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CONTRIBUTIONS TOWARD A FLORA OF NEVADA

NO. 48

NYCTAGINACEAE OF NEVADA

by

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January 27, 1960

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NYCTAGINACEAE OF NEVADA

By Clyde F. Reed (*)

Contributions Toward a Flora of Nevada, No. 48

Annual or perennial herbs; stems usually with swollen nodes; leaves opposite (in ours), without stipules; flowers perfect, often subtended by bracts forming a calyx-like involucre; perianth simple, corolla-like, campanulate or funnelform; stamens single to many; pistil single with a 1-celled ovary, surrounded by the perianth-tube; fruit indehiscent, angled, ribbed or winged.

KEY TO GENERA

1. Stigma spheric or hemispheric; both cotyledons well-developed; anthocarp often with mucilaginous glands. I. Mirabileae.
2. Flowers borne on nerves of large foliaceous bracts. . 1. HERMIDIUM
2. Flowers in calyx-like involucre or subtended by bracts shorter than the inflorescence.
3. Anthocarp lenticular with the margins revolute and usually dentate. 2. ALLIONIA
3. Anthocarp not lenticular.
4. Bracts united into an involucre.
5. Anthocarp definitely angled or ribbed; involucre accrescent. 3. OXYBAPHUS
5. Anthocarp smooth or nearly so; involucre but little changed in fruit. 4. MIRABILIS

(*) Reed Herbarium, Baltimore, Maryland

4. Bracts free and distinct.

6. Free portion of perianth tubular-funnelform, not constricted above the ovary; stamens 5 or 6, adherent to the perianth-tube; flowers solitary or geminate.

5. SELINOCARPUS

6. Free portion of perianth funnelform or campanulate; stamens 1-5, exserted (or included); flowers not solitary, usually cymose, racemose or umbellate.

7. Anthocarp with 5 or fewer angles or costae, obpyramidal or clavate; free portion of perianth campanulate.

6. BOERHAAVIA

7. Anthocarp 10-costate, turbinate or biturbinate, often with a horizontal wing, eglandular; free portion of perianth funnelform. 7. ANULOCAULIS

1. Stigma linear; inner cotyledon abortive; anthocarp without mucilaginous glands; flowers capitate. II. Abronieae.

8. Wings of the anthocarp thin, transparent, extended around the body above and below it; flowers usually tetramerous; stamens 4.

8. TRIPTEROCALYX

8. Wings of the anthocarp thick, opaque, not extended around the fruit, but interrupted above and below, or the anthocarp often exalate; flowers pentamerous; stamens 5 or more. 9. ABRONIA

1. HERMIDIUM Wats., Bot. King Expl. 286. 1871.

Perennial herbs, nearly glabrous, with dichotomous stems; leaves opposite, short-petioled with broad entire blades; flowers perfect, exinvolucrate, bracteate, glomerate in head-like racemes in the axils and at the ends of the branches, each flower sessile upon a broad foliaceous bract; perianth campanulate, obscurely 5-lobed, purplish-red, corolla-like, constricted above the ovary; stamens 5-7, the filaments unequal, united at the base into a short cup and the anthers didymous; ovary globose, the style capillary and the stigma capitate; anthocarp ellipsoid, smooth, glabrous, usually 10 light-colored lines; seed with

the teste adherent to the pericarp; embryo uncinatc, enclosing the copious endosperm, the cotyledons orbicular, concave, the radicle descending, incurved.

1. HERMIDIUM ALIPES Wats., Bot. King Expl. 286. 1871; Standl., N. Amer. Fl. 21: 196. 1918. (Map 1)

Perennial herbs, 2-4 dm. tall, the stems arcuate-ascending, sparsely branched, the branches very stout, glaucous, glabrous or obscurely puberulent above; leaves orbicular-ovate to broadly oval-ovate, 4-7 cm. long and 2-5.5 cm. wide, rounded to obtuse at the base and obtuse to broadly rounded and apiculate at the apex, or the uppermost leaves acute, green, thick and succulent, with rather prominent lateral nerves, glabrous; flowers in heads of usually 6, these on peduncles 3-10 mm. long, the peduncles at first minutely puberulent but soon glabrate; bracts oblong to broadly ovate, 1.5-2.5 cm. long, subcordate or rounded at the base, rounded or obtuse at the apex and often apiculate, rarely slightly united at the base, thin, glabrous, often tinged with red; perianth 2 cm. long, the limb 1.7 cm. broad, glabrous; stamens equaling or slightly shorter than the perianth; fruit 7 mm. long, 3.5-4 mm. diam., slightly narrowed at both ends, dark-olive.

Low foothills from the Big Bend of the Truckee R. to Oreamna on the Humboldt, Nevada, TYPE loc. Watson 968 (US-23021, TYPE); W Nevada and adjacent California.

Nevada: Churchill, Esmeralda, Humboldt, Lyon, Mineral, Nye, Ormsby, Pershing and Washoe Cos.

Representative specimens: CHURCHILL CO.: Lahonton, Curtis (Reno 17679); Headley 9 (Reno 17515); near Hot Springs between Lovelock and Fernley, Lehenbauer 1555 (Reno 5036); Mt. Wells, Moon (Reno 17660); 20 mi. S Fallon, rocky soil, 4050 ft., Billings 1515 (Reno 11135); vic. Fallon, Archer 5287 (NA-99894); 13 mi. E Fallon, Indian Res., Breene 139 (NA-94740); gravelly hillside, 1 mi. W Eastgate on Rt. US 50, 5000 ft., Mills & Beach 688 (NA-290125); 25 mi. E Fallon on Rt. US 50, Reifschneider 143 (NA-302512); S Fallon on Rt. 95, Reifschneider 116 (NA-302511);

ESMERALDA CO.: desert flats, near mouth Pinchot Creek, White Mts., 6500 ft., Duran 3256 (RM-225012 & 139697; US-1601981); E Lida, M. E. Jones (US-1369136); Palmetto Range, Purpus 5862 (US-348115); HUMBOLDT CO.: along rocky gulches and on hillsides, 8-10 mi. SE Jungo, 4500 ft., Hester 1195 (NA-289530); LYON CO.: sandy soil, graze land, N Yerington, Koch, Holstein & Carlson N-10 (NA-75501); Yerington, Lehenbauer & R.E.L. 905 (Reno 5037); along Fallon highway, 3 mi. W Lahonton Dam, Goodner & Henning 70 (NA-94731); across Walker R., 2 mi. from Indian Colony at Yerington. "Indian use: root peeled, dried and ground to powder for sores. For headache, boil whole plant and wash head with it", E. V. A. Murphey 574 (NA-226301); dry sandy soil, Yerington Hills, 4400 ft., Schmidt (NES-15236); MINERAL CO.: about 12 mi. W Schurz, in the mts., 5000 ft., Murphey 32 (NA-91273); 10 mi. NW Schurz, 4400 ft., Breene 108 (NA-94725); NYE CO.: vic. Carrant, Bentley (RM-100696; US-1326002); W highway along Amargosa R., Rives & McKenzie 48 (NA-94702); desert valleys and canyons near Ione, Beach 51 (NA-278663); 5 mi. beyond Round Mt., betw. Round Mt. and Manhattan, in sandy gravel, Goodner & Henning 293 (NA-94727); E slope Toiyabe Range, mouth Ophir Canyon, 5 mi. N

Twin R., Smoky Valley, Train 2739 (NA-182963); gravelly hillsides, 3 mi. NW Penelas Mill, 16 mi. NW Ione, 5400 ft., Beach 817 (NA-290506); frequent in thin gravelly shadscale slopes, W side Lodi Valley, Maguire & Holmgren 25454 (US-1887069); 3/4 mi. N Locke's Ranch, Maguire & Holmgren 25129 (US-1886910); ORMSBY CO.: 6 mi. from Carson on road to Fallon, sandy loam, loose rock, Murphey 11 (Reno 9776); 15 mi. NE Carson on S side Carson-Fallon highway, Breene 81 (NA-94705); PERSHING CO.: Humboldt Sink, 5 mi. S Toulon on Victory highway, 4200 ft., Train 22 (NA-94726); Oreana, 4500 ft., Jones (US-298384; 855520; 1365403); Big Bend of the Truckee R. to Oreana on the Humboldt, on low foothills, Watson 968 in Bot. King Expl.; WASHOE CO.: Wadsworth, Jacobs 458 (NES-2458); Pyramid Lake Region, Frandsen & Brown (NES-7029); betw. Pyramid Lake and Winnemucca Lake, 4000 ft., P. B. Kennedy 1989 (NES-14180; RM-76262); collected by children of Nixon Indian School, 1935, "Root pulverized for sores; made into tea for colds", Murphey 290 (NA-226208); Wadsworth, "Paiutes use root in treatment for delirium; roots are boiled and used to wash the head and face; also pulverized and sprinkled on sores.", Breene & Sampson 50 (NA-226263); sandy gravel soil, 7 mi. N Wadsworth, Archer 6192 (NA-70125).

2. ALLIONIA L., Syst. Nat., ed. 10: 890. 1759 (not Standl., N. Amer. Fl. 21: 217. 1918).

Wedeliella Cockerell, Torreyia 9: 167. 1909; Standl., N. Amer. Fl.

21: 199. 1918; Wedelia Loefl. (Iter Hisp. 180, hyponym. 1759)

Reise 240. 1766 (Not Wedelia Jacq., 1760).

Prostrate annuals or perennials with dichotomous branches; flowers

perfect in axillary pedunculate clusters of 3, each subtended by a bract which encloses the fruit; perianth 4-5-lobed; stamens 4-7, exserted; stigma capitate; anthocarp coriaceous, compressed, the margins thin, entire or toothed, revolute, outer surface with 1-2 longitudinal rows of stipitate glands; embryo curved, the broad cotyledons enclosing the endosperm. Represented with us by a single species.

1. *ALLIONIA INCARNATA* L., Syst. Nat., ed. 10: 890. 1759. (Map 2)

Wedelia incarnata (L.) Kuntze, Rev. Gen. Pl. 533. 1891; Wedeliella incarnata (L.) Cockerell, Torreya 9: 167. 1909; Standl., N. Amer. Fl. 21: 200. 1918; Wedeliella incarnata var. nudata Cockerell, Torreya 9: 167. 1909; Wedelia incarnata subsp. nudata Standl., Contr. U. S. Nat. Herb. 12: 334. 1909.

Perennial from a woody root; stems numerous, 2-10 dm. tall, slender or stout, much-branched, densely viscid-villous or glandular-puberulent, rarely glabrate, often tinged with red, the internodes short or usually elongated; leaves of a pair subequal, the petioles 0.3-2.2 cm. long, the blades broadly deltoid-orbicular to oval, oval-ovate, oblong or ovate, 1-6 cm. long, 0.6-4.5 cm. wide, subcordate or rounded at the base and unequal, rounded at the apex, entire or sinuate, often crispate, thick and somewhat fleshy, yellow-green above, glaucous or at least paler beneath, glandular-puberulent or viscid-villous, at least when young, frequently scabrous on the upper surface, becoming glabrate in age; involucre numerous, on slender peduncles 5 cm. long or shorter, the lobes obovate-orbicular, 5-8 mm. long, rounded or obtuse at the apex, densely viscid-villous; perianth 7-15 mm. long, purplish-red or rarely

white, viscid-villous or puberulent outside; fruit 3-4.5 mm. long, pale-brown to olive, the inner side 3-costate, shallowly transverse-rugose, the sides usually with 3-5 low, broad teeth, the teeth rarely more numerous and slender, the margins rarely entire, strongly incurved, the outer surface bearing 2 parallel rows of short to long stipitate glands.

Dry sandy soil. SE California and Nevada to S Utah and Colorado, southward to W Texas, Lower California and Puebla; Hispaniola; Venezuela to Argentina and Chile. April-Sept.

Nevada: Clark and Lincoln Cos.

Representative specimens: CLARK CO.: 10 mi. S Bunkerville, 1550 ft., Jones 5029n (US-253633); rocky and sandy washes, common locally, 1 mi. W end Boulder Lake, 1000 ft., LaRivers & Hancock 126 (NA-94690); gravelly soil, Covillea belt, 30 mi. SSW Las Vegas on highway 91 to Los Angeles, 2700 ft., LaRivers & Hancock 288 (NA-91272); granite mesa, 1 mi. S Nelson, Eldorado Canyon, Opal Mts., Train 1515 (NA-91269 and 154006); gravel wash, Lake Mead, Boulder Dam, 1200 ft., Train 1614 (NA-91268); Corn Creek, Desert Game Range, S. G. Jewett 185 (NA-95167); E Indian Springs, roadside, Covillea belt, 940 ft., Clokey & Bean 7080 (US-1696900 and RM-152663); disturbed soil and wash, Old Kyle Canyon Fan, 1250 m., Clokey 7918 (RM-181843; US-1785450; NA-91478); in washes, Mesquite Well, L. N. Goodding 2255 (RM-64925); LINCOLN CO.: Moapa, Kennedy 1110 (NES-6403 and 14974); Quartz Springs, Pintwater Range, 4500 ft., LaRivers & Hancock 641 (NA-91271); Ash Springs, Pahrangat Valley, 3750 ft., LaRivers & Hancock 723 (NA-91270); desert slopes, 3 mi. N Ash Springs on Crystal Springs Alamo Road, E side Pahrangat Valley, 3800 ft., Train 2422 (NA-91267 and 154009); Muddy Valley, 1700 ft., Kennedy & Goodding (NES-6557).

3. OXYBAPHUS L'Her., ex Willd., Sp. Pl. 1: 185. 1797.

Allionia L. in Standl., N. Amer. Fl. 21: 217. 1918; not Allionia L., Syst. Nat., ed. 10: 890. 1759.

Perennial plants, mostly herbaceous from a woody root; the branches swollen at the nodes; leaves opposite, entire, sessile or petiolate; flowers perfect, 1-3 in each involucre; involucre 5-lobed, accrescent, nearly rotate in age and strongly reticulate-veined; perianth campanulate to short-funnelform, the limb 5-lobed; stamens unequal, 3-5, slightly united at the base, conspicuously 5-angled or -ribbed, mucilaginous when wet; embryo curved; cotyledons enclosing the copious endosperm.

KEY TO SPECIES

Perianth longer than broad; leaves linear. 1. O. LINEARIS

Perianth broader than long; leaves not linear.

Fruiting involucres 7-8 mm. long; leaves obtuse. . . . 2. O. PUMILUS

Fruiting involucres 10-15 mm. long; leaves acuminate.

3. O. NYCTAGINEUS

1. OXYBAPHUS LINEARIS (Pursh) Robinson, Rhodora 10: 31. 1908. (Map 3)

Allionia linearis Pursh, Fl. Amer. Sept. 728. 1814; Standl., N. Amer. Fl. 21: 222. 1918; Mirabilis linearis (Pursh) Heimerl, Ann. Cons. Jard. Geneve 5: 186. 1901; Oxybaphus angustifolius Sweet, Hort. Brit. 1: 334. 1826.

Plants erect or decumbent, 1-12 dm. tall, the stems solitary or several, simple or branched below, the branches ascending, glaucous, often nearly white, glabrous below or puberulent, viscid-puberulent or short-villous above, the internodes short or elongate; leaves few to

many, often crowded, the blades narrowly linear or lanceolate, 3-10 cm. long, 1-5 (rarely 12) mm. wide, attenuate and sessile at the base or gradually narrowed to a short petiole, narrowed to the obtuse or acute apex, entire, thick and succulent, usually glaucous, at least beneath, glabrous, or those of the uppermost leaves viscid-puberulent; involucre slender-pedunculate, usually all axillary in young plants and with cleistogamous flowers, the plants in age developing a loosely branched cymose panicle, the branches slender, viscid-puberulent or short-villous, with mostly fulvous hairs, bearing reduced bractlike sessile leaves, linear to broadly ovate; involucre at anthesis about 4 mm. long, densely viscid-villous with fulvous hairs, the lobes ovate-orbicular or oval, rounded or acutish at the apex, the involucre in age 12-20 mm. broad, the lobes rounded, conspicuously veined; flowers usually 3 in each involucre, the perianth about 10 mm. long, sparsely pilose, pale pink to purplish-red, the limb deeply lobed, the lobes retuse; anthocarp 4.5-5 mm. long, obovoid, brownish or olivaceous, the angles smooth, the sides coarsely transverse-rugose; seed rounded-obovoid, 3 mm. long, pale yellowish-brown.

Dry soil. South Dakota to Montana, S to Arizona, Texas and W Missouri; rarely adventive eastward.

Nevada: LINCOLN CO.: Deer Lodge, Pinyon Mt., 7200 ft., Desma Hall (NA-43150). Also in Watson, Geogr. & Geol. Expl. & Surv. W of the 100th Meridian, 1871, 1872 & 1873: 15. 1874. (as O. angustifolius Sweet).

2. OXYBAPHUS PUMILUS (Standl.) Standl., Field Mus. Bot. Ser. 8: 11.

1930.

(Map 3)

Allionia pumila Standl., Contr. U. S. Nat. Herb. 12: 345. 1909; N. Amer. Fl. 21: 226. 1918; A. pachyphylla Standl., Contr. U. S. Nat. Herb. 12: 346. 1909.

Stems from a thick woody root, ascending or puberulent, 1-5 dm. long, very stout, much-branched, the branches mostly divaricate, sometimes ascending, whitish, densely pilose with short soft hairs, or rarely glabrate in age, the internodes usually elongate; petioles stout, up to 2.5 cm. long, those of the uppermost leaves usually very short, densely pilose; leaf-blades mostly deltoid or ovate-deltoid, 1.5-5 cm. long, 1.3-4 cm. wide, truncate or subcordate at the base or often abruptly short-decurrent, rounded or acute at the apex, entire or subsinuate, very thick and succulent, thick-coriaceous when dry, yellowish-green above, glaucous or glaucescent beneath, densely puberulent or short-pilose; inflorescence in young plants often wholly of axillary involucre, in mature plants a small narrow cyme, this sparsely branched, the branches stout, alternate, densely viscid-pilose, usually with numerous small broad reduced bractlike leaves; involucre few, short-peduncled, 3-flowered, at anthesis 3-4 mm. long, in age about 8 mm. long, densely viscid-pilose with short fulvous hairs, the lobes ovate-orbicular, rounded or acutish; perianth 8-10 mm. long, sparsely pilose, pale pink, the limbs about 12 mm. broad; stamens usually 3, long-exserted; fruit obovoid, 3 mm. long, brownish-olivaceous, short-pilose, the angles narrow, smooth, or rugose on their sides, the sides of the fruit rugulose; seed broadly obovoid, 2.5-3 mm. long, pale yellowish-brown.

Dry areas and hillsides. W New Mexico to Nevada and SE California.

Nevada: Clark, Lincoln, Nye and Washoe Cos.

Representative specimens: CLARK CO.: Deadman's Canyon, Hidden Forest, 7400 ft., Alexander & Kellogg 1784 (US-1826997); Charleston Park in Charleston Mts., Clokey 7077 (NA-81994); Kyle Canyon, 10 mi. E Charleston Peak, Spring Mts., LaRivers & Hancock 558 (NA-94882); Wheeler Spring, 19 mi. E Pahrump, W side Charleston Mts., Train 2046 (NA-91233); Kyle Canyon, Charleston Mts., Train 2190 (NA-91236); Deadmans Canyon, Desert Game Range, J. C. Allen 25 (NA-95085); Kyle Canyon, Clokey 8337 (NA-91596; US-1785579; RM-181572); LINCOLN CO.: limestone soil, Black Canyon, 20 mi. W Panaca, Highland Range, Train 2498 (NA-91234); limestone of mine dump, 2 mi. below Adams Spring, E side Irish Mts., 12 mi. W Pahrana-gat Valley, Train 2401 (NA-91235); Panaca area, R. D. Hermansen 209-H (NA-75485); sagebrush and scattered juniper betw. Pioche and Eagle Valley, Hall (Reno 5056); Panaca, Jones (US-1368920); Highland Peak, 9700 ft., Purpus 5905 (US-348128); NYE CO.: 5 mi. beyond Round Mt., betw. Round Mt. and Manhattan, Goodner & Henning 298 (NA-94869); WASHOE CO.: 2 mi. NW Wadsworth, Calvin McMillan & Kent H. McKnight 96 (NA-278548).

3. OXYBAPHUS NYCTAGINEUS (Michx.) Sweet, Hort. Brit. Ed. 1: 334. 1827; Abrams, Ill. Fl. Pac. States 2: 106. 1944.

Allionia nyctaginea Michx., Fl. Bor. Amer. 1: 100. 1803; Standl., N. Amer. Fl. 21: 227. 1918; Oxybaphus nyctagineus var. oblongifolius Gray, in Torr. Bot. Mex. Bound. Surv. 174. 1859.

Plants 3-6 dm. tall, ascending, glabrous or nearly so; leaves petio- late, ovate-lanceolate, 3-10 cm. long; inflorescences many-flowered,

cymose, involucre 5-6 mm. long in anthesis, 10-15 mm. in age, the lobes obtuse, short-pilose on the margin, sometimes pilose at the base; perianth reddish, 8-10 mm. long; pedicels slender; stamens exserted; fruit 5-6 mm. long, pilose, rugose.

Adventive in S California; native, Montana to Wisconsin and S to Tennessee and Mexico.

Nevada: Watson, Geogr. & Geol. Expl. & Surv. W 100th Meridian, 1871-1872 and 1873: 15. 1874.

4. MIRABILIS L., Sp. Pl. 177. 1753; Standl., N. Amer. Fl. 21: 237. 1918.

Allioniella Rydb., Bull. Torr. Cl. 29: 687. 1902; Standl., N. Amer. Fl. 21: 230. 1918; Quamoclidion Choisy in DC., Prodr. 13(2): 429. 1849; Standl., N. Amer. Fl. 21: 231. 1918; Hesperonia Standl., Contr. U. S. Nat. Herb. 12: 360. 1909; N. Amer. Fl. 21: 233. 1918.

Although Standley (l.c.: 230-237) separated the above four genera in the North American Flora, the characteristics of the four groups of species so blend as to make separation difficult. Recent treatments of this complex return the species to Mirabilis, in which most of the species were originally described. Jepson makes subgenera of these in Mirabilis (Man. Fl. Pl. Calif., 339-340. 1923).

KEY TO SPECIES

1. Involucre 3-10-flowered.
 2. Free portion of the perianth salverform, with an elongate or very short thick tube.
 3. Perianth-tube very short; involucre nearly rotate, accrescent after anthesis, 3-flowered. 1. M. OXYBAPHOIDES

3. Perianth-tube elongate; involucre campanulate, little if at all accrescent, 3-10 flowered.

4. Perianth glandular-villous outside; fruit olive and brown, with 10 light-colored vertical lines. . . . 2. *M. FROEBELII*

4. Perianth glabrous or sparsely puberulent; fruit dark brown to black, without vertical lines. 3. *M. MULTIFLORA*

2. Free portion of the perianth campanulate, scarcely exerted.

4. *M. PUDICA*

1. Involucre 1-flowered, campanulate; free portion of the perianth salverform-campanulate, the tube very short.

5. Plants glabrous throughout, or with a few appressed hairs upon the involucre. 5. *M. LAEVIS*

5. Plants conspicuously pubescent, chiefly with slender villous hairs. 6. *M. BIGELOVII*

1. *MIRABILIS OXYBAPHOIDES* (A. Gray) A. Gray in Torr., Bot. Mex. Bound.

Surv. 173. 1859.

(Map 4)

Quamoclidion oxybaphoides A. Gray, Amer. Jour. Sci. II. 15: 320.

1853; Allioniella oxybaphoides (A. Gray) Rydb., Bull. Torr. Cl. 29:

687. 1902; Standl., N. Amer. Fl. 21: 230. 1918.

Perennial herbs from a thick fleshy root, with much-branched dichotomous ascending or decumbent stems, forming dense clumps 4-12 dm. diam., the branches swollen at the nodes, slender, green or whitish, densely viscid-villous with short hairs, or rarely glabrate, the internodes elongate; leaves opposite, petiolate, the petioles slender or stout, 1-4 cm. long, viscid-villous or glabrate, the leaf-blades deltoid-cordate or deltoid, often broadly so, entire or undulate, 1.5-7 cm. long and 1.5-6 cm. wide, usually cordate at the base and broadly short-decurrent, sometimes truncate, acute to attenuate at the apex, thin, bright-green, viscid-villous or glabrate, ciliate; inflorescence cymose or axillary, the

cymes few-flowered, leafy; peduncles slender, solitary, usually longer than the involucre, viscid-villous; involucre about 5 mm. long at anthesis and 1-1.5 cm. broad in age, viscid-villous, the lobes narrowly or broadly triangular, acute or attenuate, very unequal, usually longer than the tube; perianth 7-10 mm. long, sparsely pilose or glabrate, the limb 6-8 mm. broad; fruit ellipsoid or subglobose, 2.5-3 mm. long, oliveaceous, marked with small elongate black spots or slightly elevated transverse ridges.

Dry brushy hillsides. S Colorado W to Utah and Nevada and S to Arizona and W Texas.

Nevada: CLARK CO.: S talus slopes, Little Falls, 2425 m., Clokey 5454 (RM-152665; US-1696842).

2. *MIRABILIS FROEBELII* (Behr) Greene, Bull. Calif. Acad. II. 1: 124.

1885; Abrams, Ill. Fl. Pac. States, 2: 107. 1944. (Map 5)

Oxybaphus froebelii Behr, Proc. Calif. Acad. 1: 69. 1855; Quamoclidion froebelii (Behr) Standl., Contr. U. S. Nat. Herb. 12: 359. 1909; N. Amer. Fl. 21: 232. 1918; Mirabilis multiflora var. pubescens Wats., Bot. Calif. 2: 2. 1880; Quamoclidion multiflorum subsp. obtusum Standl., Contr. U. S. Nat. Herb. 12: 359. 1909.

Perennials, stems erect or ascending, much-branched, 3-8 dm. tall, forming large clumps, densely viscid-pubescent throughout; leaves thick, 6-11 cm. long with stout petioles, broadly ovate, sometimes orbicular, mucronate or acute at the apex; involucre 5-9-flowered, somewhat accrescent with age, 2-3 cm. long, the lobes about one-third the length of the involucre; perianth rose-purple, 3.5-4.5 cm. long, expanded into a

shallowly 5-lobed limb, usually viscid-pubescent without; anthocarp 8 mm. long, slightly constricted at both ends, brown with darker spots and marked with 10 pale or dark vertical lines, smooth, glabrous.

S Nevada and Arizona to Kern Co., California, and S to Baja California.

Nevada: CLARK CO.: sandy washes, 3 1/2 mi. W Goodsprings on road to Kingston, 4400 ft., LaRivers & Hancock 309 (NA-94738); gravel wash, Turquoise Mine, Crescent Peak, 5100 ft., Train 1468 (NA-70072); 1/4 mi. N YMCA summer camp in Clark Co., Banta (Reno 14521).

2a. MIRABILIS FROEBELII var. GLABRATA (Standl.) Jepson, F. Calif. 458.

1914; Abrams, Ill. Fl. Pac. States 2: 107. 1944.

Quamoclidion froebelii var. glabratum Standl., Contr. U. S. Nat. Herb. 12: 360. 1909; Standl., N. Amer. Fl. 21: 232. 1918. (as syn. under Q. froebelii).

This variety differs from the species in being more glabrous. Except for the vertical markings on the fruits it suggests M. multiflora Torr. This seems to be the more frequent form of M. froebelii in Nevada.

Found with the species in its S and E distribution.

Nevada: CLARK CO.: flat in Kyle Canyon, Covillea Belt, 1500 m., Clokey 5455 (RM-152662; US-1696843; US-1730506; NA-93652); sandy soils of washes, Kyle Canyon, 10 mi. E Charleston Peak, Spring Mts., 5700 ft., LaRivers & Hancock 562 (NA-91232); open wash and cliff bank, junction Kyle Canyon-Harris Springs Rd., Charleston Mts., Train 1703 (NA-70118); sand bluff of wash, vic. Wilson's Ranch, Charleston Mts., Maguire 16612 (Reno 8568).

3. MIRABILIS MULTIFLORA (Torr.) A. Gray in Torr., Bot. Mex. Bound. Surv.
173. 1859. (Map 5)

Oxybaphus multiflorus Torr., Ann. Lyc. N. Y. 2: 237. 1827; Allionia multiflora (Torr.) Eaton, Man. 6th. ed: 11. 1833; Quamoclidion multiflorum Torr., in A. Gray, Amer. Jour. Sci. II. 15: 321. 1853; Standl., N. Amer. Fl. 21: 232. 1918.

Plants erect or ascending, 3-6 dm. tall, much-branched, often forming clumps (1 m. diam.), the branches usually stout, densely leafy, glaucous or glaucescent, obscurely puberulent or finely short-villous and viscid, often glabrate; petioles 0.4-3.5 cm. long; leaf-blades broadly ovate-deltoid to reniform-orbicular or ovate-oblong, 2.5-7.5 cm. long, 1.5-7.5 cm. wide, cordate or rounded at the base, broadly rounded and apiculate to very acute at the apex, thick and succulent, glaucescent, glabrous to puberulent, or short-villous and viscid or glandular-puberulent; peduncles solitary in the axils and cymosely clustered at the ends of the branches, 0.5-6 cm. long, the leaves of the inflorescence reduced, involucre campanulate, usually 6-8-flowered, 1.6-3.5 cm. long, glabrous, glandular-puberulent, or short-villous and viscid, green or tinged with red, the 5 lobes equaling or shorter than the tube, ovate-orbicular to triangular, rounded and apiculate to very acute; perianth purplish-red, 4-5.5 cm. long, glabrous or glandular-puberulent outside, the tube 4-7 mm. thick, expanding into a shallowly 5-lobed limb, 2.5-3 cm. broad; stamens equaling the perianth and usually slightly exserted; fruit elliptic-oblong, narrowed at both ends, 8-10 mm. long, dark-brown to nearly black, smooth, glabrous.

Dry sandy soil. S Utah and Colorado, S to W Texas and N Chihuahua, Mexico.

Nevada: Lincoln, Nye, Pershing and Washoe Cos.

Representative specimens: LINCOLN CO.: in Grayia spinosa area, 18 mi. E Alamo, Tidestrom 9547 (RM-92592); rocky ledges, Kiernan, Goodding 653 (RM-42138 and US-485368, TYPE specimen, ident. by Porter, 1950, as Quamoclidion multiflorum obtusum Standl.); gravelly soil, 2 mi. W Caliente, 4500 ft., Hermansen 80-H (NA-75479); NYE CO.: dry slopes in canyon betw. Old English Mine and Troy Mine, Troy Canyon, Grant Range, NE Nye Co., McVaugh 6094 (NA-166853); PERSHING CO.: 5 mi. S Toulon, Train 163 (US-1653857); WASHOE CO.: Wadsworth, Jacobs 458 (NES-15004).

4. MIRABILIS PUDICA Barneby, Leaflet. W. Bot. 3: 175-179. 1942 (subgenus Quamoclidion (Choisy) Jeps.)

Perennial herbs, much-branched from the base, pale glaucous-green or whitish on all parts, sometimes the filaments and perigonium obscurely puberulent or very smooth; branches numerous, slender, 3-5 dm. tall, ascending to erect from a woody caudex, being woody for a short distance above the base, branching alternately or subdichotomously, with pale striate ridges, enlarged at the nodes, bearing flowers above the middle; leaves opposite, conspicuously ascending (very often disposed on the twisted petiole perpendicularly), the petioles 2-5 cm. long, projected for the most part onto the internode above, narrowing gradually from the lower portion which is broadly ovate and obtuse to a narrower acute mid-portion and thence to a very acute upper lanceolate portion, the lamina flat, thick, rigid, very glaucous; involucre solitary, axillary or

terminal, 6- (rarely 5- or 7-) flowered, rotate, pendent upon its abruptly recurved peduncle about 1 cm. long, at anthesis shorter and when open, rotate-campanulate, 12-15 mm. long, 20-25 mm. broad, slightly umbilicate at the base, deeply cleft above the middle into 5 broad ovate, nearly cordate, very acute or apiculate, 1-nerved flaps, broadly accrescent on the fruit for 3 cm., passing unnoticeably at first more clearly rotate and then broadly so; the flowers subsessile, seated at the base of the receptacle-form involucre; ovary at anthesis suborbicularly 2.5 mm. long; the perigonium puberulent on both sides, 13-14 mm. long, the tube when in bloom broadly campanulate above a rounded base, about 10 mm. broad about the middle, gradually widening to about 2 cm. in width, traversed by 5 green nerves; stamens unequal, arranged above the perigonium, the filaments 12-16 mm. long, thickened for a short distance below, villous toward the middle, the anthers about 1 mm. broad, yellow; the style 17-19 mm. long, smooth; the anthocarp subsphaeroid, ovoid or ellipsoid, 5-8 mm. long, 5-7 mm. broad, angular, multistriate, coriaceous, castaneous or blackening; flowering at night.

Nevada: Clark, Lincoln and Nye Cos.

Representative specimens: CLARK CO.: alkaline flats at foot of Desert Range (in both Clark and Lincoln Cos.); also about the Pahrnagat Lakes; LINCOLN CO.: sandy playa, 3 mi. W Crystal Springs, 4200 ft., May 10, 1942, Ripley & Barneby 4403 (flor.); *ibid.* June 12, 1942, Ripley & Barneby 4974 (fruct.) (Types in Herb. Calif. Acad. Sci. Nos. 298965 and 298957); E Crystal Springs, Ripley & Barneby 3478; NYE CO.: alkaline flats near S end Spotted Range, Ripley & Barneby 3428.

5. *MIRABILIS LAEVIS* (Benth.) Curran, Proc. Calif. Acad. II. 1: 235.

1888; Abrams, Ill. Fl. Pac. States 2: 107. 1944. (Map 6)

Oxybaphus laevis Benth., Bot. Voy. Sulph. 44. 1844; Quamoclidion

laeve Rydb., Bull. Torr. Bot. Cl. 29: 687. 1902; Hesperonia laevis (Benth.) Standl., Contr. U. S. Nat. Herb. 12: 363. 1909; N. Amer. Fl.

21: 235. 1918; Mirabilis californica A. Gray in Torr., Bot. Mex.

Bound. 173. 1859; Hesperonia californica subsp. microphylla Standl.,

Contr. U. S. Nat. Herb. 12: 365. 1909; H. cedrosensis Standl., l. c.: 362. 1909.

Plants perennial, dichotomously much-branched, decumbent to erect, suffrutescent below, woody at the base, the stems many, glabrous throughout, or with a few appressed hairs present on the involucre, the branches slender, with long internodes, whitish; petioles of lower leaves almost as long as the blades, the blades of uppermost leaves sessile; leaf-blades orbicular-ovate or deltoid-ovate, 1.5-3.5 cm. long, 1-2 cm. wide, subcordate at the base, acutish or subobtusate at the apex, slightly sinuate, succulent, inconspicuously veined; peduncles very short, few; involucre 10 mm. long; the lobes about equaling the tube, ovate, acute; perianth about 15 mm. long; funnelform-campanulate, rose-purple; stamens exerted; fruit oval to elliptic-oval, dark, sometimes mottled, sometimes marked with paler vertical lines.

S and W Nevada, W to coastal California, in the Coastal Ranges and adjacent islands, Santa Lucia Mts., Monterey Co., California, S to Baja California, Mexico.

Nevada: Clark, Lyon and Washoe Cos.

Representative specimens: CLARK CO.: growing in shade in catclaw in loose fine gravel of wash, 3750 ft., 6 mi. S Henderson, Gullion 340 (RM-235638) (Labeled M. californica (Gray) Standl.); LYON CO.: sandy soil, Yerington foothills, 4300 ft., Schmidt (NES-15237); WASHOE CO.: sandy soil, 3.5 mi. S Sutcliff, 4000 ft., Robertson 230 (NA-256905).

6. MIRABILIS BIGELOVII A. Gray, Proc. Amer. Acad. 21: 413. 1886; Abrams, Ill. Fl. Pac. States 2: 106. 1944. "Desert four-o'clock or Wishbone bush."

Hesperonia bigelovii Standl., N. Amer. Fl. 21: 235. 1918; H. glutinosa subsp. gracilis Standl., Contr. U. S. Nat. Herb. 12: 365. 1909.

Plants perennial, dichotomously much-branched, suffrutescent, erect or spreading, stems many, typically stout, glandular-villous even in age; leaves 1.5-3 cm. long, suborbicular to deltoid-ovate, subcordate to rounded at the base, densely viscid-villous; flowers in clusters at the ends of the branches; involucre 5-6 mm. long, densely viscid-villous, lobes shorter than the tube, acute or rounded; perianth 7-11 mm. long, white or pink; fruit dark, ovoid, often mottled and sometimes microscopically rugulose.

KEY TO VARIETIES

Stems with glandular-villous pubescence.

Pubescence glandular-villous only, remaining so in age; flowers white or pink. 6a. var. BIGELOVII

Pubescence also scabrous; flowers usually rose-purple. 6b. var. ASPERA

Stems scabrous and retrorse-scabrous or glabrous; flowers white or pink.
6c. var. RETRORSA

6a. MIRABILIS BIGELOVII var. BIGELOVII; A. Gray, *Proc. Amer. Acad.* 21:

413. 1886.

(Map 7)

Hesperonia bigelovii Standl., *N. Amer. Fl.* 21: 235 (partim). 1918;

H. glutinosa subsp. gracilis Standl., *Contr. U. S. Nat. Herb.* 12:

365. 1909.

SW Nevada and adjacent California, S through E Mojave and Colorado Deserts to Arizona and Sonora, Mexico.

Nevada: Churchill, Clark, Esmeralda, Lincoln, Mineral and Washoe Cos.

Representative specimens: CHURCHILL CO.: Specimens secured by Indians in vic. Fallon, from annual wild flower show at Carson Indian Agency, Archer 5286 (NA-99899 and 70122); CLARK CO.: Slate Quarry, Desert Game Range, 4000 ft., Allen 114 (NA-95123); rocky slope, Hiko Spring, Newberry Mts., 1900 ft., Train 1377 (NA-91263); ESMERALDA CO.: granite sand, canyon wash, 8 mi. E Basalt, on Mt. Montgomery-Tonopah highway, 5400 ft., Train 3976 (NA-183288); LINCOLN CO.: rocky, gravelly soil, 4 mi. W Caliente, on highway 93, 4600 ft., Hermansen 217 H (NA-75516); MINERAL CO.: grazing land, E Yerington, 4500 ft., Holstein & Carlson C-44 (NA-75530); canyon floor, 4 mi. from mouth up Cory Creek, Wassuk Range, 6000-6600 ft., Archer 6881 (NA-154064 and 91261); WASHOE CO.: Pyramid Lake, Wooton (NA-195105); dry hills near Derby, 25 mi. E Reno, Gates 50-b (NA-235727); rocky slopes, 20 mi. E Reno, Archer 6227 (NA-91262 and 154007); stony roadside bank, S end Pyramid Lake, McVaugh 6126 (NA-166937); rocky exposed beach near Pyramid Island, E side Pyramid Lake, Billings 1602 (Reno 11715).

6b. MIRABILIS BIGELOVII var. ASPERA (Greene) Munz, Man. S. Calif. 151.
 1935; Abrams, Ill. Fl. Pac. States, 2: 107. 1944. (Map 7)
Mirabilis aspera Greene, Erythea 4: 67. 1896; M. californica var.
aspera (Greene) Parish, Muhlenb. 3: 125. 1907; Hesperonia aspera
 Standl., Contr. U. S. Nat. Herb. 12: 362. 1909.

Characterized by having both scabrous and glandular-villous pubescence on the stems. The flowers are usually rose-purple.

S Nevada, Mojave and Colorado Deserts, California.

Nevada: CLARK CO.: limestone washes, Tuly's Ranch, Las Vegas, Goodding 2347 (RM-65220 - originally identified as M. aspera); Hiko Wash, Newberry Mts., 2 mi. W Colorado R., 1900 ft., Train 1372 (NA-154008 and 91260).

6c. MIRABILIS BIGELOVII var. RETRORSA (Heller) Munz, Man. S. Calif. 151.
 1935; Abrams, Ill. Fl. Pac. States, 2: 107. 1944. (Map 8)
Mirabilis glutinosa Nels., Proc. Biol. Soc. Wash. 17: 92. 1904 (not M. glutinosa Kuntze, 1898); Hesperonia glutinosa Standl., Contr. U. S. Nat. Herb. 12: 365. 1909; Mirabilis retrorsa Heller, Muhlenbergia 2: 193. 1906; M. limosa Nels., Bot. Gaz. 47: 426. 1909; Hesperonia retrorsa (Heller) Standl., N. Amer. Fl. 21: 236. 1918; H. limosa var. retrorsa Standl., Muhlenbergia 5: 104. 1909.

This variety is characterized by having scabrous or retrorse-scabrous or glabrous stems. The flowers are white or pink. This is the most common variety of M. bigelovii in Nevada.

SW Utah, Nevada and W Arizona to SE California.

Nevada: Churchill, Clark, Esmeralda, Humboldt, Lincoln, Lyon, Mineral, Nye, Ormsby, Pershing and Washoe Cos.

Representative specimens: CHURCHILL CO.: Westgate Canyon, 5000 ft., Train 185 (US-1653874); CLARK CO.: Kyle Canyon, brushy flat, 2100 m., juniper belt, Clokey 7079 (RM-162554; US-1696899); 1670 m., Clokey 7508 (RM-181736; US-1785395 and NA-113812); Clark Canyon fan, desert, Larrea belt, 1200 m., Clokey & Anderson 7916 (RM-181541 and NA-91461); vic. Wilson's Ranch, Charleston Mts., Maguire & Maguire 18018 (Reno 8559); Mica Springs, Jones 5045 (US-253621); St. Thomas, Tidestrom 9085 (US-1602206); open slopes, Goodsprings, S end Spring Mts. Range, 4000 ft., Train 1932 (NA-91230); ESMERALDA CO.: among rocks, base of Montezuma Mt., W Goldfield, 2000 m., Tidestrom 9755 (RM-92577); HUMBOLDT CO.: sterile saline plains, Humboldt Co., Torrey 1865 (US-22677); LINCOLN CO.: Karshaw, Meadow Valley Wash, Goodding 967 (TYPE of M. glutinosa A. Nels.) (NES-2459); on cliffs, Pahranaagat Valley, 17 mi. S Alamo, Maguire & Maguire 4800 (RM-146144); gravel wash, road from Crystal Springs to Ash Springs, opp. Geer Ranch, Pahranaagat Valley, 3800 ft., Train 2421 (NA-94675); LYON CO.: sandy soil, Petrified Forest in Wilson Canyon betw. Smith and Mason Valleys, Lehenbauer 186 (NA-94686); common on exposed spots, 1 mi. W Dayton, Allen 89 (NA-94689); along old Yerington-Ft. Churchill Road, 13 mi. E Dayton, Goodner & Henning 27 (NA-94694); gravel sand, dry desert, 20 mi. NE Yerington, near Walker R. Indian Reserv., 14 mi. NE Peter Hendrick's Ranch, Allen 216 (NA-91231); MINERAL CO.: Hawthorne, Jones (RM-49286, M. limosa A. Nels., nov. nom. for M. glutinosa A. Nels., 1909; syn. of M. bigelovii var. retrorsa -- by C. L. Porter, 1950); 2-3 mi. from Schurz, Murphey 61

(NA-292002); same, Murphey 57 (NA-94687); NW edge Walker Lake, Maguire & Holmgren 25497 (US-1887092); S base Mt. Grant, Heller 10908 (US-766927); NYE CO.: Sarcobatus Flat, Ralston Desert, Bailey 1996 (US-22642); Rhyolite, 3575 ft., Heller 9662 (NES-11987 and US-508813); Buck Springs, 10 mi. SW Beatty, Maguire & Holmgren 25193 (US-1886941); ORMSBY CO.: specimens secured by Indians in vic. Stewart, from annual wild flower show at Carson Indian Agency, Archer 5214 (NA-99893); PERSHING CO.: Watson 963 (as Mirabilis californica Gray) (US-22638); WASHOE CO.: Truckee Pass, E Reno, Heller 8643 (US-611898); Truckee Pass, Virginia Mts., Kennedy 727 (co-type of M. glutinosus A. Nels.) (NES-14972; RM-47969); Truckee Pass, 4500 ft., Kennedy 1585 (NES-7568); Pyramid Lake, Headley 14 (NA-4153); Headley 37 (US-717896); Nugent's Place, Winnemucca Lake, Headley 43 (Reno 17608); on mt. S Truckee-Carson Project, Headley (Reno 17610); Pyramid Lake, Headley 37 (Reno 17609); gravelly soil, Peavine Hills near Reno, Hillman (NES-2457); Pyramid Lake, True 758 (NES-2462); Reno, Hillman (NES-2461); rocky hillsides, 20 mi. W Gerlach, 4800 ft., McMillan & McKnight 128 (NA-278589); sandy gravelly soil, 7 mi. N Wadsworth, Archer 6191 (NA-70189); sandy soil, 2 mi. S Nixon, Murphey 271 (NA-226305); abundant, rocky canyon slopes, 5 mi. N Sparks, W side Truckee R., 4000 ft., Train 1 (NA-94688); Virginia Mts., 6000 ft., Watson 963 (as Mirabilis californica Gray), (US-22637).

5. SELINOCARPUS Gray, Amer. Jour. Sci. II. 15: 262. 1853.

Erect or decumbent perennial herbs or low shrubs, dichotomously much-branched, pubescent; leaves opposite, those of a pair usually

unequal, petiolate, the blades thick and succulent, entire and sinuate; flowers perfect, pseudo-axillary, sessile or short-pedicellate, often cleistogamous, each subtended by 2 or 3 very narrow bracts; perianth tubular-funnelform, the tube elongate or rarely short, not constricted above the ovary, rather abruptly expanded into a broad, shallowly 5-lobed limb, the lobes plicate; stamens 5 or 6, filaments filiform, adherent to the perianth-tube; anthers didymous, usually exserted; ovary oblong, style filiform, exserted; stigma peltate, smooth, anthocarp compressed, broadly 3-5-winged, the wings hyaline, not nerved; seed with the testa adherent to the pericarp; embryo conduplicate, the cotyledons enclosing the farinaceous endosperm; radicle elongate, descending.

1. SELINOCARPUS DIFFUSUS Gray, Amer. Jour. Sci. II. 15: 262. 1853; Standl., N. Amer. Fl. 21: 198. 1918; Abrams, Ill. Fl. Pac. States 2: 102. 1944. (Map 9)
Selinocarpus diffusus subsp. nevadensis Standl., Contr. U. S. Nat. Herb. 12: 388. 1909.

Erect or decumbent plants with stout woody roots, 1-3 dm. tall, much-branched from the base and also above, the branches rather slender, covered with short appressed, inflated white hairs and very sparsely glandular-puberulent or hirtellous, very leafy; petioles slender or stout, 0.3-2.5 cm. long, often exceeding the blades; leaf-blades oval, oval-ovate to ovate-oblong, 1.2-2.5 cm. long, 0.6-1.5 cm. wide, rounded to acute at the apex, thick, fleshy, flat or crispate, when young densely covered with short appressed inflated white hairs, glandular-puberulent and scabrous, sometimes glabrate in age; flowers often all

cleistogamous, short-pedicellate, the bracts linear-subulate, 3-6 mm. long; perianth 3.5-4.5 cm. long, densely glandular-hirtellous outside, the tube very slender, the limb 1.5 cm. broad, pale greenish-yellow; stamens 5, slightly exserted; fruit 6-7 mm. long, the 5 wings 2-3 mm. long, glabrate, the body subtruncate at both ends, puberulent; seed narrowly elliptic, 4.5 mm. long, light-brown.

Dry soil, W Texas to S Utah and Nevada.

Nevada: Clark and Lincoln Cos.

Representative specimens: CLARK CO.: desert 3 mi. W Riverside, US 91, Maguire & Blood 4394 (RM-140526); Apex, station on Union Pacific R. R. along highway 91 from Las Vegas to Moapa, 2000 ft., Train 1824 (NA-91237); along US 91-93, 20 mi. NE Las Vegas, Gullion 376 (NA-302514); Overton, Bailey 1932 (TYPE of S. diffusus nevadensis Standl. - US-23012); Moapa, Kennedy 1085 (NES-7058); LINCOLN-CLARK CO.: Meadow Valley Wash, Goodding 807 (RM-65500); LINCOLN CO.: Muddy Valley, 1700 ft., Kennedy & Goodding 5 (NES-6401, 6402 and 14973).

6. BOERHAAVIA L., Sp. Pl. 3. 1753.

Perennial or annual (ours), branched, variously pubescent, the stems often with viscous areas in the internodes; leaves opposite, petiolate, those of a pair subequal, the blades entire or sinuate, flowers perfect, bracteate, cymose-paniculate (in ours); perianth corolla-like, campanulate or nearly rotate, constricted above the ovary, the limb shallowly 5-lobed; stamens 1-5, exserted or inclined; filaments unequal, capillary, connate at the base; anthers didymous; ovary stipitate; style filiform; stigma peltate; anthocarp obovoid or obpyramidal, 3-5-angulate,

rarely 3-5-winged, glabrous or pubescent, symmetric; seed with the thin testa adherent to the pericarp; embryo uncinat, the cotyledons enclosing the scanty endosperm; radicle elongate, descending.

Although this is a large genus in SW United States and Mexico, only one species has been found in Nevada.

1. BOERHAAVIA WRIGHTII A. Gray, Amer. Jour. Sci. II. 15: 322. 1853; Standl., N. Amer. Fl. 21: 211. 1918; Abrams, Ill. Fl. Pac. States, 2: 104. 1944.

B. bracteata Wats., Proc. Amer. Acad. 20: 370. 1885.

Erect annual herb, 2-6 dm. tall, much-branched, the branches slender to stout, ascending, densely puberulent below and often short-villous, densely glandular-puberulent and villous above; petioles 0.5-2 cm. long; blades ovate to narrowly oblong or lanceolate, the uppermost ones linear, 2-4.5 cm. long and 0.3-2.5 cm. wide, truncate or rounded at the base, obtuse or rounded to long-attenuate at the apex, sinuate or entire, rather thin, green above, paler beneath, brown-punctate, puberulent; inflorescence cymose-paniculate, much-branched, the branches slender, glandular-puberulent, viscid-villous or glandular-hirtellous, the flowers on pedicels about 1 mm. long, in dense or somewhat interrupted racemes, these with glabrous rachices; bracts about as long as the fruit, persistent, ovate-orbicular or ovate, abruptly acuminate or long-cuspidate, purplish, short-villous and ciliate; perianth pink, 1.5 mm. long; stamens 3 or 4, included; fruit broadly oblong, rounded at the apex, 2 mm. long and over 1 mm. thick, glabrous, usually 4-angulate, the angles broad, acute, smooth, the sulci broad, rugulose.

Dry, gravelly hillside. W Texas and Nevada, S to Sonora, Mexico.

Nevada: Wheeler's Expedition, 1872, (US-22925) cited in Standl., Contr. U. S. Nat. Herb. 12: 385. 1909; Abrams, Ill. Fl. Pac. States, 2: 104. 1944.

7. ANULOCAULIS Standl., Contr. U. S. Nat. Herb. 12: 374. 1909; N. Amer. Fl. 21: 216. 1918.

Perennial herbs, branched, the internodes usually with a viscid ring; leaves opposite, petiolate, a few borne near the base of the stem, the blades broad, coriaceous, glandular-dentate or denticulate; flowers perfect, bracteate, umbellate or in axillary glomerules or racemose, the inflorescence much-branched, the bracts small, scarious or coriaceous; perianth funnelform, the tube elongate, constricted above the ovary, the limb campanulate, 5-lobed; stamens 3 or 5, exserted; filaments unequal, filiform, connate at the base; anthers didymous; style filiform, the stigma peltate; anthocarp coriaceous, biturbinate, 10-striate, glabrous; seed with the thin testa adherent to the pericarp; embryo uncinate, the broad cotyledons enclosing the copious endosperm; radicle elongate, descending. Sometimes this genus is included in Boerhaavia.

1. ANULOCAULIS LEIOSOLENUS (Torr.) Standl., Contr. U. S. Nat. Herb. 12: 375. 1909; N. Amer. Fl. 21: 216. 1918. (Map 10)

Boerhaavia leiostenus Torr., Bot. Mex. Bound. Surv. 172. 1859;

Acleisanthes nummularia M. E. Jones, Contr. West. Bot. 10: 43. 1902;

Boerhaavia nummularia M. E. Jones, Ind. Kew. Suppl. 4: 27. 1913.

Perennial herbs, erect, 6-10 dm. tall, sparsely branched below, the branches stout, glaucous and glabrous; leaves opposite, coriaceous, 1 or 2 pairs at the base of the stem, the blades reniform to broadly oval or ovate-oval, 3-15 cm. long and 3-12 cm. broad, deeply cordate to truncate at the base, broadly rounded at the apex, yellow-green on the upper surface and when young, tomentulose, beneath glaucescent and tomentulose or villous when young but early glabrate and gland-dotted; inflorescence much-branched, the branches stout, naked, the flowers fasciculate or in dense spikes, short-pedicellate; bracts minute, ovate, coriaceous, glabrous; perianth yellow-green, 2.5-3 cm. long, glabrous, gradually dilated above into a narrow limb; stamens 5, short-exserted; fruit biturbinate, 5-6 mm. long, glaucous, in age developing at the middle a rigid, horizontal wing, 6-7 mm. diam.; seed biturbinate, 3 mm. long; pale brown.

Alkaline soil. W Texas to Arizona and Nevada.

Nevada: CLARK CO.: Muddy Creek, Purpus 6155 (US-348210, cited in Standl., Contr. U. S. Nat. Herb. 12: 375. 1909); in gypsum, road to West End Chemical Mine, 1 mi. E Gypsum Cave, 2000 ft., Train 1811 (NA-70185).

8. TRIPTEROCALYX (Torr.) Hooker, Jour. Bot. & Kew Misc. 5: 261. 1853; Standl., Contr. U. S. Nat. Herb. 12: 327. 1909; N. Amer. Fl. 21: 240. 1918.

Abronia subgen. Tripterocalyx Torr. in Frém., Rep. 92. 1843.

Succulent annual herbs, erect, decumbent or procumbent, branches more or less pubescent; leaves opposite, those of a pair unequal, long-petiolate, blades entire or slightly sinuate, elliptic-oblong to broadly

ovate; flowers perfect, capitate, the heads many-flowered, surrounded by an involucre of numerous distinct thin bracts; perianth corolla-like, tubular-funnelform, the tube slender, elongate, constricted above the ovary, the limb narrow, 4 (rarely 5)-lobed, the lobes obovate or obcordate; stamens 4 (rarely 5), with linear-oblong included anthers; ovary ovoid, the style filiform, the stigma fusiform and included; the anthocarp fusiform with 2-4 broad thin reticulate-veined vertical wings, these completely encircling the body and extended above and below it, the body coriaceous, spongy or indurate, often costate between the wings; seed with a thin testa adherent to the pericarp; one of the cotyledons broad and enclosing the farinaceous endosperm, the other obsolete; radicle slender, elongate, descending. --Standl., l.c.: 240. 1918.

KEY TO SPECIES

1. Body of the fruit between the wings transversely wrinkled or ribbed, the ribs extending into the wings. 1. T. CRUX-MALTAE
1. Body of the fruit not transversely wrinkled, but frequently with vertical ribs between the wings.
 2. Body of the fruit spongy, without vertical ribs; stems pubescent; peduncles shorter than the leaves. 2. T. MICRANTHUS
 2. Body of the fruit scarcely spongy, frequently with longitudinal ribs between the wings; stems glabrous; peduncles as long as the leaves or longer. 3. T. PEDUNCULATUS

1. TRIPTEROCALYX CRUX-MALTAE (Kellogg) Standl., Contr. U. S. Nat. Herb. 12: 328. 1909; N. Amer. Fl. 21: 241. 1918. "Sand verbenae" (Map 11)
Abronia crux-maltae Kellogg, Proc. Calif. Acad. 2: 71. 1863 (TYPE loc., Carson Valley, Washoe Co., Nev.).

Plants ascending or procumbent, much-branched, the branches stout, 1-3 dm. long, viscid-villous with very slender, long white hairs or glabrate; petioles 1-4 cm. long; leaf-blades elliptic-oblong, ovate-oblong, broadly ovate or ovate-rhombic, 2-5 cm. long, 2-3 cm. wide, acute to rounded at the base and often unequal, narrowed to an obtuse apex, bright-green, viscid-puberulent when young but soon glabrate; peduncles 1-6 cm. long; bracts ovate or lanceolate, 6-10 mm. long, attenuate or long-attenuate, densely viscid-villous; perianth 2-2.5 cm. long, densely long-villous outside or rarely only puberulent, the limb about 1 cm. broad, deeply lobed, bright purplish-pink with a green throat, the lobes deeply bilobate; fruit 1-1.5 cm. long, orbicular or broader than long, the body coarsely transverse-rugose, villous, the 2 wings thin, very coarsely reticulate-veined, the veins indurate, puberulent or villous, the margins ciliolate.

Nevada and adjacent California.

Nevada: Churchill, Elko, Esmeralda, Humboldt, Lander, Lyon, Mineral, Nye, Ormsby, Pershing and Washoe Cos.

Representative specimens: CHURCHILL CO.: Mt. Wells, Moon (Reno 17719); 40 mi. NE Fallon, Murphey 102 (NA-91259); specimen secured by Indians in vic. Fallon, from annual wild flower show at Carson Indian Agency, Archer 5280 (NA-217309); Truckee-Carson Experiment Farm, Fallon, Headley 1 (NA-4159); Fallon, Moon (Reno 17741); ELKO CO.: vic. Izzenhood Ranch, 20 mi. N Battle Mt., Hudspeth 59 (RM-186869); Battle Mt., Jones RM-167344); ESMERALDA-NYE CO.: on desert, 6-12 mi. W Tonopah, Rives & McKenzie 73 (NA-94846); HUMBOLDT CO.: along highway about 9 mi. N Winnemucca, Paradise Valley, 4350 ft., Train 108 (NA-94849 and 83744); in

sand dunes about 5 mi. N Winnemucca, Murie 2900 (NA-252049); Winnemucca Dunes, 4500 ft., Robertson 270 (NA-256906); 10 mi. N Winnemucca, 5000 ft., Pearse 248 (NA-117851); betw. Jungo and Winnemucca, Hester 1212 (NA-289523); N Winnemucca, Piemeisel 34-429 (NA-254470); LANDER CO.: 10 mi. N Battle Mt. (Holmgren, 1942, Handb. Vasc. Pl. NE Nevada, p. 68); LYON CO.: 4 mi. E intersection Appian road along Carson-Fallon highway, Goodner & Henning 77 (NA-94853 and 94774); SW Yerington, 4500 ft., Carlson N-129 (NA-75502); 16 mi. E Dayton, on highway 50, Esser 13 (Reno 14969); near Fernley, Reifschneider 158 (NA-302513); MINERAL CO.: Gillis, 1883, Shockley 349 (US-23035) (Cited in Standl., l.c.: 328. 1909); 10 mi. NE Schurz, betw. Rawhide and Schurz, Murphey 19 (NA-91257); 15 mi. N Schurz, soil almost pure sand, Murphey 79 (NA-153980); 5 mi. N Schurz, 4500 ft., Billings 1509 (Reno 11440); NYE CO.: 15 mi. W Tonopah, Maguire & Holmgren 25277 (US-1886982); ORMSBY CO.: Carson City, 1897, Jones (Cited by Standl., l.c.: 328. 1909); Empire City, 1882, Jones 4038 (US-23037; 933337; 222910 and 1100276); (Cited by Standl., l.c.: 328. 1909); 5 mi. E Carson City on Dayton Road, Moore & Franklin 80 (NA-94847); along Carson R. near Carson City, Petersen & Mrs. Baker 179 (NES-14706); PERSHING CO.: Pah Ute Mts., 5000 ft., Watson 967 (US-23034); Lovelock sand dunes, 1 mi. N Southern Pacific overhead on Victory Highway, 4000 ft., Train 50 (NA-94848); road from Imlay to Jungo, Alexander & Kellogg 4624 (US-1926688); Oreana, Jones 1903 (US-855516); WASHOE CO.: 7 mi. E Reno, Canby (Reno 5083); Spanish Springs Valley, Lehenbauer (NA-43234); 2.1 mi. NE Pyramid, 4100 ft., Simontacchi 547 (NA-77995); canyon, Virginia Hills, SE Reno, Lehenbauer (NA-43240); 2 mi. N Wadsworth, McKnight & McMillan 100 (NA-278595); Wadsworth, Hillman 1897 (NES-2441);

betw. Wadsworth & Mud Lake, Kennedy 441 (NES-2439); Wadsworth, Kennedy 871 (NES-2435 and RM-48038); Truckee R., 1 mi. W Reno, Heizer 309 (NES-2443 and 15051); 14 mi. E Reno, 4000 ft., Waltenspiel 13 (Reno 11798); Truckee Pass, Virginia Mts., Kennedy 734 (NES-2446, 2447 and RM-44947); road to Wadsworth, dry sandy hills, Lehenbauer 443 (Reno 5063); SE corner Nevada Hereford Ranch, Spanish Springs Valley, Anker 24 (Reno 11293); Chap Canyon, Lehenbauer 1560 (Reno 5072); Nixon-Wadsworth Road, Reifschneider 71 (NA-302508).

2. *TRIPTEROCALYX MICRANTHUS* (Torr.) Hook., Jour. Bot. & Kew Misc. 5: 216. 1853; Standl., Contr. U. S. Nat. Herb. 12: 328. 1909; N. Amer. Fl. 21: 241. 1918. (Map 12)

Abronia micrantha Torr. in Frém., Rep. 92. 1843; Torr. in Frém., Rep. Exped. Rocky Mt. 96. 1845.

Plants much-branched, the branches stout, 2-5 dm. long, ascending or procumbent, glaucescent, scabrous or viscid-puberulent with short stout hairs, finally glabrate; petioles 1-5 cm. long; leaf-blades lance-oblong, oblong, ovate-oblong, ovate, or rhombic-ovate, 2.5-6 cm. long, 1-3 cm. wide, broadly cuneate to truncate at the base, narrowed to an obtuse or rarely rounded apex, green above, glaucous or glaucescent beneath, scaberulous when young but soon glabrate, scaberulo-ciliolate; peduncles 1-2.5 cm. long, much shorter than the subtending leaves; bracts lanceolate or lance-ovate, 6-10 mm. long, long-attenuate, glabrous or viscid-puberulent, ciliate; perianth about 1.5 cm. long; viscid-puberulent outside, the limb 3-4 mm. broad, greenish-white; fruit 1.5-3 cm. long, usually 3-winged, retuse or rounded at the apex, the

body very thick, loosely spongiöse, coarsely rugose or nearly smooth, glabrous or obscurely puberulent, the wings thin, finely veined, scaberulo-ciliolate; seed narrowly oblong, 6-8 mm. long, obtusely 3-angulate, brown.

Sandy soil. W Kansas to North Dakota, Montana, Nevada and N New Mexico.

Nevada: LINCOLN CO.: Muddy Valley, Kennedy & Goodding 1700 (Cited in Standl., l.c.: 328. 1909) (NES-6553).

3. *TRIPTEROCALYX PEDUNCULATUS* (Jones) Standl., Contr. U. S. Nat. Herb. 12: 328. 1909; N. Amer. Fl. 21: 241. 1918. "Sandpuffs." (Map 12) Abronia micrantha var. pedunculata Jones, Proc. Calif. Acad. II. 5: 716. 1895; A. pedunculata Rydb., Bull. Torr. Bot. Cl. 29: 686. 1902.

Plants erect or decumbent, 2-3 dm. tall, much-branched, the branches stout, glabrous or minutely viscid-puberulent; petioles 1-4.5 cm. long; leaf-blades ovate-oblong, lance-oblong, or broadly ovate, 2.5-4.5 cm. long, 1.2-2.5 cm. wide, rounded to broadly cuneate at the base and unequal, obtuse or acutish at the apex, scaberulous when young but soon glabrate, green above, glaucescent beneath; peduncles 1.5-5.5 cm. long, often longer than the subtending leaves; bracts lanceolate or ovate, long-attenuate, 5-10 mm. long, glabrous, obscurely ciliolate; perianth 1.5 cm. long, glabrous outside or obscurely puberulent, the limb 4 mm. wide, greenish-white; fruit 2-2.5 cm. long, rounded or emarginate at the apex, the body 1-3-costate between each pair of wings, obscurely viscid-puberulent when young but soon glabrate, the wings thin, scaberulous on

the margins, with conspicuous slender reticulate veins; seed oblong-cylindric, 6-7 mm. long, rounded at the apex, acute at the base, brown. Standl., l.c.: 241. 1918;-"The fruit resembles that of T. wootonii and the flowers, those of T. micranthus; possibly a hybrid."

Central Utah, Nevada and NW Arizona.

Nevada: CLARK CO.: Mesquite, Burge 1559 (Reno 5084); 1 mi. W Overton, sand dunes, Train 1870 (NA-70213); valley sand, site of Lost City, 1200 ft., LaRivers & Hancock 201 (NA-70121).

9. ABRONIA Juss., (Gen. 448, hyponym. 1789) ex Lam., Tab. Encycl. 1:

469. 1791; Standl., Contr. U. S. Nat. Herb. 12: 306. 1909; N. Amer. Fl. 21: 242. 1918.

Annual or perennial herbs with branched stems, erect or prostrate, sometimes caespitose and apparently acaulescent, more or less pubescent with viscid hairs; leaves opposite, those of a pair usually unequal, petiolate, the blades succulent, entire or sinuate-lobed; flowers perfect, capitate, few or many in each head, the heads long-pedunculate, each subtended by usually 5 distinct scarious bracts; perianth funnel-form, the tube slender, elongate, constricted above the ovary, the limb 5-lobate, the perianth withering and often persistent after anthesis; stamens usually 5, with linear-oblong included anthers; ovary ovoid, the style filiform, the stigma fusiform, included; anthocarp turbinate or biturbinate, coriaceous or indurate, eglandular, deeply lobed or winged, the wings or lobes 2-5; seed adherent by the testa to the pericarp; one of the cotyledons broad, concave, enclosing the farinaceous endosperm, the other abortive, making the seed appear monocotyledonous; radicle exterior, elongate, descending.

KEY TO SPECIES

1. Fruits, at least most of them, winged.
 2. Wings of fruit 2; bracts broadly ovate or orbicular-ovate; perianth white to pink. 1. *A. POGONANTHA*
 2. Wings of fruit usually 3-5; bracts commonly lance-ovate to narrowly lanceolate; perianth-tube 10-14 mm. long, purplish-red; stem and perianth densely long-villous; body of the fruit strongly rugose-veined, the coarse veins extending into the wings.
 2. *A. VILLOSA*
1. Fruits not winged, usually deeply lobed, the lobes often compressed and winglike, but the central cavity extending quite to their edges.
 3. Plants acaulescent or nearly so, perennial, caespitose, with branched caudices; bracts oval to oblong, 3.5-7 mm. wide; leaf-blades suborbicular to oblong-elliptic, 5-14 mm. wide; perianth white. 3. *A. NANA*
 3. Plants with elongate stems, annual or perennials, never caespitose; perianth white, pink or purplish-red.
 4. Plants perennial; perianth white, or abnormally purplish-red; bracts usually large and broadly ovate or obovate, acute or acutish.
 5. Stems copiously villous or short-villous, at least above, distinctly viscid-pubescent; leaves scabrous-puberulent; bracts 1-1.5 cm. long; blades of stem-leaves elliptic to lanceolate. 4. *A. SALSA*
 5. Stems finely puberulent or glabrous.
 6. Bracts rounded or very obtuse at the apex, 10-12 mm. long, 5-7 mm. wide.
 7. Perianth 18-22 mm. long; leaf-blades usually oval to ovate-oblong, longer than wide. 5. *A. ELLIPTICA*
 7. Perianth 12-14 mm. long; leaf-blades, even those of the upper leaves, orbicular or nearly so.
 6. *A. ORBICULATA*
 6. Bracts oval to broadly ovate, usually 4-5 mm. wide; fruit turbinate, the lobes flat-topped; leaf-blades mostly oblong or ovate-oblong. 7. *A. PUMILA*
 4. Plants annuals; perianth white inside but always reddish outside; bracts small, 5-7 mm. long, obtuse to very acute.

8. Fruit deeply lobed, the lobes compressed and acute; bracts linear-lanceolate or lance-oblong, very acute or attenuate. 8. A. TURBINATA
8. Fruit shallowly lobed, the lobes with obtuse angles; bracts ovate or oval, obtuse or acutish. 9. A. EXALATA

1. ABRONIA POGONANTHA Heimerl, Bot. Jahrb. 11: 87. 1889; Standl., N. Amer. Fl. 21: 245. 1918.

Abronia angulata M. E. Jones, Contr. West. Bot. No. 8: 39. 1898.

Annual, much-branched, the branches ascending or decumbent, villous with long slender hairs and viscid-puberulent, often tinged with red; petioles 1-3.5 cm. long; leaf-blades ovate-oblong or broadly ovate, rarely orbicular-ovate or ovate-deltoid, 2.5-4.5 cm. long, 1-2 cm. wide, rounded or rarely cordate at the base, rounded or very obtuse at the apex, entire, glandular-puberulent or glabrate on the upper surface, viscid-villous along the veins beneath and on the margins, at least when young; peduncles 2-7 cm. long, viscid-villous and glandular-puberulent; bracts broadly ovate or rounded-ovate, 7-10 mm. long, acute or attenuate, scarious, viscid-villous outside, perianth about 2 cm. long, white or pink, the tube puberulent or glabrate above, usually densely long-villous below, the limb 6-8 mm. broad; fruit orbicular-obcordate, 3-6 mm. long, compressed, 2-winged, rounded or obtuse at the base, the body finely reticulate-veined, the wings thin, obscurely veined, minutely ciliolate; seed obovate, 2 mm. long, compressed, dark-brown, lustrous.

Sandy soil. S California and W Nevada.

Nevada: W borders of Nevada, Abrams, Ill. Fl. Pac. States, 2: 111. 1944.

2. *ABRONIA VILLOSA* Wats., Amer. Nat. 7: 302. 1893; Standl., Contr. U. S.

Nat. Herb. 12: 315. 1909; N. Amer. Fl. 21: 246. 1918. (Map 18)

Annual, much-branched, 1-5 dm. long, ascending, decumbent or procumbent, villous and usually very viscid, often tinged with red; leaf-blades rhombic-ovate to oval, oblong, deltoid-ovate or suborbicular, 1.3-5 cm. long, 1-2.5 cm. wide, rounded or subcordate at the base and broadly rounded to acutish at the apex, entire or sometimes undulate, viscid-puberulent or glabrate on the upper surface, usually viscid-villous beneath; petioles of leaves up to 3.5 cm. long; peduncles of flowers slender, 2-8.5 cm. long, densely to sparsely viscid-villous; bracts linear-lanceolate to ovate-lanceolate, 6-9 mm. long, attenuate, scarious, viscid-villous outside; perianth 17-20 mm. long, purplish-red, the tube densely villous throughout with short or long hairs, rarely only puberulent above, the limb about 1 cm. broad; fruit 6-8 mm. long and often broader than long, the body indurate, rugose-veined, villous above, the wings 3 or 4, or sometimes abortive, broad, thin, usually prolonged above the body, rounded to acutish above, whitish, stramineous, or tinged with red, ciliolate above; seed narrowly oblong, 2.5 mm. long, dark-brown, lustrous.

Sandy soil. Nevada to SW Arizona, S California and W Sonora, Mexico.

Nevada: Churchill, Clark and Washoe Cos.

Representative specimens: CHURCHILL CO.: Newlands Field Station, Fallon, Moon (Reno 17670); CLARK CO.: Mormon Mesa, 2100 ft., 14 mi. N Overton, Gullion 558 (NA-302503); 10 mi. S Overton on Muddy R., 1200 ft., LaRivers & Hancock 200 (NA-94854); Glendale sand dunes along highway to

Salt Lake, 8 mi. NE Moapa, 2000 ft., Train 1858 (NA-91264 and 154025); Moapa, Kennedy 1101 (NES-6555); St. Thomas, Jones 1903 (US-1368869); Goodsprings, Jones 1905 (US-369666); Nelson-LasVegas Rd., Opal Mts., Train 1558 (NA-91265); Stump Springs, 20 mi. NW Ripley, 2700 ft., LaRivers & Hancock 364 (NA-91266); dry lake bed, Boulder City-Nelson, Clokey 5835 (Reno 8707); sandy wash, Boulder City, Munz 14888 (RM-173429); Logan, Kennedy 1833 (NES-11820, US-508973); Mesquite, 2000 ft., Hermansen 275 (NA-71456); Vegas Wash, Coville & Funston 425 (US-23108); WASHOE CO.: betw. Wadsworth and Mud Lake, Kennedy 436 (NES-2445).

3. ABRONIA NANA Wats., Proc. Amer. Acad. 14: 294. 1870; Standl., Contr. U. S. Nat. Herb. 12: 317. 1909; N. Amer. Fl. 21: 249. 1918; not A. nana Coville, 1893. (Map 13)
Abronia nana var. lanciformis M. E. Jones, Contr. West. Bot. 11: 2. 1903.

Perennial from a thick woody root, the caudex sparsely branching, the branches stout, usually covered by the persistent imbricate petioles; leaves fasciculate, the petioles slender, 1-5.5 cm. long, the blades oval suborbicular, ovate or oblong-elliptic, 1-2.5 cm. long, 0.5-1.4 cm. wide, acute to rounded at the base, rounded or acutish at the apex, thick, entire, concolorous, finely short-villous or minutely hirtellous when young, usually glabrate in age; peduncles scape-like, slender, 7-15 cm. long, viscid-villous; heads many-flowered, the bracts broadly oval, oval-ovate, or oblong, 8-10 mm. long, 4-6 mm. wide, obtuse and apiculate to acutish at the apex, scarious, glandular-puberulent and

short-villous; perianth white, sometimes tinged with pink, 2-2.5 cm. long, the slender tube glandular-puberulent or short-villous, the limb 7-8 mm. broad; fruit turbinate, 7 mm. long, thin-walled, deeply lobed, truncate at the summit and puberulent, glabrous below.

SW Utah, E Nevada and NW Arizona.

Nevada: Clark, Elko and Lincoln Cos.

Representative specimens: CLARK CO.: limestone slope, Hidden Forest, head of Deadmans Canyon, Sheep Mt., (flowers pink), Train 1776 (NA-91258); Hidden Forest, Desert Game Refuge, 8400 ft., Allen 18 (NA-95143); Lee Canyon, Charleston Mts., 8300 ft., limestone, Heller 11045 (US-693768); N slope, Wire Grass Spring, Hidden Forest, Sheep Mts., 8100 ft., Alexander & Kellogg 1663 (US-1826974); ELKO CO.: 15 mi. S Wendover (Utah) in Nevada (Holmgren, 1942, A Handb. of Vasc. Pl. NE Nevada, p. 68); LINCOLN CO.: Highland Peak, Purpus 6431 (US-348333, 735043 & 769278); Mormon Mts., Kennedy & Goodding 148 (NES-6554).

3a. *ABRONIA NANA* var. *COVILLEI* (Heimerl) Munz, Man. S. Calif. 150, 598. 1935; Abrams, Ill. Fl. Pac. States 2: 110. 1944.

Abronia nana Coville, Contr. U. S. Nat. Herb. 4: 178. 1893; A. covillei Heimerl, Smithson. Misc. Coll. 52: 197. 1908; Standl., N. Amer. Fl. 21: 249. 1918.

Densely caespitose perennial from a thick woody root, the caudex much-branched, the very stout branches interlaced, 3-4 cm. long, bearing dense fascicles of leaves; petioles 1-4 cm. long, puberulent; leaf-blades ovate-rhombic, ovate, oval-oblong, oval or suborbicular, 7-16 mm. long, 5-11 mm. wide, acute to truncate at the base, rounded or very

obtuse at the apex, thick, entire, concolorous, minutely puberulent; peduncles scape-like, 1.7-10 cm. long, slender, minutely hirtellous or puberulent; heads 6-many-flowered, the 4-6 bracts lanceolate or narrowly oblong, 6-8 mm. long, 2 mm. wide, acute or attenuate, scarious, densely and finely puberulent; perianth 11 mm. long, finely puberulent, the limb about 8 mm. wide, white with a pink tube; stamens 5-7; fruit turbinate, 7-8 mm. long, puberulent above, glabrous below, obcordate with 5 thin-walled, regular, wing-like lobes.

California (Inyo Mts., Inyo Co., to San Bernardino Mts.) and adjacent ranges in Nevada.

Nevada: Cited in Abrams, Ill. Fl. Pac. States 2: 110. 1944.

4. *ABRONIA SALSA* Rydb., Bull. Torr. Cl. 29: 684. 1902; Standl., Contr. U. S. Nat. Herb. 12: 323. 1909; N. Amer. Fl. 21: 250. 1918. (Map 14)
Abronia fallax Heimerl in Rydb., Bull. Torr. Cl. 29: 684. 1902; A. fragrans var. pterocarpa M. E. Jones, Contr. West. Bot. 11: 3. 1903.

Perennial, from a somewhat elongate root; stems few to numerous, 2-5 dm. long, erect or decumbent, stout, whitish or stramineous, short-villous or puberulent below or sometimes glabrate, viscid-villous above with short hairs, the internodes elongate; petioles slender, 1-4 cm. long, viscid-puberulent or short-villous; leaf-blades oblong, oval, elliptic-oblong or oblong-ovate, rarely deltoid-ovate or suborbicular, sometimes lanceolate, 2-5.5 cm. long, 0.7-3 cm. wide, rounded to acute at the base, broadly rounded to acute at the apex, entire or subsinuate, concolorous or paler beneath, densely viscid-puberulent; peduncles slender or stout, 1.5-8 cm. long, viscid-villous; bracts broadly oval or

rounded-ovate, 10-16 mm. long, 5-12 mm. wide, acute, white, scarious, viscid-villous or puberulent; flowers numerous, the perianth 18-25 mm. long, the tube very slender, villous, greenish, the limb 5-8 mm. broad, white; fruit turbinate, 5-7 mm. long, coriaceous, whitish-stramineous, short-villous or puberulent, usually deeply 5-lobed, the lobes compressed and wing-like, finely reticulate-veined, truncate at the summit and flattened; seed narrowly obovoid, 2.5-3 mm. long, dark-brown, lustrous.

Sandy soils. Utah and E Nevada.

Nevada: LINCOLN CO.: dry sandy area, canyon floor, 2-3 mi. SW of Deer Lodge, 7000 ft., pinyon-juniper belt, Hall (Reno 5073); Ryan State Park, 4500 ft., Hermansen 107H (NA-75495).

5. *ABRONIA ELLIPTICA* Nels., Bull. Torr. Cl. 26: 7. 1899; Standl., Contr. U. S. Nat. Herb. 12: 322. 1909; N. Amer. Fl. 21: 251. 1918. (Map 15) *Abronia fragrans* var. *elliptica* (Nels.) Heimerl, in Rydb., Bull. Torr. Cl. 29: 684. 1902; Jones, Contr. U. S. Nat. Herb. 11: 3. 1903; *A. ramosa* Standl., Contr. U. S. Nat. Herb. 12: 321. 1909; *A. glabra* Rydb., Torr. Bot. Cl. 29: 685. 1902; Flora Rocky Mts., 257. 1922; *A. bakeri* Greene, Pl. Baker. 3: 32. 1901; *A. glabrifolia* Standl., Contr. U. S. Nat. Herb. 12: 321. 1909.

Perennial, often from a woody root; stems usually numerous, erect or decumbent, 1-5 dm. long, stout, much-branched, whitish or tinged with red, glabrous or finely viscid-puberulent, especially above; petioles slender, 1-4 cm. long puberulent or glabrate; leaf-blades usually oval, oval-oblong or ovate-oblong, sometimes deltoid or elliptic-ovate or those of the lowest leaves suborbicular, 1-5.5 cm. long, 0.8-3.5 cm.

wide, rounded, truncate or obtuse at the base, rounded or obtuse at the apex, succulent, entire or subsinuate, usually pale or glaucescent beneath, glabrous or puberulent; bracts broadly oval or obovate-oval, 10-12 mm. long, 5-7 mm. wide, rounded and often apiculate at the apex, scarious, white or greenish-white, glabrous or minutely puberulent; flowers very numerous, the perianth 18-22 mm. long, viscid-puberulent, the tube very slender, greenish-white or pinkish, the limb 5-8 mm. broad, white; fruit turbinate, or the outer ones biturbinate, 5-8 mm. long, subcoriaceous, puberulent or short-villous above, stramineous or olivaceous, usually deeply 5-lobed, the lobes compressed, finely reticulate-veined, rounded or truncate above and flattened at the apex; seed elliptic-oblong, 2.5-3 mm. long, brown, lustrous.

Dry clay or sandy soils. Wyoming to Nevada and S to NE Arizona and NW New Mexico.

Nevada: Elko, Eureka, Lincoln, Nye and White Pine Cos.

Representative specimens: ELKO CO.: White Horse Summit, Toand Range, 28 mi. SW Wendover on US 50, 6700 ft., Train 3842 (NA-100724); EUREKA CO.: Hoosac Canyon, 5000 ft., Train 270 (US-1653911); LINCOLN CO.: Joseco, Mathews 1554 (Reno 5064); 2-3 mi. SW Deer Lodge, Pinyon Mt., 7000 ft., Hall (NA-43151); Cave Valley, LaRivers & Hancock 794 (NA-91240); 11 mi. SSW Caliente, in Kershaw Canyon, 4200 ft., LaRivers & Hancock 682 (NA-91238); Ryan State Park, 4 mi. S Caliente, 4000 ft., Train 2455 (NA-91239); NYE CO.: 3 mi. above Trout Creek Branch, Goodner & Henning 1226 (NA-91241); sandy soil along highway betw. Manhattan & Belmont, Goodner & Henning 321 (NA-91243); 1 mi. W Manhattan, Goodner & Henning 1197 (NA-91242); WHITE PINE CO.: 1 mi. S Lehman Cave's Ranger

Station, 7000 ft., Moore & Franklin 564 (NA-94861); Baker Creek, E slope Snake Range, 6000 ft., Train 1158 (NA-91244); Baker Creek, 4 mi. W Baker, 7000 ft., Moore & Franklin 621 (NA-94873).

6. ABRONIA ORBICULATA Standl., Contr. U. S. Nat. Herb. 12: 322. 1909;
N. Amer. Fl. 21: 251. 1918. (Map 16)

Perennial; stems numerous, ascending, 1.5-3 dm. long, stout, much-branched, whitish, finely viscid-puberulent; petioles slender, 1-2.5 cm. long, viscid-puberulent; leaf-blades orbicular, rounded-oval or rounded-deltoid, 0.8-1.7 cm. long, 0.6-1.4 cm. wide, rounded or truncate at the base, broadly rounded at the apex, entire, thick and succulent, concolorous or slightly paler beneath, densely and minutely viscid-puberulent, or glabrate in age; peduncles slender, 3-5 cm. long, viscid-puberulent; bracts broadly oval, 1 cm. long, 5-7 mm. wide, rounded at the apex, scarious, whitish, minutely viscid-puberulent; flowers numerous, the perianth 12-14 mm. long, viscid-puberulent, the tube slender, the limb about 5 mm. broad, white; fruit turbinate, 5 mm. long, whitish-puberulent, green-stramineous, usually deeply 5-lobed, the lobes compressed, truncate or rounded at the apex.

Nevada: Clark and Nye Cos.

Representative specimens: CLARK CO.: Cottonwood Springs, Vegas Valley, Bailey 1886 (TYPE-US 23045); same locality, 1050 m., in Larrea belt, Clokey 7920 (NA-91477; US-1785451; RM-224549 & 181902); S Red Rocks, 1030 m., Larrea belt, Clokey 8701 (NA-280748); sand bluff, in wash, vic. Wilson's Ranch, Charleston Mts., Maguire 16611 (Reno 8566); NYE CO.: 49 mi. NE Tonopah, 2 mi. SW Warm Springs, Maguire & Holmgren 25522 (US-1887108).

7. *ABRONIA PUMILA* Rydb., Bull. Torr. Cl. 29: 683. 1902; Standl., N.

Amer. Fl. 21: 252. 1918.

(Map 16)

Abronia sparsifolia Standl., Contr. U. S. Nat. Herb. 12: 322. 1909.

Perennial from a slender woody root; stems few to numerous, ascending or decumbent, 1-4 dm. long, stout, whitish, minutely viscid-puberulent or glabrate, sparsely branched, the internodes short or elongate; petioles slender, 1-3 cm. long, puberulent or glabrate; leaf-blades ovate-oblong, ovate-orbicular to elliptic-oblong, 1.5-3.5 cm. long, 0.7-2.5 cm. wide, subcordate to obtuse at the base, rounded or obtuse at the apex, entire, thick and succulent, often glaucescent beneath, minutely puberulent or glabrate; peduncles slender, 2-5 cm. long, viscid-puberulent; bracts broadly ovate or oval, 5-10 mm. long, 4.5 mm. wide, acute or attenuate, scarious, whitish, viscid-puberulent; flowers numerous, the perianth 13-18 mm. long, viscid-puberulent, the tube slender, the limb about 5 mm. broad; fruit turbinate, about 5 mm. long, subcoriaceous, stramineous or olivaceous, finely puberulent, usually deeply 5-lobed, the lobes compressed, truncate and flat above; seed elliptic-oblong, 2.5 mm. long, brown.

Sandy soils. S Utah to SE Nevada and Arizona.

Nevada: Cited in Standl., N. Amer. Fl. 21: 253. 1918; LINCOLN CO.: Quartz Springs, Mt. Irish, Purpus 6325 (Type specimen for *A. sparsifolia* Standl., US-348270).

8. *ABRONIA TURBINATA* Torr. ex Wats., Bot. King Expl. 285. 1871; Standl.,

Contr. U. S. Nat. Herb. 12: 318. 1909; N. Amer. Fl. 21: 254. 1918;

Jepson, Man. Fl. Pl. Calif., 338. 1923. (Both this and the next

species are lacking in Rydb., Flora Rocky Mts., 1922. (Map 17)

Abronia latiuscula Greene, Leaflets Bot. Obs. 2: 105. 1910.

Annual, much-branched, the branches erect, ascending or decumbent, 1.5-5 dm. long, stout, viscid-puberulent when young, glabrate in age, often tinged with purplish-red; petioles slender, 1-4.5 cm. long; leaf-blades orbicular to ovate-orbicular or broadly oval, 1.4-3.7 cm. long, 1-3 cm. wide, broadly rounded or subcordate at the base and often unequal, broadly rounded at the apex or very obtuse, viscid-puberulent or glabrate, yellowish-green, entire, the blades of the uppermost leaves usually reduced and short-petioled but not proportionally narrower than the lower ones; peduncles slender, 2.5-9.5 cm. wide, viscid-puberulent; bracts lanceolate to linear-lanceolate, 5-7 mm. long, scarious, long-attenuate or very acute, viscid-puberulent; perianth 17-22 mm. long, viscid-villosulous or minutely viscid-puberulent outside, the limb 6 mm. broad, white, the tube pinkish; inner fruit of the head broadly turbinate, 5 mm. long and often broader, deeply lobed, the lobes compressed and winglike, acute, truncate above and short-villous; seed lance-oblong, 2 mm. long, dark-brown, lustrous.

Sandy soils. S Oregon to W Nevada and E California.

Nevada: Churchill, Esmeralda, Humboldt, Lander, Lyon, Mineral, Nye, Pershing, Storey and Washoe Cos.

Representative specimens: CHURCHILL CO.: common on open desert, 7 1/2 mi. N Fallon, Old River district near Farley Ranch, 4000 ft., Allen 280 (NA-91248); Fernley sand dunes, Carson Sink, Train 161 (US-1653856); semi-desert, 40 mi. NW Fallon, Murphey 103 (NA-91245); Fallon, Scofield 1907 (US-1725559); specimen secured by Indians, vic. Fallon,

from annual wild flower show at Carson Indian Agency, Archer 5288 (NA-217308); 26 mi. S Fallon, just N Mineral Co. line, Billings 1511 (Reno 6826); Carson Sink 4200 ft., Kennedy 1766 (NES-9624; US-498365); Fallon, Curtis 28 (Reno 17657); Moon (Reno 17693); Rawhide Road, near Hiway 95, 35 mi S Fallon, Reifschneider 73 (NA-302501); Truckee-Carson Experiment Farm, Fallon, Headley 1910 (Reno 17607); ESMERALDA CO.: Goldfield to Tonopah, Shockley 149 (NES-7905); on desert, 6-12 mi. due W Tonopah, on Esmeralda-Nye Co. line, Rives & McKenzie 72 (NA-94859); 10 mi. NW Tonopah, Alexander & Kellogg 5637 (US-2033384); HUMBOLDT CO.: Hot Spring Butte, Watson (TYPE COLLECTION-US.); Paradise Valley sand dunes, 15-16 mi. N Winnemucca, 4350 ft., Train 110 (NA-91247); 10 mi. N Winnemucca, 4500 ft., Breene 187 (NA-94862); Paradise Valley sand dunes, 4350 ft., Train, June 5, 1933, (NA-83738); Train 64 (US-1419820); LANDER CO.: dry sandy places, 10 mi. N Battle Mt. (Holmgren, 1942, Handb. Vasc. Pl. NE Nev., p. 68); LYON CO.: 20 mi. NE Yerington, near Walker River Indian Reserv., 14 mi. NE Peter Hendricks Ranch, Allen 214 (NA-91249 & 91250); 1/2 mi. W Wilson Canyon Bridge on Smith Valley and Yerington Road, very common, Lehenbauer 158 (NA-91251, "petals white"); Petrified Forest in Wilson Canyon betw. Smith and Mason Valleys, Lehenbauer 172 (NA-91246, "petals violet at top, shading to yellow at base"); sandy flat opposite Lahontan Reservoir, 1 mi. W Lahontan Dam along the highway, Goodner & Henning 51 (NA-94864); 4 mi. E intersection Appian along Carson-Fallon highway, Goodner & Henning 78 (NA-94856); 28 mi. E Carson on S side Fallon-Carson highway, Breene 50 (NA-94857); MINERAL CO.: Hawthorne, Jones 4039 (US-23081 & 222907); about 15 mi. N Schurz on way to Fallon, Murphey 76 (NA-90954); NYE CO.: along Cloverdale-Tonopah Road, S Cloverdale, Goodner & Henning

744 (NA-91252, "flowers white with pink tint"); vic. "Five Mile" along Tonopah-Ely highway, Goodner & Henning 772 (NA-90953); Lodi Valley, 2 mi. N Gabbs, Maguire & Holmgren 25493 (US-1887090 & NA-289664); PERSHING CO.: road from Imlay to Jungo, 4200 ft., Alexander & Kellogg 4620 (US-1926686); STOREY CO.: 2 mi. NNE Five Mile House, Sec. T. R., 6050 ft., Bradshaw 206 (NA-95268); WASHOE CO.: Pyramid Lake Region, Frandsen & Brown (NES-6404); Pyramid Lake, Kennedy 1016 (NES-6556; US-498364 & 560641); True 759 (NES-2449); sand hills, Pyramid Lake, Kennedy 2031 (RM-76260); Wadsworth, Archer 5529 (NA-90955); Hillman (NES-2450); 2-7 mi. N Wadsworth, Archer 6184 (NA-90933, "flowers pink in bud, white when open"; and RM-224546); common 2 mi. N Wadsworth, 4300 ft., McMillan & McKnight 105 (NA-278570); Wadsworth, near Clarks, Jones 1897 (US-358973).

9. ABRONIA EXALTA Standl., Contr. U. S. Nat. Herb. 12: 318. 1909; N.

Amer. Fl. 21: 254. 1918.

(Map 17)

Abronia turbinata Coville, Contr. U. S. Nat. Herb. 4: 178. 1893; not

A. turbinata Torr., 1871.

Annual, much-branched, the branches stout, ascending or decumbent, 2-5 dm. long, densely viscid-puberulent or rarely glabrate, sometimes tinged with purplish-red; petioles slender, 1-3 cm. long; leaf-blades orbicular to ovate-orbicular or broadly oval, 1-3.5 cm. long, 1-3.5 cm. wide, subcordate or broadly rounded at the base and often very unequal, broadly rounded to very obtuse at the apex, entire, viscid-puberulent; bracts ovate or oval, 5-7 mm. long, obtuse or acutish, scarious, viscid-puberulent; perianth 1.2-2 cm. long, viscid-puberulent or short-villous outside, the limb 5-6 mm. wide, white or nearly so, the tube pinkish;

inner fruits of the head turbinate, 3 mm. long, shallowly lobed, the lobes broad, obtuse, truncate above, short-villous; seed lance-oblong, 1.5 mm. long, dark-brown, lustrous.

This species is sometimes considered a variation of A. turbinata, having wingless or 2-winged fruits, in which the wings are sharply incurved.

Sandy soil. W and S Nevada and adjacent California.

Nevada: Clark, Mineral and Washoe Cos.

Representative specimens: CLARK CO.: Canyon station, 2656 ft., Heller 10433 (NES-12432; US-691281); MINERAL CO.: Belleville, Shockley 267 (US-23089; Standl., l.c.: 318. 1909); WASHOE CO.: 2 1/2 mi. E White Hill, 4200 ft., Hendrix 858 (NA-79516).

MAP 1

MAP 2

MAP 3

MAP 4

MAP 5

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