DESCRIPTION OF A NEW SECTION AND SUBSECTION IN *CLARKIA* (ONAGRACEAE)

In their monograph of *Clarkia*, Lewis and Lewis (1955) described two new sections in the genus, sects. *Peripetasma* and *Fibula*. In addition, they described four subsections under *C.* sect. *Peripetasma*: subsects. *Peripetasma, Lautiflorae, Micranthae,* and *Prognatae*. The type of both *C.* sect. *Peripetasma* and *C.* subsect. *Peripetasma* is *Godetia bottae* Spach [≡ *C. bottae* (Spach) Lewis & Lewis]. The type of *C.* sect. *Fibula* is *Godetia deflexa* Jepson [≡ *C. deflexa* (Jepson) Lewis & Lewis].

Raven and Parnell (1977) re-examined the type of *Godetia bottae* and concluded that it is conspecific with the type of *G. deflexa*. Because *G. bottae* has priority over *G. deflexa* (1835 versus 1907), the correct name for the taxon Lewis and Lewis (1955) treated as *Clarkia deflexa* is *Clarkia bottae*. In addition, the taxon treated as *C. bottae* by Lewis and Lewis was provided with a new name, *Clarkia lewisii* Raven & Parnell, since no other specific epithet was available.

Further nomenclatural adjustments must result from the work of Raven and Parnell (1977). Article 10.1 of the International Code of Botanical Nomenclature (ICBN) provides that "the type of a name of any subdivision of a genus is the type of a name of a species . . . for purposes of designation or citation of a type, the species name alone suffices . . . ." Thus, Raven and Parnell's investigation demonstrated that the type of *Clarkia* sect. *Peripetasma,* which is also the type of *C.* subsect. *Peripetasma,* and the type of *Clarkia* sect. *Fibula* are conspecific. Since "the application of names of taxa of the rank of family or below is determined by means of nomenclatural types . . . ." (ICBN, Art. 7.1), the description accompanying the publication of *C.* sect. *Peripetasma* and *C.* subsect. *Peripetasma* is simply in error insofar as it does not apply to the taxon including the type of *C. bottae*; *C.* sect. *Fibula* and *C.* sect. *Peripetasma* are taxonomic synonyms; and the section and subsection including *C. lewisii* are without a name.

Article 57.2 (ICBN) provides that if two taxa bearing names of equal priority are united, as we propose to unite *Clarkia* sect. *Fibula* and *C.* sect. *Peripetasma,* one of them must be chosen, and the choice must be followed by subsequent workers. In the interests of nomenclatural stability we choose *C.* sect. *Fibula* as the name for the section including the types of *C. deflexa* and *C. bottae.* In addition, we describe a new section and subsection to accommodate those taxa that Lewis and Lewis (1955) included in *C.* sect. *Peripetasma* and *C.* subsect. *Peripetasma.* A synopsis of the taxa involved is provided below.

Clarkia Pursh sect. **Fibula** Lewis & Lewis, Univ. Calif. Publ. Bot. 20: 333. 1955. TYPE: *Godetia deflexa* Jepson, Univ. Calif. Publ. Bot. 2: 332. 1907. [≡ *C. deflexa* (Jepson) Lewis & Lewis, = *C. bottae* (Spach) Lewis & Lewis]

Clarkia Pursh sect. *Peripetasma* Lewis & Lewis, Univ. Calif. Publ. Bot. 20: 313. 1955. *Clarkia* Pursh subsect. *Peripetasma* Lewis & Lewis, Univ. Calif. Publ. Bot. 20: 315. 1955. TYPE: *Godetia bottae* Spach, Nouv. Ann. Mus. Hist. Nat. 4: 393, 1835. [≡ *C. bottae* (Spach) Lewis & Lewis]

Erect herbs; stems glabrous and glaucous; rachis of the inflorescence erect; buds deflexed, becoming erect as the flowers open; floral tube obconical, 2–3 mm long, the ring of hairs at the apex; sepals remaining united and deflexed to one side at anthesis; petals fan-shaped, 1–3 cm long, flecked, the claw very short or obscure; stamens 8, in two series, the inner usually with cream-colored pollen, the outer at first divergent, the pollen blue; anthers obtuse, shorter than the filaments; filaments slender; immature capsule terete or 4-grooved.

1. **Clarkia bottae** (Spach) Lewis & Lewis, Madroño 12: 33. 1953. *Godetia bottae* Spach, Nouv. Ann. Mus. Hist. Nat. 4: 393. 1835. *Oenothera godetia* Steudel, Nomencl. Bot., 2nd edition, 2: 206. 1841, nom. illeg. TYPE: U.S.A. California: s.d., *Paolo Emilio Botta s.n.* (P; fragment, DS).

   Godetia deflexa Jepson, Univ. Calif. Publ. Bot. 2: 332. 1907. *Godetia bottae* var. *deflexa* (Jepson) Hitchcock, Bot. Gaz. (Crawfordsville) 89: 355. 1930. *Clarkia deflexa* (Jepson) Lewis & Lewis, Madroño 12: 33. 1953. TYPE: U.S.A. California: sandy plains of Los Angeles, 1854, *Lobb s.n.* (K).

2. **Clarkia jolonensis** Parnell, Madroño 20: 322. 1970. TYPE: U.S.A. California: Monterey Co., 9 mi. NW of Bradley along Jolon road, 3

June 1963, *Thorne & Everett 32186* (holotype, LA; isotype, CAS).

Clarkia Pursh sect. **Sympherica** Holsinger & Lewis, sect. nov. TYPE: *Clarkia lewisii* Raven & Parnell, Ann. Missouri Bot. Gard. 64: 642. 1977 [1978].

Herbae erectae; caulibus pubescentibus raro subglabris; inflorescentium axe in apice recurvato; calycis tubo obconico, 0.5–5 mm longo, annulo pilorum ad apicem interdum in medio ornato; calycis limbo sub anthesi connato et declinato; petalis 5–35 mm longis, oblanceolatis vel obovatis vel flabelliformis interdum bilobis, plerumque ferme purpureopunctulatis, unguiculis brevis, staminibus 8, circilis duo dissimilibus; antheris obtusis quam filamenta brevioribus, filamentis gracilibus; ovario 4- vel 8-canaliculato vel 8-costato.

Erect herbs; stems puberulent, at least above, with short upwardly curled hairs, rarely glabrate; rachis of the inflorescence recurved in bud, the buds pendulous; floral tube obconical, 0.5–5 mm long, the ring of hairs at the middle or more frequently at or near the apex; sepals remaining united and deflexed to one side at anthesis; petals 5–35 mm long, oblanceolate to obovate or fan-shaped, sometimes bilobed, usually flecked with reddish purple, the claw short or obscure; stamens 8, in two series, the inner usually with cream-colored pollen, the outer with blue pollen; anthers obtuse, shorter than the filaments; filaments slender; immature capsule 4- or 8-grooved or 8-ribbed.

The name for this section is taken from the Greek, *συμφέρων* (useful) and the adjectival suffix *-ικον* (fitness or ability), referring to the usefulness this group has had in several evolutionary studies. The results of a comparison of *Clarkia lingulata* Lewis & Lewis and *Clarkia biloba* (Durand) Nelson & Macbride using the techniques of enzyme electrophoresis (Gottlieb, 1974) were consistent with the hypothesis that *C. lingulata* is a recent derivative of *C. biloba* (Lewis & Roberts, 1956; Lewis, 1962). All of the diploid members of this section, with the exception of *C. rostrata* Davis, have two loci coding for subunits of the cytosolic isozyme of phosphoglucoisomerase (PGI) instead of only one locus, as is characteristic of most diploid plants (Gottlieb, 1982). This is also the only section in *Clarkia* in which there are differences between species in the number of loci coding for cytosolic PGI (Gottlieb & Weeden, 1979). Four of the eight diploid species in this section have only one locus coding for subunits of the cytosolic isozyme of 6-phosphogluconate dehydrogenase (6PGD), while the remainder of the diploid species in the genus have two loci coding for cytosolic 6PGD. In addition, two of the diploid species in this section have only one locus coding for subunits of the plastid 6PGD, while other species in the genus have two loci coding for plastid 6PGD (Odrzykoski & Gottlieb, 1984). Finally, a recent analysis based on restriction mapping of chloroplast DNA indicates that *Heterogaura heterandra* (Torrey) Coville and *Clarkia dudleyana* (Abrams) Macbride are more closely related to one another than either is to any other extant species (Sytsma & Gottlieb, 1986).

Clarkia Pursh subsect. **Lautiflorae** Lewis & Lewis, Univ. Calif. Publ. Bot. 20: 319. 1955. TYPE: *Oenothera biloba* Durand, J. Acad. Nat. Sci. Philadelphia, Ser. 2, 3: 87. 1855. [≡ *Clarkia biloba* (Durand) Nelson & Macbride]

Petals 10–30 mm long, lavender to pink, not differentiated into bands or zones of different color; mature stigma usually held above the stamens, the stamens maturing first; immature capsule conspicuously 8-ribbed or grooved.

3. Clarkia biloba (Durand) Nelson & Macbride, Bot. Gaz. (Crawfordsville) 65: 60. 1918. *Oenothera biloba* Durand, J. Acad. Nat. Sci. Philadelphia, Ser. 2, 3: 87. 1855. *Godetia biloba* (Durand) Watson, Bot. Calif. 1: 231. 1876. *Oenothera prismatica* var. *biloba* Léveille, Monogr. Onothera 264. 1908. LECTOTYPE: grown from seed at Louisville, Kentucky, U.S.A., 1855, *Short s.n.* (P).

3a. Clarkia biloba subsp. **australis** Lewis & Lewis, Univ. Calif. Publ. Bot. 20: 322. 1955. TYPE: U.S.A. California: Mariposa Co., Hwy. 140, Merced River, 1 mi. W of junction with the South Fork of the Merced River, 18 June 1949, *Lewis & Lewis 628* (LA).

3b. Clarkia biloba subsp. **biloba**

3c. Clarkia biloba subsp. **brandegeae** (Jepson) Lewis & Lewis, Univ. Calif. Publ. Bot. 20: 323. 1955. *Godetia dudleyana* f. *brandegeae* Jepson, Univ. Calif. Publ. Bot. 2: 334. 1907. *Godetia dudleyana* var. *brandegeae* (Jepson) Jepson, Man. Fl. Pl. Calif. 675. 1925. TYPE: U.S.A. California: Eldorado Co., Simpson Ranch, Sweetwater Creek, 29 May 1907, *Brandegee s.n.* (UC).

4. Clarkia dudleyana (Abrams) Macbride, Contr. Gray Herb. 56: 54. 1918. *Godetia dudleyana* Abrams, Fl. Los Angeles 267. 1904. TYPE: U.S.A. California: Los Angeles Co., Little Santa Anita Canyon at 2,500 ft., s.d., *Abrams 2625* (DS).

Godetia bottae var. *usitata* Jepson, Univ. Calif. Publ. Bot. 2: 332. 1907. TYPE: U.S.A. California: San Bernardino Co., s.d., *Parish 3672* (holotype, UC; isotype, GH).

5. Clarkia lingulata Lewis & Lewis, Madroño 12: 35. 1953. TYPE: U.S.A. California: Mariposa Co., Merced River, 0.2 mi. W of bridge over South Fork of the Merced River, 8 June 1947, *Lewis & Lewis 334* (LA).

6. Clarkia modesta Jepson, Man. Fl. Pl. Calif. 673. 1925. *Godetia epilobioides* var. *modesta* (Jepson) Jepson, Fl. Calif. 2: 585. 1936. *Phaeostoma modesta* (Jepson) Heller, Leafl. W. Bot. 2: 221. 1940. TYPE: U.S.A. California: Fresno Co., Waltham Creek, San Carlos (Diablo) Range, s.d., *Jepson 2690* (JEPS).

Clarkia Pursh subsect. **Micranthae** Lewis & Lewis, Univ. Calif. Publ. Bot. 20: 330. 1955. TYPE: *Oenothera epilobioides* Nuttall ex Torrey & Gray, Fl. N. Amer. 1: 511. 1840. [≡ *Clarkia epilobioides* (Nutall ex Torrey & Gray) Nelson & Macbride]

Petals white, as much as 10 mm long, not flecked; mature stigma not held above the stamens; stigma and stamens maturing more or less simultaneously; anthers adhering to the stigma and depositing pollen directly upon it; immature capsule subterete, not conspicuously ribbed.

7. Clarkia epilobioides (Nuttall ex Torrey & Gray) Nelson & Macbride, Bot. Gaz. (Crawfordsville) 65: 60. 1918. *Oenothera epilobioides* Nuttall ex Torrey & Gray, Fl. N. Amer. 1: 511. 1840. *Sphaerostigma epilobioides* (Nuttall ex Torrey & Gray) Walpers, Repert. Bot. Syst. 2: 78. 1843. *Godetia epilobioides* (Nuttall ex Torrey & Gray) Watson, Bot. Calif. 1: 231. 1876. TYPE: U.S.A. California: San Diego, s.d., *Nuttall s.n.* (NY).

Clarkia Pursh subsect. **Prognatae** Lewis & Lewis, Univ. Calif. Publ. Bot. 20: 332. 1955. TYPE: *Clarkia similis* Lewis & Ernst, Madroño 12: 89. 1953.

Petals pale pink to nearly white, flecked with purple in the lower half, not differentiated into distinct zones of color, 6–12 mm long; anthers usually free, maturing with the stigma; stigma not held above the stamens.

8. Clarkia similis Lewis & Ernst, Madroño 12: 89. 1953. TYPE: U.S.A. California: San Diego Co., 7.6 mi. W of Ramona, 22 Apr. 1951, *Lewis, Lewis, Ernst & Mathias 773* (LA).

Clarkia Pursh subsect. **Sympherica** Holsinger & Lewis, subsect. nov. TYPE: *Clarkia lewisii* Raven & Parnell, Ann. Missouri Bot. Gard. 64: 642. 1977 [1978].

Petalis 10–35 mm longis, plerumque 15 mm longioribus, duobus vel tribus coloris zonae; staminibus plerumque quam stylo brevioribus; proterandrus; ovario plerumque 4-canaliculato.

Petals 10–35 mm long, usually more than 15 mm long, differentiated into two or three zones of color; mature stigma held above the stamens, the stamens maturing first; immature capsule usually 4-grooved.

9. Clarkia cylindrica (Jepson) Lewis & Lewis, Madroño 12: 33. 1953. *Godetia bottae* var. *cylindrica* Jepson, Univ. Calif. Publ. Bot. 2: 332. 1907. *Godetia cylindrica* (Jepson) Hitchcock, Bot. Gaz. (Crawfordsville) 89: 352. 1930. TYPE: U.S.A. California: Fresno Co., Waltham Creek, near Alcade, s.d., *Jepson 2656A* (JEPS).

9a. Clarkia cylindrica subsp. **clavicarpa** Davis, Brittonia 22: 283. 1970. TYPE: U.S.A. California: Tulare Co., Exeter to Springville road, 1.5 mi. E of the County Fire Station, 6 June 1947, *Lewis & Lewis 300* [holotype, LA (the specimen on the far right); isotypes, LA, RSA].

9b. Clarkia cylindrica subsp. **cylindrica**

10. Clarkia lewisii Raven & Parnell, Ann. Missouri Bot. Gard 64: 642. 1977 [1978]. TYPE: U.S.A. California: Monterey Co., Point Lobos, along the trail to China Cove from the end of the road, 26 June 1947, *Lewis & Lewis 498* (LA).

11. Clarkia rostrata Davis, Brittonia 22: 281. 1970. TYPE: U.S.A. California: Mariposa Co., Hell Hollow, Merced River Canyon, 3.3 mi.

N of Bear Valley on California Hwy. 49, 17 May 1968, *Lewis, Bloom & James 1424* (LA).

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