 7–11 mm, glabrous; petals white, with light brown or purplish veins, 11–17 mm; adaxial filaments 8–10 mm. **Fruits** glabrous, straight, divaricate to ascending. **2n** = 28.

Flowering: Apr–Jul.

Habitat: rocky, often barren ultramafic grassland openings.

Elevation: 100–800 m.

Distribution: United States (California/Santa Clara Co.).

**17b. *Streptanthus glandulosus*** W. J. Hooker subsp. ***glandulosus***; *Erysimum glandulosum* (W. J. Hooker) Kuntze, Revis. Gen. Pl. 2: 933. 1891; *E. glandulosa* (W. J. Hooker) Greene, Leafl. Bot. Observ. Crit. 1: 82. 1904. TYPE: United States, California, Monterey, 1833, *D. Douglas s.n.* (holotype, K!; isotypes, GH!, MO!, NY!).

*Streptanthus asper* Greene, Pittonia 3: 225. 1897; *Euclisia aspera* (Greene) Greene, Leafl. Bot. Observ. Crit. 1: 83. 1904. TYPE: United States, California, Mt. St. Helena, 13 Jun 1894, *E. L. Greene s.n.* (lectotype here designated, NDG #001800!; isolectotype, NDG #001801!). The two sheets at NDG carry the exact information; the more complete specimen is designated herein as the lectotypes

*Euclisia bakeri* Greene, Leafl. Bot. Observ. Crit. 1: 84. 1904. TYPE: United States, California, near Bethany, on the plains of the upper San Joaquin, 27 Apr 1903, *C. F. Baker 2785* (holotype, NDG!).

*Streptanthus biolettii* Greene, Pittonia 2: 225. 1892 ; *E. biolettii* (Greene) Greene, Leafl. Bot. Observ. Crit. 1: 83. 1904. TYPE: United States, California, Sonoma Co., Hood's Peak, 1 May 1892, *F. T. Bioletti s.n.* (holotype, NDG!).

*Euclisia eliator* Greene, Leafl. Bot. Observ. Crit. 1: 84. 1904. TYPE: United States, California, Santa Lucia Mts., 1880, *G. R. Vasey 4295* (holotype, US).

*Streptanthus mildrediae* Greene, Fl. Francisc. 260. 1891; *Euclisia mildrediae* (Greene) Greene, Leafl. Bot. Observ. Crit. 1: 83. 1904. TYPE: United States, California,.....(holotype, xxx).

*Streptanthus versicolor* Greene, Erythea 3: 99. 1895; *Euclisia versicolor* (Greene) Greene, Leafl. Bot. Observ. Crit. 1: 83. 1904. TYPE: United States, California, Mendocino Co., banks of Navarro River, 1894, *Edith Byxbee s.n.* (holotype, NDG!).

*Euclisia violacea* Greene, Leafl. Bot. Observ. Crit. 1: 83. 1904. TYPE: United States, California, without locality, 1876, *Edward Palmer 4297* (holotype, US).

*Streptanthus peramoenus* Greene, Bull. Torrey Bot. Club 13: 142. 1886; *Streptanthus albidus* Greene subsp. *peramoenus* (Greene) Kruckeberg, Madroño 14: 225. 1958. TYPE: United States, California, Oakland Hills, May 25 1886, *E. L. Greene s.n.* (lectotype, here designated, NDG!; isolectotypes, CAS!, GH!). Kruckeberg (1958) arbitrarily stated that the type of this name is "Bolander in Okland Hills", but he did not give the herbarium where such collection is housed nor did he give a justification for such incomplete typification. He did not examine Greene's specimen until 1970 when he annotated it as the type. In my opinion, Greene's specimen at NDG should have been taken in the first place as the type.

**Stems** 1–10 dm, densely to moderately hirsute below, moderately to sparsely so above.

**Cauline leaves** densely to sparsely hirsute, upper ones conduplicate or flat, entire or denticulate.

**Racemes** not secund; rachis straight; fruiting pedicels 3–15 mm, sparsely pubescent or glabrous.

**Flowers:** sepals reddish purple, dark maroon, or lilac-lavender, 5–13 mm, sparsely pubescent or glabrous; petals lavender to purple, with or without darker purple veins, 8–17 mm; adaxial filaments 8–13 mm. **Fruits** glabrous or sparsely pubescent, straight to arcuate, ascending to divaricate or reflexed. **2n** = 28.

Flowering: Apr–Jul.

Habitat: rocky, often barren, ultramafic or metamorphic (Franciscan formation) slopes, chaparral openings, steep slopes in woodland.

Elevation: 0–1400 m.

Distribution: United States (California).

**17c. *Streptanthus glandulosus*** W. J. Hooker subsp. ***hoffmanii*** (Kruckeberg) M. Mayer and D. W. Taylor, Novon 18: 280. 2008; *S. glandulosus* var. *hoffmanii* Kruckeberg, Madroño 14:

223. 1958. TYPE: U.S.A. California: Sonoma Co., Russian Gulch, 8 mi S of Fort Ross, 400 ft., 24 Apr. 1938, *Lincoln Constance 2155* (holotype, UC!; isotypes, GH!, 2MO!).

**Stems** 1.5–4.5(–7) dm, densely hirsute below, sparsely to moderately so above. **Cauline leaves** moderately to sparsely hirsute, upper ones flat, entire or denticulate. **Racemes** secund; rachis straight; fruiting pedicels 5–15 mm, sparsely pubescent or glabrous. **Flowers:** sepals lavender or rose to purple, 6–7 mm, sparsely pubescent or glabrous; petals lavender to purplish, 10–12 mm; adaxial filaments 7–10 mm. **Fruits** sparsely pubescent or glabrous, arcuate, spreading to reflexed. **2n** = 28.

Flowering: May–Jul.

Habitat: serpentine or Franciscan formation outcrops.

Distribution: United States (California/Sonoma Co).

**17d. *Streptanthus glandulosus* W. J. Hooker subsp. *josephinensis* Al-Shehbaz & M. S. Mayer, Novon 18: 280. 2008. TYPE: U.S.A. Oregon: Josephine Co., serpentine soil 6.9 mi. N of California-Oregon line on Happy Camp-O'Brien rd, 9 July 1948, *Freed W. Hoffman 2311* (holotype, MO!; isotypes, GH!, UC!).**

**Stems** 1.7–3.8 dm, moderately pubescent below, glabrous above. **Cauline leaves** sparsely pubescent, upper ones flat, dentate. **Racemes** secund; rachis straight; fruiting pedicels 5–10 mm, glabrous or sparsely pubescent. **Flowers:** sepals white or cream, 3–5 mm, glabrous or sparsely pubescent; petals with purple veins, 7–8 mm; adaxial filaments 5–6 mm. **Fruits** glabrous or sparsely pubescent, straight or curved inwards, divaricate-ascending.

Flowering: Jun–Jul.

Habitat: serpentine areas.

Distribution: United States (Oregon/Josephine Co.).

**17e. *Streptanthus glandulosus* W. J. Hooker subsp. *niger* (Greene) Al-Shehbaz, M. Mayer and D. W. Taylor, Novon 18: 280. 2008; *S. niger* Greene, Bull. Torrey Bot. Club 13: 141. 1886; *Euclisia nigra* (Greene) Greene, Leaf. Bot. Observ. Crit. 1: 83. 1904; *Streptanthus glandulosus* var. *niger* (Greene) Munz, Aliso 4: 91. 1958. TYPE: United States, California, Marin Co., Point Tiburon, Apr 1886, *E. L. Greene s.n.* (lectotype designated by Al-Shehbaz & Meyer 2008: 280, NDG!; isolectotypes, 2CAS!, JEPS!).**

**Stems** 2–11 dm, glabrous throughout. **Cauline leaves** glabrous, upper ones conduplicate, entire. **Racemes** not secund; rachis flexuous; fruiting pedicels 1–3.2 cm, glabrous. **Flowers:** sepals dark purple-black, 7–8 mm, glabrous; petals dark purple, 10–12 mm; adaxial filaments 8–10 mm. **Fruits** 3.5–6.7 cm, glabrous, straight, divaricate-ascending. **2n** = 28.

Flowering: May–Jul.

Habitat: serpentine grasslands.

Distribution: United States (California/Marin Co., Tiburon Peninsula).

**17f. *Streptanthus glandulosus* W. J. Hooker subsp. *pulchellus* (Greene) Kruckeberg, Madroño 14: 222. 1958; *S. pulchellus* Greene, Pittonia 2: 225. 1892; *Euclisia pulchella* (Greene) Greene, Leaf. Bot. Observ. Crit. 1: 83. 1904; *S. glandulosus* var. *pulchellus* (Greene) Jepson, Man. Pl. Calif. 420. 1925. TYPE: United States, California, Marin Co., Mill Valley, 7 May 1892, *M. A. Howe s.n.* (holotype, NDG!). The type sheet has another collection (Bioletti s.n.) from Mt. Tamalpais, but this is not part of the type collections (check) because it does not carry Greene's handwriting as in the Howe's collection.**

**Stems** 1–3(–3.7) dm, densely hirsute below, glabrous above. **Cauline leaves** hirsute, upper ones flat, dentate. **Racemes** secund; rachis straight; fruiting pedicels 2–5 mm, sparsely pubescent

or glabrous. **Flowers:** sepals rose to lavender or purple, 5–7 mm, glabrous or sparsely pubescent; petals purple, 8–11 mm; adaxial filaments 6–8 mm. **Fruits** glabrous or sparsely pubescent, curved upwards, divaricate to ascending.  $2n = 28$ .

Flowering: May–Jun.

Habitat: serpentine outcrops.

Distribution: United States (California/Marin Co., Mt. Tamalpais).

**17g. *Streptanthus glandulosus* W. J. Hooker subsp. *secundus* (Greene) Kruckeberg, Madroño 14: 223. 1958; *S. secundus* Greene, Fl. Francisc. 261. 1891; *Euclisia secunda* (Greene) Greene, Leaf. Bot. Observ. Crit. 1: 83. 1904. TYPE:** United States, California, N base of Mt. Tamalpais, 18 May 1886, *E. L. Greene s.n.* (holotype, NDG!).

**Stems** 1.5–9.3 dm, densely hirsute below, sparsely pubescent above. **Cauline leaves** densely to moderately pubescent, upper ones flat, dentate. **Racemes** secund; rachis straight; fruiting pedicels 7–10 mm, sparsely pubescent or glabrous. **Flowers:** sepals greenish white with lavender or purplish base, 6–7 mm, glabrous; petals with purple veins, 12–16 mm; adaxial filaments 7–9 mm. **Fruits** glabrous, arcuate, spreading to reflexed.  $2n = 28$ .

Flowering: Apr–Jun.

Habitat: rocky open slopes, often barren or on talus, forest openings.

Elevation: 100–1200 m.

Distribution: United States (California/Marin Co).

**17h. *Streptanthus glandulosus* W. J. Hooker subsp. *sonomensis* (Kruckeberg) M. Mayer and D. W. Taylor, Novon 18: 280. 2008; *S. glandulosus* var. *sonomensis* Kruckeberg, Madroño 14: 223. 1958. TYPE:** United States, California, Sonoma Co., near Guernville, Great Eastern Quicksilver Mine, serpentine, *Freed W. Hoffman 2323* (holotype, UC!; isotypes, GH!, MO!, NY!).

**Stems** 2.3–7(–9) dm, moderately to densely hirsute below, glabrous above. **Cauline leaves** hirsute, upper ones conduplicate, entire or denticulate. **Racemes** secund; rachis straight; fruiting pedicels 3–10 mm, sparsely pubescent or glabrous. **Flowers:** sepals cream or pale yellow, without purplish or lavender base, 5–6 mm, glabrous or sparsely pubescent; petals without purple veins, 10–17 mm; adaxial filaments 7–10 mm. **Fruits** glabrous or sparsely pubescent, arcuate, spreading to slightly reflexed.  $2n = 28$ .

Flowering: May–Jul.

Habitat: serpentine or Franciscan formation outcrops

Distribution: United States (California/Sonoma Co).

**18. *Streptanthus gracilis* Eastwood, Proc. Calif. Acad. Sci., ser. 3, Bot. 2: 285. 1902; *Pleiocardia gracilis* (Eastwood) Greene, Leaf. Bot. Observ. Crit. 1: 86. 1904. TYPE:** United States, California, Tulare Co., on trail from East Lake to Harrison's Pass, 1–13 Jul 1899, *Alice Eastwood s.n.* (holotype, CAS).

**Herbs**, annual, slender, glabrous throughout, glaucous. **Stems** (0.6–)1–3.5 dm, erect, often branched about base. **basal leaves** rosulate, petiolate, oblanceolate to spatulate, 1–7 cm, sinuate to dentate or rarely lobed; middle cauline leaves oblong to ovate, 0.5–3 cm x, 1–5 mm, short petiolate or sessile, auriculate, entire or apically dentate; upper leaves reduced, amplexicaul or auriculate, entire. **Racemes** bracteate below or between lowermost 1 or 2 flowers, without a terminal cluster of sterile flowers; fruiting pedicels divaricate to ascending, straight or recurved, 3–6 mm, not expanded at receptacle. **Flowers:** sepals forming slightly urceolate calyx, rose-purple, 4–5 mm, not keeled; petals pinkish, 7–10 mm, spreading; blade 3–5 x 1.5–2.5 mm, not

crisped; claw 5–6 mm, narrower than blade; filaments in 3 pairs of unequal length, free; adaxial pair 5–6 mm; abaxial pair 3–4 mm; lateral pair 1.5–2.5 mm; anthers of all stamens fertile, 1.5–2 mm. **Fruits** 3–7 cm x 1–1.5 mm, ascending, slightly flattened, straight, torulose; valves glabrous, with obscure midvein; gynophore 0.5–3 mm; replum straight; style 0.1–0.5 mm; stigma entire; ovules and seeds 24–52 per fruit. **Seeds** oblong, 1–1.5 x 0.6–0.9 mm; wing absent or distal, 0.05–0.25 mm.

Flowering: Jun–Sep.

Habitat: rocky open subalpine or alpine vegetation, often in pockets of weathered granite sand.

Elevation: 2600–3600 m.

Distribution: United States (California/Fresno, Inyo Co., and Tulare counties).

**19. *Streptanthus hesperidis*** Jepson, *Erythea* 1: 14. 1893; *S. breweri* A. Gray var. *hesperidis* (Jepson) Jepson, *Fl. Calif.* 2: 33. 1936; *Pleiocardia hesperidis* (Jepson) Greene, *Leafl. Bot. Observ. Crit.* 1: 86. 1904. TYPE: United States, California, Knoxville Grade to Lower Lake, 28 Jul 1892, *W. L. Jepson 13,355* (holotype, JEPS!). One of the two sheets of this collection carries Jepson's handwriting and is taken here as the type.

**Herbs**, annual, glabrous, mostly yellowish. **Stems** 1–3 dm, simple or branched about base. **Basal leaves** not rosulate, short petiolate, soon withered, broadly obovate, 2–3 cm, coarsely and bluntly dentate distally; middle cauline leaves ovate to lanceolate, 1–4 x 0.5–1.5 cm, sessile, amplexicaul, often entire, yellowish, not overlapping; upper leaves reduced, entire. **Racemes** ebracteate, without a terminal cluster of sterile flowers, secund, rachis flexuous; fruiting pedicels divaricate-ascending, straight, 1–2 mm. **Flowers**: sepals forming urceolate calyx, yellow-green, ovate-lanceolate, 5–8 mm, glabrous, keeled, recurved or flaring apically; petals whitish with purplish veins, 6–8 mm; blade 2–3 x 1–1.3 mm, not crisped; claw 4–5 mm, about as wide as blade; filaments in 3 pairs of unequal length; adaxial pair united full length, recurved, 6–9 mm; abaxial pair united to middle, 3–5 mm; lateral pair 2–3.5 mm; anthers of adaxial stamens sterile, 0.7–1.2; anthers of abaxial and lateral stamens fertile, 1.7–2.5 mm. **Fruits** 3–6 cm x 0.9–1.1 mm, divaricate-ascending, nearly straight to rarely arcuate, flattened, somewhat torulose; valves glabrous, with obscure midvein; gynophore 0.2–0.5 mm; replum straight; style 0.1–0.3 mm; stigma entire; ovules and seeds 26–38 per fruit. **Seeds** oblong, 1.2–1.5 x 0.6–0.8 mm; wing absent or distal and 0.05–0.1 mm wide. **2n** = 28.

Flowering: May–Jul.

Habitat: serpentine barrens and associated openings in chaparral-oak woodland and cypress woodland.

Elevation: 250–600 m.

Distribution: United States (California/Lake and Napa counties).

**20. *Streptanthus hispidus*** A. Gray, *Proc. Calif. Acad. Sci.* 3: 101. 1864; *Euclisia hispida* (A. Gray) Greene, *Leafl. Bot. Observ. Crit.* 1: 83. 1904. TYPE: United States, California, Contra Costa Co., dry summit, Mt. Diablo, 1860–1862, *W. H. Brewer 1098* (holotype, GH!).

**Herbs**, annual, densely hirsute-hispid throughout with simple trichomes to 1.4 mm. **Stems** 0.3–3 dm, simple or branched about base. **Basal leaves** not rosulate, shortly petiolate, obovate, 1–5 cm, coarsely to shallowly dentate; middle cauline leaves obovate to oblong, 0.7–6 x 0.2–2.5 cm, sessile, cuneate or truncate at base, not auriculate, coarsely dentate; upper leaves minutely auriculate, dentate. **Racemes** ebracteate, with a terminal cluster of sterile flowers, not secund; fruiting pedicels divaricate-ascending, straight, 2–5 mm. **Flowers**: sepals forming subcampanulate calyx, pale green to purplish, densely pubescent, ovate, 4–6 mm, not keeled;

petals light purple, with white margins, 6–9 mm; blade crisped, 2–3 x 1–1.5 mm; claw 5–6 mm, wider than blade; filaments in 3 pairs of unequal length; adaxial pair exerted, united to near apex, 5–6 mm; abaxial pair united to a little beyond middle, 4–5 mm; lateral pair 3–4 mm; anthers of adaxial stamens sterile, 0.3–0.5 mm; anthers of abaxial and adaxial stamens fertile, 1.5–1.8 mm. **Fruits** 4–8.5 cm x 2–2.5 mm, divaricate-ascending to suberect, straight, flattened; valves hispid-hirsute, with a prominent midvein; gynophore 0.1–0.3 mm; replum straight; style 0.4–1 mm; stigma slightly 2-lobed; ovules and seeds 34–66 per fruit. **Seeds** ovate to suborbicular, 1.6–2 x 1.2–1.8 mm; wing continuous, 0.2–0.35 mm wide. **2n** = 28.

Flowering: Mar–Jun.

Habitat: talus or rocky outcrops (Franciscan formation, largely on chert) and sparsely vegetated openings in grassland or chaparral.

Elevation: 600–1200 m.

Distribution: United States (California/Contra Costa Co., Mt. Diablo).

**21. *Streptanthus howellii*** S. Watson. Proc. Amer. Acad. Arts 20: 353. 1885; *Cartiera howellii* (S. Watson) Greene, Leaflet Bot. Observ. Crit. 1: 226. 1906. TYPE: United States, Oregon, Curry Co., Coast Mts., 12 June 1884, *Thomas J. Howell* 39 (holotype, GH!).

**Herbs**, perennial, glabrous, glaucous; caudex simple or branched. **Stems** 3–8 dm, simple or rarely branched above. **Basal leaves** not rosulate, petiolate, rather fleshy, soon withering; middle cauline petiolate, broadly spatulate-obovate to suborbicular, 1.5–10 x 0.5–4.5 cm, entire to repand or obtusely dentate; upper leaves narrowly oblong-oblongeolate to linear, cuneate to attenuate at base, not auriculate, entire. **Racemes** ebracteate, without a terminal cluster of sterile flowers, lax; fruiting pedicels divaricate to ascending, straight, 0.7–1.7 cm. **Flowers**: sepals forming subcampanulate calyx, purplish, oblong, 5–8 mm, not keeled; petals maroon to purple, 8–12 mm; blade 3–5 x 0.5–1 mm, not crisped; claw 5–7 mm, wider than blade; filaments in 3 pairs of unequal length, free; adaxial pair 6–7 mm; abaxial pair 5–6 mm; lateral pair 4–5 mm; anthers of all stamens fertile, 3–3.5 mm. **Fruits** 5.5–12 cm x 2.5–3.2(–3.5) mm, divaricate-ascending, straight to slightly curved inwards, not torulose; valves glabrous, with a distinct midvein; gynophore 0.5–5 mm; replum straight; style 0.3–3 mm; stigma subentire; ovules and seeds 24–44 per fruit. **Seeds** broadly oblong to suborbicular, 3–4 x 2–3 mm; wing continuous, 0.5–1.1 mm wide. **2n** = 28.

Flowering: Jun–Jul.

Habitat: dry serpentine slopes and ridges in open conifer-hardwood forests.

Elevation: 600–800 m.

Distribution: United States (N California/Del Norte and Siskiyou counties, S Oregon/Curry and Josephine counties).

**22. *Streptanthus hyacinthoides*** W. J. Hooker, Bot. Mag. t. 3516. 1836; *Erysimum hyacinthoides* (W. J. Hooker) Kuntze, Revis. Gen. Pl. 2:P 933. 1891; *Euklisia hyacinthoides* (W. J. Hooker) Small, Fl. SE U.S. 486. 1903; *I. hyacinthoides* (W. J. Hooker) Greene, Leaflet Bot. Observ. Crit. 1: 197. 1906. TYPE: United States, Texas, Austin Co., San Felipe, *T. Drummond* 12 (holotype, K!; isotypes, GH!, K!).

*Icianthus atratus* Greene, Leaflet Bot. Observ. Crit. 1: 198. 1906. TYPE: United States, Indian Territory, along the Canadian River, Jun 1891, *M. A. Carleton* s.n. (holotype, US).

*Streptanthus glabrifolius* Buckley, Proc. Acad. Nat. Sci. Philadelphia 1861: 448. 1861; *Icianthus glabrifolius* (Buckley) Greene, Leaflet Bot. Observ. Crit. 1: 197. 1906. TYPE: United States, Texas: Young Co., Sandy Post Oaks woods, 1861–1862, N of Belknap, *S. B. Buckley* s.n. (holotype, PH?; fragment, GH!).

**Herbs**, annual, glabrous throughout except sometimes for stem base. **Stems** 2.8–13 dm, erect, simple or branched above. **Basal leaves** not seen; middle cauline leaves short petiolate or sessile, not auriculate, linear to linear-lanceolate or rarely oblanceolate, 2.5–16 x 0.2–0.7(–2) cm, entire; upper leaves similar, reduced. **Racemes** ebracteate, without a terminal cluster of sterile flowers; fruiting pedicels divaricate-ascending, straight, 3–10 mm. **Flowers** horizontal to pendent, slightly zygomorphic; sepals forming campanulate calyx, purple, lanceolate, 7–11 mm, not keeled; petals deep purple to magenta or whitish with purple veins, 1.3–2 cm; blade strongly recurved, not crisped, 7–12 x 1–4 mm; claw 5–12 mm; filaments in 3 pairs of unequal length; adaxial pair united to ca.  $\frac{3}{4}$  length, 7–10 mm; abaxial pair united below middle, 8–14 mm; lateral pair 4–7 mm; anthers of adaxial stamens sterile, 1–1.5 mm; anthers of abaxial and lateral stamens fertile, 2–3 mm. **Fruits** 3.7–11.2 cm x 1.5–2 mm, divaricate-ascending, flattened, straight or slightly curved inwards, not torulose; valves glabrous, with a distinct midvein; gynophore 0.3–3 mm; replum straight; style 0.3–1.5 mm; stigma subentire; ovules and seeds 90–120 per fruit. **Seeds** broadly ovate, 1.5–1.8 x 1–1.3 mm; wing continuous, 0.1–0.25 mm.

Flowering: May–Jun.

Habitat: sandy soils of prairies, open glades in woods, grassy roadsides.

Elevation: 100–800 m.

Distribution: United States (Arkansas, Kansas, Louisiana, Oklahoma, Texas).

### 23. *Streptanthus insignis* Jepson, Man. Fl. Pl. Calif. 420. 1925.

**Herbs**, annual, hirsute-hispid throughout. **Stems** 1.2–6 dm, simple or branched above. **Basal leaves** not rosulate, short petiolate, lanceolate to oblanceolate, 2–8 cm, coarsely dentate to pinnatifid; middle cauline leaves lanceolate, 1.3–9 x 0.2–2 cm, dentate, sessile, auriculate; upper leaves smaller, dentate. **Racemes** ebracteate, lax, with a terminal cluster of dark purple or greenish yellow sterile flowers; fruiting pedicels divaricate to ascending, straight or curved upwards or downwards, 3–8 mm. **Flowers**: fertile sepals forming campanulate calyx, dark purple, purplish, or greenish yellow, hirsute-hispid, oblong to lanceolate, 4–6 mm, not or slightly keeled; sterile sepals 8–14 mm, glabrous; petals purplish white, lemon-yellow, or yellowish white, with darker midvein, 7–12 mm; blade crisped, 2–4 x 1–2 mm, adaxial pair parallel and erect, abaxial pair spreading and reflexed; claw 5–8 mm, about as wide as blade; filaments in 3 pairs of unequal length; adaxial pair completely united, 6–9 mm; abaxial pair free, 4–6 mm; lateral pair 3–4 mm; anthers of adaxial stamens sterile, 0.2–0.7 mm; anthers of abaxial and lateral stamens fertile, 1.3–2 mm. **Fruits** 3.5–11.4 cm x 1.5–2 mm, flattened, ascending or reflexed, straight or slightly curved, not torulose; valves sparsely to densely hispid with trichomes to 1.7 mm, with a prominent midvein; gynophore 0.4–1 mm; replum straight; style 1–2 mm; stigma entire; ovules and seeds 32–94 per fruit. **Seeds** broadly oblong, 1.4–2 x 1–1.3 mm; wing continuous, 0.15–0.3 mm wide.

Flowering: Mar–May.

Habitat: steep scree or talus slopes of serpentine or Franciscan formation, openings in chaparral, oak woodlands.

Elevation: 200–1100 m.

Distribution: United States (SC California).

Two subspecies.

#### KEY TO THE SUBSPECIES OF *STREPTANTHUS INSIGNIS*

1. Fertile sepals dark purplish, terminal cluster of sterile flowers dark purple; petals purplish white; fruits subglabrous or sparsely to rarely densely hispid .....23a. *S. insignis*
1. Fertile sepals greenish yellow or purplish; terminal cluster of sterile flowers greenish

yellow or purple; petals lemon yellow or yellowish white; fruits moderately to densely hispid .

.....23b. subsp. *lyonii*

**23a. *Streptanthus insignis*** Jepson subsp. *insignis*. TYPE: United States, California, Fresno Co., Warthan, 11 May 1893, *Alice Eastwood s.n.* (holotype, JEPS!).

**Racemes** with a dark purple terminal cluster of sterile flowers. **Flowers:** fertile sepals purple or purplish; petals purplish white. **Fruits** subglabrous or sparsely to rarely densely hispid. **2n** = 28.

Flowering: Mar–May.

Habitat: steep scree or talus slopes of serpentine or Franciscan formation, openings in chaparral, oak woodlands.

Elevation: 300–1100 m.

Distribution: United States (SC California).

**23b. *Streptanthus insignis*** Jepson subsp. *lyonii* Kruckeberg & J. L. Morrison, Madroño 30:

234. 1983. TYPE: United States, California, Merced Co.: serpentine outcrop, 2 mi N of Ortigalita Peak, inner South Coast ranges, 3 Apr 1938, *Gregory Lyon 1223* (holotype, UC!; isotype, UC!).

**Racemes** with a pale yellow or purplish terminal cluster of sterile flowers. **Flowers:** fertile sepals greenish yellow or purplish; petals lemon yellow or yellowish white. **Fruits** moderately to densely hispid. **2n** = 28.

Flowering: Apr–May.

Habitat: serpentine outcrops in arid grassland, oak woodland.

Elevation: 200–900 m.

Distribution: United States (California/Merced Co.).

**24. *Streptanthus longisiliquus*** G. L. Clifton & R. E. Buck, Madroño 54: 94. 2007. TYPE:

United States, California, Butte Co., ca. 0.8 km N of Robley Point, steep road bank, 39°52'21"N, 121°31'06"W, 13 Jun 1997, *G. Clifton 35529* (holotype, JEPS; isotypes, CAS, CHSC, MO!, NY!, PUA, RSA).

**Herbs**, perennial, short lived, glabrous throughout except for sepals and sometimes petioles, glaucous; caudex simple or few branched. **Stems** 2.2–12(–15) dm, few branched. **Basal leaves** rosulate in juvenile plants, with glabrous or rarely ciliate petioles, obovate to spatulate, 3.5–10 cm; middle cauline leaves broadly oblong to ovate or suborbicular, 2.5–10 x 1–3.5 cm, sessile, amplexicaul, entire, not overlapping; upper leaves smaller in size, reduced. **Racemes** ebracteate, lax, without a terminal cluster of sterile flowers; fruiting pedicels divaricate-ascending, straight, 5–10 mm. **Flowers:** sepals forming subcampanulate calyx, yellow greenish proximally, purple distally, oblong, 6–8 mm, not keeled, with a subapical tuft of hairs; petals with yellow-green claws and purple to brownish blades, 8–12 mm; blade not crisped, 1–3 x 0.5–0.8 mm; claw 6–10 mm, wider than blade; filaments in 3 pairs of unequal length, free; adaxial pair 7–10 mm; abaxial pair 6–8 mm; lateral pair 4–6 mm; anthers of all stamens fertile, 3.5–5 mm. **Fruits** 5–13(–15) cm x 2–2.5 mm, arcuate, descending, flattened, not or only slightly torulose; valves glabrous, with distinct midvein; gynophore 0.3–1 mm; replum straight; style 1.5–3.5 mm; stigma entire; ovules and seeds 50–82 per fruit. **Seeds** oblong, 2.2–3 x 1.4–1.8 mm; wing continuous, 0.1–0.4 mm wide.

Flowering: May–July.

Habitat: openings in pine forests, oak woodland.

Elevation: 400–1700 m.

Distribution: United States (California/Butte, Shasta, and Tehama counties).

**25. *Streptanthus maculatus*** Nuttall, J. Acad. Nat. Sci. Philadelphia 5: 134. 1825; *Erysimum maculatum* (Nuttall) Kuntze, Revis. Gen. Pl. 1: 933. 1891. TYPE: U.S.A. Arkansas: near banks of the Kiamesha of Red River, *Thomas Nuttall s.n.* (holotype, BM!).

*S. obtusifolius* W. J. Hooker, Bot. Mag. t. 3317. 1834; *Streptanthus maculatus* subsp. *obtusifolius* (W. J. Hooker) Rollins, Cruciferae Continental N. Amer. 843. 1993. TYPE: no specimens at K, and the excellent plate above serves as the type.

**Herbs**, annual, glabrous throughout except sometimes for stem base, glaucous. **Stems** 1.7–10.6 dm, erect, simple or branched above, glabrous or puberulent near base with simple trichomes 0.05–0.5 mm. **Basal leaves** petiolate, soon withered; middle cauline leaves broadly ovate to broadly oblong or lanceolate, 2–15 x 1–8 cm, acute to acuminate or rounded at apex, entire, sessile, amplexicaul; upper leaves similar, smaller. **Racemes** ebracteate, dense or lax, without a terminal cluster of sterile flowers; fruiting pedicels divaricate-ascending, straight, 4–7 mm. **Flowers**: sepals forming campanulate calyx, erect, purplish, outer pair without or rarely with a subapical callus 0.1–0.3 mm, not keeled; petals magenta with deep purple center, 11–21 mm; blade widely spreading to somewhat reflexed, not crisped, 6–12 x 5–11 mm; claw 5–10 mm, narrower than blade; stamens tetradynamous; median filament pairs free, 5–7 mm; lateral pair 3–5 mm; anthers of all stamens fertile, 3–4 mm. **Fruits** 6–11.4 cm x 2–3 mm, ascending, straight, not torulose; valves glabrous, with a prominent midvein; gynophore 0.7–1.5 mm; replum straight; style 1–2.5 mm; stigma strongly 2-lobed; ovules and seeds 56–92 per fruit. **Seeds** broadly oblong, 2–2.5 x 1–1.3 mm; wing continuous, 0.2–0.3 mm wide.

Flowering: Apr–May.

Habitat: near creeks, roadside banks, moist bottoms, open oak woods, moist land in woods, rocky bluffs, ledges, dry talus slopes, rock crevices, pine-hickory forests.

Elevation: 200–500 m.

Distribution: United States (Arkansas, Oklahoma, Texas).

**26. *Streptanthus morrisonii*** F. W. Hoffman, Madroño 11: 225. 1952. TYPE: United States, California, Sonoma Co., serpentine outcrop, headwaters of Big Austin Creek at Layton Chromite Mine, 26 Sep 1946, *Freed W. Hoffman 1020* (holotype, UC!).

*S. morrisonii* subsp. *elatus* F. W. Hoffman, TYPE: United States, California, Napa-Lake Co. line, serpentine outcrop on low saddle ¼ mi W of White's Point, Table Mt. rd., ca. 5 mi. E of Mountain Mill House, 3 May 1947, *Arthur R. Kruckeberg 1438* (UC!).

*S. morrisonii* subsp. *hirtiflorus* F. W. Hoffman, TYPE: United States, California, Sonoma Co., headwaters of East Austin Creek, a short distance above Dorr's Cabin, 16 Jun 1948, *Freed W. Hoffman 2344* (holotype, UC!; isotypes, 2GH!, NY!).

*S. morrisonii* subsp. *kruckebergii* R. Dolan & LaPré, Madroño 36: 39. 1989. TYPE: United States, California, Lake Co., Dunnigan Hill in Knoxville Recreation Area, T11N, R5W, Sec. 11, 8 Jun 1985, *Lawrence LaPré s.n.* (holotype, UC!; isotypes, CAS!, RSA!, UC!).

**Herbs**, biennial, glaucous, glabrous throughout except sometimes for sepals. **Stems** (2.5–)6.5–12(–15) dm, simple, often paniculately branched above. **Basal leaves** rosulate, fleshy, gray-green, often mottled above and purplish abaxially, petiolate, oblanceolate to broadly obovate or orbicular, 1–7 cm, dentate or repand; middle cauline leaves broadly ovate to narrowly lanceolate, 0.7–5 x 0.2–4 cm, sessile, auriculate to amplexicaul, entire; upper leaves much smaller. **Racemes** ebracteate, lax, secund, without a terminal cluster of sterile flowers; fruiting pedicels divaricate to ascending, straight 1–3(–4) mm. **Flowers**: sepals forming suburceolate

calyx, pale yellow to violet, ovate-lanceolate, 5–8 mm, keeled, glabrous or sparsely to densely hirsute with trichomes to 1.3 mm, usually recurved at apex; petals barely exerted, creamy white with brownish purple veins, 7–10 mm; blade 2–3 x 1–2 mm, channeled, not crisped; claw 5–7 mm, about as wide as blade; filaments in 3 pairs of unequal length; adaxial pair united to apex, 7–9 mm; abaxial pair united along proximal half, 4–6 mm; lateral pair 2–4 mm; anthers of adaxial stamens sterile, 0.6–1 mm; anthers of abaxial and lateral stamens fertile, 2–3 mm. **Fruits** 2.5–8 cm x 1.5–2 mm, suberect to divaricate, straight or sometimes slightly curved, flattened, strongly torulose; valves glabrous, with a distinct midvein; gynophore 0.1–1 mm; replum constricted between seeds; style 0.1–0.2 mm; stigma entire; ovules and seeds 24–38 per fruit. **Seeds** oblong, 1.5–2 x 0.9–1.3 mm; wing absent or distal, 0.05–0.1 mm wide.  $2n = 28$ .

Flowering: May–Sep.

Habitat: ridges, serpentine barrens and openings in serpentine chaparral, cypress-knob cone pine woodlands.

Elevation: 150–1100 m.

Distribution: United States (California).

**27. *Streptanthus oblanceolatus*** T. W. Nelson & J. P. Nelson, *Madroño* 55: xxx. 2009. TYPE: U.S.A. California: Trinity Co., T5N, R6E, Sec. 3, 418 m, steep bluff along State Route 299, 100 m E of Shasta-Trinity Natl. Forest, ca. 1 mile W of Burnt Ranch, 2 Jun 2004, *Thomas W. Nelson & Jane P. Nelson 9217* (holotype, HSC; isotype, MO!, CAS).

**Herbs**, biennial, glabrous throughout, glaucous. **Stems** 5–10 dm, woody at base, virgately branched above. **Basal leaves** rosulate, petiolate, oblanceolate, 3.5–7 cm, coarsely dentate distally; middle cauline leaves, linear-lanceolate, 2–10 cm, sessile, auriculate, entire; upper leaves much reduced. **Racemes** bracteate below or between lowermost 1 or 2 flowers, lax, without a terminal cluster of sterile flowers; fruiting pedicles ascending, strongly expanded at receptacle, 3–6 mm. **Flowers**: sepals yellow, slightly keeled, 8–9 mm, acuminate and recurved at apex; petals yellowish, 12–16 mm, recurved at apex, adaxial pair slightly longer; blade 3–5 mm, not crisped; claw 7–9 mm, wider than blade; filaments in 3 pairs of unequal length; adaxial pair 13–16 mm, united to above middle; abaxial pair 9–11 mm, free; lateral pair 7–9 mm; anthers of adaxial stamens sterile, ca. 1 mm; anthers of abaxial and lateral stamens fertile, 3–3.5 mm. **Fruits** 4–8 x 1.5–2 mm, divaricate ascending, flattened, torulose; valves glabrous; style to 1 mm; stigma entire; ovules and seeds per fruit unknown. **Seeds** oblong, ca. 2 x 1 mm; wing distal. Flowering: Jun–Jul.

Habitat: cliffs and canyon walls in conifer forest.

Elevation: ca. 400 m.

Distribution: United States (California/Trinity Co., Box Canyon).

**28. *Streptanthus oliganthus*** Rollins, *Contr. Dudley Herb.* 3: 372. 1946. United States, California, Mono Co.: rocky slope, 2 mi. NW of Masonic, N of Masonic Peak, 8100 ft., 3 Aug 1945, *Ira L. Wiggins & Reed C. Rollins 535* (holotype, DS!; isotypes, 2GH!, NY!, UC!).

*Streptanthus cordatus* var. *exiguus* Jepson, *Fl. Calif.* 2: 29. 1936. TYPE: United States, California, Sonora Pass, 10,000 ft., 16 Jul 1863, *W. H. Brewer 1885* (holotype, UC!; isotypes, CAS!, GH!, MO!).

**Herbs**, perennial, glabrous throughout except for petioles of basal leaves, glaucous; caudex simple or few branched. **Stems** 1.5–4(–5) dm, simple or rarely few branched. **Basal leaves** rosulate, with wingless or rarely narrowly winged, setose-ciliate petioles, narrowly oblanceolate to lanceolate, 4–10 cm, entire; middle cauline leaves oblong-lanceolate, 2.5–8 x 0.5–1.6(–2.5) cm, sessile, auriculate, entire, obtuse to acute at apex, not overlapping; upper leaves smaller in size, reduced. **Racemes** ebracteate, lax, without a terminal cluster of sterile flowers; fruiting

pedicels divaricate-ascending, straight, 3–10 mm. **Flowers:** sepals forming campanulate calyx, purple, broadly oblong, 5–8 mm, not keeled, glabrous; petals maroon-purple, 9–12 mm; blade 2–4 x 0.7–1 mm, not crisped; claw purplish, 6–8 mm, wider than blade; filaments in 3 pairs of unequal length, free; adaxial pair 7–9 mm; abaxial pair 5–7 mm; lateral pair 3–5 mm; anthers 2.5–4 mm. **Fruits** 4.5–9.7(–10.5) cm x 2–2.7(–3) mm, ascending to divaricate-ascending, flattened, straight, not torulose; valves glabrous, with a distinct midvein; gynophore 0.5–1 mm; replum straight; style 0.1–1 mm; stigma entire; ovules and seeds (42–)48–60 per fruit. **Seeds** oblong, 2–2.5(–2.7) x 1.5–2 mm; wing continuous, 0.2–0.4 mm wide.

Flowering: Jun–Aug.

Habitat: dry open pinyon woodland, pine forest, rocky subalpine forests, sagebrush.

Elevation: 2000–3050 m.

Distribution: United States (California/Mono Co., Nevada).

**29. *Streptanthus petiolaris*** A. Gray, Mem. Amer. Acad. Arts 4: 7. 1849; *Arabis petiolaris* (A. Gray) A. Gray, Proc. Amer. Acad. Arts 6: 187. 1863; *Erysimum petiolare* (A. Gray) Kuntze, Revis. Gen. Pl. 2: 933. 1891. TYPE: United States, Texas, San Marcos Springs, 1847, *Charles Wright s.n.* (holotype, GH!).

*Streptanthus brazoensis* Buckley, Proc. Acad. Nat. Sci. Philadelphia 448. 1891. TYPE: United States, Texas: Fort Belknap, on the upper Brazos, May 1861, *S. B. Buckley s.n.* (holotype, PH!).

**Herbs**, annual, pilose on proximal half, glabrous distally. **Stems** 2–12 dm, simple or branched above. **Basal leaves** subrosulate, long petiolate, oblanceolate in outline, 3–21 cm, lyrate-pinnatifid, with dentate lobes, pilose; middle cauline leaves long petiolate, lyrate-pinnatifid or hastate, 2–14 x 0.5–7 cm; upper leaves linear lanceolate, petiolate, entire. Racemes ebracteate, lax, without a terminal cluster of sterile flowers; fruiting pedicels divaricate to ascending, straight or curved upwards, 7–13 mm. **Flowers:** sepals forming subcampanulate calyx, lavender, oblong, 3–4.5 mm, not keeled; petals white to lavender, 4–8 mm; blade 1.5–4 x 1.5–2 mm, not crisped; claw 2.5–4 mm, narrower than blade; stamens tetradynamous; median filament pairs free, 2.5–4 mm; lateral pair 1.5–3 mm; anthers of all stamens fertile, 0.5–1 mm. **Fruits** 4–9 cm x 3.5–5 mm, suberect to divaricate-ascending, strongly flattened, straight, slightly torulose; valves glabrous, with obscure midvein; gynophore 0.3–0.7 mm; replum straight; style 0.5–2.7 mm; stigmas slightly 2-lobed; ovules and seeds 28–50 per fruit. **Seeds** orbicular, 3.5–5 mm diam.; wings continuous, 0.8–1.4 mm wide. **2n** = 28.

Flowering: Mar–May.

Habitat: thickets, roadsides, canyons, grassy grounds, bluffs, knolls, rocky limestone prairies, juniper-oak woods.

Distribution: United States (Texas).

**30. *Streptanthus platycarpus*** A. Gray, Pl. Wright.5: 10. 1853; *Erysimum platycarpum* (A. Gray) Kuntze, Revis. Gen. Pl. 2: 933. 1891. TYPE: United States, Texas, stony hills, Valley of the Pecos, Jun 1851, *Charles Wright 844* (holotype, GH!; isotypes, GH!, MO!, NY!).

*Streptanthus sparsiflorus* Rollins, Contr. Gray Herb. 200: 190. 1970. TYPE: U.S.A. Texas: Culberson Co., S fork of McKittrick Canyon, Guadalupe Mts., 21 Jun 1964, *Donovan S. Correll & C. Hanson 29805* (holotype, GH!; isotypes, LL!, UC!).

**Herbs**, annual, glaucous, glabrous throughout except sometimes for uppermost stems and pedicels. **Stems** 1.2–10 dm, single, usually branched, glabrous or sparsely pilose distally. **Basal leaves** subrosulate, petiolate, soon withered, oblanceolate in outline, 4–20 cm, sinuate to lyrate or pinnatifid; middle cauline leaves ovate, 1.5–15 x 0.5–6 cm, sessile, auriculate to amplexicaul,

entire or sinuate-dentate; upper leaves ovate, entire, smaller. **Racemes** ebracteate or lowermost few flowers bracteate, very rarely bracteate throughout, lax, without a terminal cluster of sterile flowers; fruiting pedicels divaricate to ascending, straight, glabrous or pilose, 0.7–3.5 cm.

**Flowers:** sepals forming campanulate calyx, purple to deep maroon, lanceolate, 8–12 mm, not keeled; petals lavender or purplish lavender, 1.6–2.7 cm; blade spreading to reflexed, not crisped, 1–1.8 cm x 6–9 mm; claw crisped, 6–10 mm; filaments in 3 pairs of unequal length, free; adaxial pair 5–8 mm; abaxial pair 4–6 mm; lateral pair 3–5 mm; anthers of all stamens fertile, 4.5–6 mm. **Fruits** 4–9.5 cm x 4.5–6 mm, erect to divaricate-ascending, strongly flattened, straight, not torulose; valves glabrous, with a distinct midvein; gynophore 0.3–1 mm; replum straight; style 0.5–2 mm; stigma strongly 2-lobed; ovules and seeds 26–42 per fruit. **Seeds** orbicular to oblong-orbicular, 4.5–5 x 4–5 mm; wing continuous, 0.7–1.2 mm wide. **2n** = 28.

Flowering: Mar–Apr.

Habitat: cliff ledges, often on limestone, rocky sites, roadsides, rocky creek beds.

Elevation: 400–1200 m.

Distribution: Mexico (Coahuila), United States (Texas).

**31. *Streptanthus polygaloides*** A. Gray, Proc. Amer. Acad. Arts 1: 519. 1865; *Microsemia polygaloides* (A. Gray) Greene, Leaf. Bot. Observ. Crit. 1: 89. 1904. TYPE: United States, California, on the Tuolumne River, 11 Jun 1863, *W. H. Brewer 1615* (holotype, GH!).

**Herbs**, annual, glabrous throughout, sometimes glaucous. **Stems** (0.8–)2–8(–10) dm, simple or branched above. **Basal leaves** rosulate, petiolate, soon withered, 2–20 cm, sinuate-dentate or 1- or 2-pinnatifid with broadly linear to filiform lobes; middle cauline leaves linear, 1–10 cm x 1–3 mm, sessile, auriculate, entire; upper leaves similar, reduced. **Racemes** ebracteate, lax, without a terminal cluster of sterile flowers; fruiting pedicels strongly recurved, 2–5 mm.

**Flowers** markedly zygomorphic; sepals forming urceolate calyx, greenish yellow or purplish, 4–6 mm, not keeled; adaxial pair suborbicular to broadly ovate-cordate, 6–8 mm wide, forming a banner-like hood; abaxial sepal broadly ovate, keeled, 3–4 mm wide; lateral sepals ovate-lanceolate, 1.5–2 mm wide; petals white with brownish veins, 5–8 mm; blade crisped, channeled, 1–3 x 0.7–1.2 mm; claw 4–5 mm, wider than blade; stamens in 3 pairs of unequal length; adaxial pair united, 5–6 mm; abaxial pair free, 4–5 mm; lateral pair 3–4 mm; anthers of adaxial stamens sterile, 0.3–0.7 mm; anthers of abaxial and lateral stamens fertile, 1.5–2 mm. **Fruits** 2.4–5.6 cm x 1.2–1.7 mm, pendent, straight, flattened, not torulose; valves glabrous, with obscure or somewhat distinct midvein; gynophore 0.1–0.4 mm; replum straight; style 0.8–2 mm; stigma entire; ovules and seeds (10–)18–50 per fruit. **Seeds** oblong, 1.7–2 x 0.9–1.1 mm; wing distal, 0.2–0.3 mm wide. **2n** = 28.

Flowering: May–Jul.

Habitat: serpentine substrates in grasslands, openings chaparral, oak and pine woodlands.

Elevation: 200–1900 m.

Distribution: United States (California).

**32. *Streptanthus squamiformis*** Goodman, Rhodora 58: 354. 1957. TYPE: United States, Oklahoma, McCurtain Co., slope of pine-oak forest, Beaver's Bend State Park, 27 Apr. 1952, *George J. Goodman 5507* (holotype, OKL; GH!, NY!, UC!).

**Herbs**, annual, sparsely to densely pubescent or glabrous except for sepals. **Stems** 1.5–8.5(–11) dm, single, simple or branched above, sparsely to densely hirsute at base, glabrous distally or rarely throughout. **Basal leaves** not rosulate, petiolate, withered by flowering; middle cauline leaves ovate to oblong or lanceolate, 1–9 x 0.5–3 cm, sessile, amplexicaul, entire or rarely shallowly dentate, glabrous or pubescent along midvein abaxially; upper leaves similar, smaller, glabrous. **Racemes** ebracteate, dense to lax, without a terminal cluster of sterile flowers; fruiting

pedicels divaricate-ascending, straight, glabrous or pubescent, 5–16 mm. **Flowers:** sepals forming campanulate calyx, purplish, 4–7 mm, not keeled, hirsute with trichomes 0.7–2 mm, both pairs with subapical callosities 1–2.5 mm; petals purple with a dark purple center, 9–17(–20) mm; blade 5–10 x 5–7 mm, not crisped; claw 4–7 mm, narrower than blade; stamens tetradynamous; median filament pairs free, 5–6 mm; lateral pairs 3–4 mm; anthers of all stamens fertile, 1.5–2.8 mm. **Fruits** 6–14 x 2–3 mm, ascending to suberect, straight, flattened, not torulose; valves glabrous, with a prominent midvein; gynophore 1–1.5 mm; replum straight; style 1–1.5 mm; stigma strongly 2-lobed; ovules and seeds 54–86 per fruit. **Seeds** broadly oblong, 2–2.7 x 1–1.2 mm; wing continuous, 0.1–0.25 mm wide.

Flowering: Apr–May.

Habitat: glades, steep slopes, sandstone and soft shale in ravines or rocky openings in oak-pine-hickory forests.

Distribution: United States (Arkansas, Oklahoma).

- 33. *Streptanthus tortuosus*** Kellogg, Proc. Calif. Acad. Sci. 2: 152. 1863; *Disaccanthus tortuosus* (Kellogg) O. E. Schulz in Engler & Harms, Nat. Pflanzenfam. Ed. 2, 17B: 302. 1936; *Erysimum tortuosum* (Kellogg) Kuntze, Revis. Gen. Pl. 1: 29. 1891; *Pleiocardia tortuosa* (Kellogg) Greene, Leafl. Bot. Observ. Crit. 1: 86. 1904. TYPE: United States, California, “from the copper region of the Sierra Nevada Mountains,” *C. D. Gibbs s.n.* (holotype, xx).
- Streptanthus foliosus* Greene, Pittonia 3: 226. 1897; *Pleiocardia foliosa* (Greene) Greene, Leafl. Bot. Observ. Crit. 1: 86. 1904. TYPE: United States, California, Fresno Co., without locality, 1888, *Peckinpah s.n.* (lectotype here designated, NDG 1835!; isolectotype, NDG 1836!).
- S. orbiculatus* Greene, Fl. Francisc. 258. 1891; *Pleiocardia orbiculata* (Greene) Greene, Leafl. Bot. Observ. Crit. 1: 86. 1904; *S. tortuosus* var. *orbiculatus* (Greene) H. M. Hall, Univ. Calif. Publ. Bot. 4: 197. 1912. TYPE: U.S.A. United States, California, Mt. Diablo, *F. P. McLean s.n.* (lectotype here designated, NDG).
- S. sanhedrensis* Eastwood, Proc. Calif. Acad. Sci., ser. 4, 20: 146. 1931. TYPE: United States, California, Lake Co., trail to Mt. Sanhedrin from Dashiels, 22 May 1925, *Alice Eastwood 12928* (holotype, CAS!; isotype, GH!).
- S. suffrutescens* Greene, Erythea 1: 147. 1893; *Pleiocardia suffrutescens* (Greene) Greene, Leafl. Bot. Observ. Crit. 1: 86: 1904; *S. tortuosus* var. *suffrutescens* (Greene) Jepson, Jepson, Man. Fl. Pl. Calif. 418. 1925. TYPE: United States, California, Sonoma Co., Hood’s Peak, 30 May 1893, *F. T. Bioletti s.n.* (holotype, xxx; isotype, CAS!). In the original description, Greene cited Bioletti as the collector from the above locality, but the
- S. tortuosus* var. *flavescens* Jepson, Man. Fl. Pl. Calif. 418. 1925. TYPE: United States, California, Mulkey Meadow to Three Rivers, Coyote Pass trail, 8000 ft, 25 Jul 1900, *Willis L. Jepson 982* (holotype, JEPS!).
- S. tortuosus* var. *oblongus* Jepson, Man. Fl. Pl. Calif. 418. 1925. TYPE: United States, California, Trinity Co., Burnt Ranch, 1300 ft., 9 Jul 1922, *Joseph P. Tracy 6099* (lectotype, JEPS 2887!; isolectotype, JEPS2886!). The two sheets above were both marked in Jepson’s handwriting as type. The more complete one is designated herein as the lectotype, thus agreeing with D.W. Taylor who marked it in 1994 as the lectotype)
- S. tortuosus* var. *optatus* Jepson, Fl. Calif. 2: 31. 1936. TYPE: United States, California: Madera Co., Fresno Big Trees, 7 Aug. 1931, ca. 5700 ft, *Willis L. Jepson 15990* [as 15998 in publ.] (holotype, JEPS 2888!; isotype, JEPS 54008!).
- S. tortuosus* var. *pallidus* Jepson, Fl. Calif. 2: 30. 1936. TYPE: United States, California: Trinity Co., Junction City, 1500 ft, 31 May 1926, *Joseph P. Tracy 7534* (holotype, UC!).

**Herbs**, biennial or short-lived perennial, glabrous throughout, glaucous. **Stems** (0.5–)1.5–12(–15) dm, simple or highly branched about base and above. **Basal leaves** subsulate, petiolate, soon withered, broadly ovate, obovate or oblong, 1.5–6 cm, entire to repand or dentate above middle; middle cauline leaves oblong to obovate or suborbicular, (0.7–)1.5–6(–9) x (0.4–)1–4.5 cm, sessile, auriculate to amplexicaul; upper leaves orbicular to oblong-ovate, amplexicaul. **Racemes** bracteate below or between lowermost 1 or 2 flowers, without a terminal cluster of sterile flowers, lax to compact, secund or not; fruiting pedicels divaricate to ascending, (2–)3–12(–17) mm, expanded at receptacle. **Flowers**: sepals forming urceolate calyx, purplish, gray-green, or yellowish, keeled or not, 6–10(–13) mm, recurved at apex; petals purplish or yellowish white, usually with purple veins, (6–)8–14 mm, reflexed at apex; blade 2–5 x 1–2.5 mm, not crisped; claw 4–10 mm, as wide as or wider than blade; filaments in 3 pairs of unequal length, free; adaxial pair (5–)7–11 mm; abaxial pair (2.5–)4–7 mm; lateral pair (1.5–)3–5 mm; anthers of all stamens fertile or adaxial pair with reduced fertility and shorter, (1.5–)2.5–4.5(–6) mm. **Fruits** (3–)4–13(–16) cm x 1.5–2.5(–3) mm, arcuate-spreading to pendent, flattened, torulose or smooth; valves glabrous, with obscure or somewhat distinct midvein; gynophore 0.2–1 mm; replum straight; style 0.4–0.7 mm; stigma entire; ovules and seeds 26–76(–110) per fruit. **Seeds** broadly oblong to ovate or orbicular, 1.5–2.5 x 0.8–1.7 mm; wing continuous or on distal half, 0.1–0.5 mm wide.  $2n = 28$ .

Flowering: Apr–Sep.

Habitat: rocky open slopes, open woodlands montane forests, alpine areas.

Elevation: 200–4100 m.

Distribution: United States (California, Nevada, Oregon).

**34. *Streptanthus vernalis*** R. O'Donnell & R. Dolan, *Madroño* 52: 202. 2005. TYPE: United States, California, Lake Co., serpentine talus and gravel, less than 0.4 km NE of Three Peaks, between White Point and McGuire Peak, 610 m., 1 May 2004, *Richard O'Donnell s.n.* (holotype, JEPS!).

**Herbs**, annual, glabrous throughout. **Stems** 0.2–2 dm, simple or branched above. **Basal leaves** not rosulate, soon withered, shortly petiolate, broadly obovate to suborbicular, 1.5–4 cm, coarsely dentate, fleshy, not mottled; middle cauline leaves ovate to oblong, 5–18 x 1–7 mm, sessile, auriculate to amplexicaul, entire; upper leaves similar, much reduced. **Racemes** ebracteate, sometimes secund, lax, without a terminal cluster of sterile flowers; fruiting pedicels divaricate-ascending, straight, 1–2 mm. **Flowers**: sepals forming urceolate calyx, green, ovate-lanceolate, 5–7 mm, keeled, erect, apex recurved; petals white, 6.5–8 mm; blade 1.5–2 x ca. 1.5 mm, not crisped, without darker colored veins; claw 5–6 mm, about as wide as blade; filaments in 3 pairs of unequal length; adaxial pair completely united, usually recurved, 6–8 mm; abaxial pair united to middle, 3–4 mm; lateral pair 1.5–2.5 mm; anthers of adaxial stamens sterile, ca. 0.7 mm; anthers of abaxial and lateral stamens fertile, 1.5–2 mm. **Fruits** 3–5 cm x 1.5–2 mm, divaricate-ascending, flattened, straight, torulose; valves glabrous, with obscure midvein; gynophore 0.2–0.5 mm; replum constricted between seeds; style 0.1–0.2 mm; stigma entire; ovules and seeds 16–20 per fruit. **Seeds** oblong, 1.6–2 x 1–1.2 mm; wing distal, 0.1–0.2 mm wide.

Flowering: Mar–May.

Habitat: serpentine talus and gravel.

Elevation: ca. 600 m.

Distribution: United States (California/Lake Co.).

**35. *Streptanthus vimineus*** (Greene) Al-Shehbaz & D. W. Taylor, *Novon* 18: 281. 2008;  
*Mesoreanthus vimineus* Greene, *Leaflet Bot. Observ. Crit.* 1: 90. 1904. TYPE: United States,  
California, Lake Co., near Lakeport, common along stony hills, 9 May 1903, *C. F. Baker 3059*  
(lectotype designated by Al-Shehbaz and Taylor in Al-Shehbaz & Mayer (2008), NDG!;  
isotypes, GH!, LL!, MO!, 2NDG!).

*Mesoreanthus fallax* Greene, *Leaflet Bot. Observ. Crit.* 1: 90. 1904. TYPE: United States,  
California, Napa Co., St. Helena, Jul 1891, *E. L. Greene s.n.* (holotype, US!; isotypes, GH!,  
2NDG!).

**Herbs**, annual, glabrous throughout except sometimes for sepals, glaucous. **Stems** 1–7.5 dm,  
erect, branched above base. **Basal leaves** not rosulate, petiolate, soon withered, narrowly ovate to  
oblong, entire, 2.5–5 cm; middle cauline leaves linear to narrowly linear-lanceolate, 2–12 cm x  
1–3(–4) mm, entire, sessile, auriculate, not overlapping; upper leaves, similar, reduced. **Racemes**  
ebracteate, usually secund, lax, without a terminal cluster of sterile flowers; fruiting pedicels  
divaricate, straight, 1–3(–6) mm. **Flowers**: sepals forming urceolate calyx, greenish to purplish,  
ovate-lanceolate, 6–8 mm, keeled, recurved at apex, glabrous or rarely sparsely pubescent; petals  
white, unequal, 8–12 mm, abaxial pair with purple veins, longer than adaxial pair; blade 3–5 x 2–  
3 mm, not crisped; claw 5–7, narrower than blade; filaments in 3 pairs of unequal length; adaxial  
pair united full length, 7–11 mm, recurved; abaxial pair 4–7 mm, united to middle; lateral pair 2–  
4 mm; anthers of adaxial stamens sterile, 0.5–1.2 mm; anthers of abaxial and lateral stamens  
fertile, 2–2.7 mm. **Fruits** 3.5–6.5 cm x 1–1.2 mm, divaricate, recurved, flattened, slightly  
torulose; valves glabrous, with obscure midvein; gynophore 0.2–0.5 mm; replum straight; style  
0.1–0.3 mm; stigma entire; ovules and seeds 28–40 per fruit. **Seeds** narrowly oblong, 1–1.5 x  
0.6–0.8 mm; wing absent or distal and ca. 0.1 mm wide.

Flowering May–Jul.

Habitat: serpentine grasslands, ridges and barrens, openings in chaparral.

Elevation: 250–800 m.

Distribution: United States (California/Colusa, Lake, and Napa counties).