SYNOPTICAL STUDY OF THE GENUS *MACROMERIA* (BORAGINACEAE)

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ABSTRACT

Macromeria, a genus of Guatemala, México, and the southwestern U.S.A., is treated as comprising eleven species, as follows: *M. alba* Nesom, endemic to Tamaulipas; *M. barbiger*a, localized endemic of southern Nuevo León and closely adjacent Tamaulipas; *M. ezserta*, widespread and common over much of western México; *M. guatemalensis*, a shrubby species endemic to southwestern Guatemala; *M. hintoniorum* B.L. Turner, *sp. nov.*, rarely encountered endemic of Guerrero and Oaxaca; *M. hispida*, relatively uncommon in Nayarit, Jalisco and Michoacán; *M. leontis*, endemic to southern Nuevo León and closely adjacent Tamaulipas; *M. longiflora*, common and widespread throughout much of southcentral México; *M. notata*, endemic to southeastern Coahuila and closely adjacent Nuevo León; *M. pringlei*, endemic but relatively common in Hidalgo and Veracruz; and *M. viridiflora*, relatively common in the more montane regions of northwestern México and closely adjacent U.S.A. (Arizona and New México), represented by var. *viridiflora* (mostly Mexican) and var. *thurberi* (confined to the U.S.A.). A key to species and complete synonymy is provided, along with distributional maps.

KEY WORDS: Boraginaceae, *Macromeria*, México, U.S.A.

Johnston (1954a, b) provided an overview of the genera belonging to the tribe Lithospermeae, to which he assigned *Macromeria* along with 22 other genera, six of these endemic to the New World (*Lasiarrhenum*, *Macromeria*, *Onomosa*, *Onosmodium*, *Perittostema*, and *Psilolaenus*), sixteen endemic to the Old World, and one (*Lithospermum*) common to both the New and Old Worlds. Johnston was a careful and perceptive researcher, especially when working with the Boraginaceae, and provided detailed keys to all the genera of the tribe (1954b) as well as a more elaborate key to the seven genera occurring in North America (1954a).

Johnston (1954a), correctly I think, reckoned *Macromeria* to be most closely related to *Onosmodium*, from which the former is readily distinguished by its much longer stamens which are clearly exerted from the corolla throat. He also provided a detailed description of *Macromeria* with complete synonymy, recognizing nine specific taxa in the group. Since his revisionary study, only two species have been added to the genus, *M. alba* Nesom by Nesom in 1989 and *M. hintoniorum* B.L. Turner in the present study, bringing to eleven the number of species recognized in *Macromeria*, all of these restricted to North America, and all but two confined to México.

Because of the new additions and many newly collected specimens of *Macromeria* that have accrued in herbaria since Johnston's work, I have felt it necessary to provide an overview of the genus as currently perceived. The present contribution is based upon the study of approximately 2204 specimens (including sheets of *Lasiarrhenum* and *Onosmodium*) from sixteen herbaria, as follows (numbers shown in parentheses): ARIZ (84), CAS (153), F (282), GH (208), KANU (183), LL (110), MEXU (98), MICH (217), MO (54), NY (185), OKLA (39), PH (40), TEX (150), UC (147), US (178), WIS (76).

KEY TO MACROMERIA SPECIES

1. Plants suffruticose shrublets mostly 1.0-1.5 m high; Guatemala. 4. *M. guatemalensis*
1. Plants herbaceous, mostly 0.5-1.0 m high (to 2 m high in *M. hintoniorum*); state of Oaxaca, México and northwards. (2)
 2. Stamens at maturity with filaments 3-5 cm long. 3. *M. exserta*
 2. Stamens at maturity with filaments 1-2 cm long. (3)
3. Corolla lobes at maturity spreading at right angles to the tube or else these sharply reflexed. (4)
3. Corolla lobes at maturity ascending to erect. (5)
 4. Anthers yellow; mouth of corolla tube abundantly glanduliferous; northeastern México. 7. *M. leontis*
 4. Anthers purple; mouth of corolla tube glabrous or nearly so, not glanduliferous; western México. 6. *M. hispida*
5. Midstem leaves mostly (3-)4-6 cm wide; stems hispidulous with stiffly spreading trichomes 2-3 mm long, not at all strigose; inner surface of corolla lobes densely glanduliferous; Nuevo León. 2. *M. barbiger*

5. Midstem leaves mostly 1-3(-4) cm wide; stems variously pubescent but not as described in the above; inner surface of corolla lobes not densely glanduliferous. (6)
 6. Corollas orange to orange-yellow; upper surfaces of leaves with minute scabridulous hairs 0.1 mm long or less, at maturity appearing glabrous. 8. *M. longiflora*
 6. Corollas yellow, pale-yellow, greenish-yellow or white; upper surfaces of leaves with well-developed, broad-based hairs 0.3-1.0 mm long. (7)
7. Anthers 3-4 mm long, the filaments attached well below the middle; underside of anther sacs with at least a few hairs near the apex. 11. *M. viridiflora*
7. Anthers 2-3 mm long, the filaments attached near the middle; underside of anther sacs glabrous throughout. (8)
 8. Stems and foliage pubescent with mostly strigose (appressed) hairs. (9)
 8. Stems and foliage pubescent with mostly pilose, widely spreading hairs. (10)
9. Corollas white; leaves sparsely strigose beneath; southern Tamaulipas. ... 1. *M. alba*
9. Corollas greenish-yellow; leaves moderately to densely strigose beneath; Hidalgo and Veracruz. 10. *M. pringlei*
 10. Stiffly erect, mostly unbranched herbs 20-50 cm high; corollas greenish-yellow; leaves thick, abruptly acute to narrowly obtuse; Nuevo León. 9. *M. notata*
 10. Lax, erect, mostly branched, suffruticose herbs or shrublets 1-2 m high; corollas yellow; leaves thin, gradually acuminate, Guerrero and Oaxaca. 5. *M. hintoniorum*

1. *MACROMERIA ALBA* Nesom, Madroño 36:28. 1989. TYPE: MEXICO. Tamaulipas: Mpio. Gomez Farias, 5-7 km NW of Gomez Farias, just S of Agua del Indio, 30 May 1969, A. Richardson 1763 (HOLOTYPE: TEX!).

Nesom has provided an excellent account of this taxon, including an illustration of the species, along with a map showing its distributional relationships with *Macromeria notata* I.M. Johnst., which he presumed to be its closest relative. It appears equally close, if not closer, to *M. pringlei* Greenm. (in habit, leaf shape, and vestiture) but sufficiently distinct to warrant recognition. No new collections have come to the fore since Nesom's publication; the taxon is presumably restricted to the Gomez Farias area of southern Tamaulipas (Figure 1).

2. *MACROMERIA BARBIGERA* I.M. Johnst., J. Arnold Arb. 16:189. 1935.

TYPE: MEXICO. Nuevo León: N slope of Sierra Tronconal between Canyon de los Charcos and Canyon de San Miguel, ca. 15 mi SW of Galeana, "common in dense oak woods beyond pine-fir belt", 6000-9000 ft, 4 Jun 1934, C.H. & M.T. Mueller 741 (HOLOTYPE: GH!; Isotypes: F!, MICH!, TEX!).

This species was known to Johnston (1954a) by relatively few collections (Figure 1). As indicated below, numerous collections are now available from pine-oak woodlands mostly between 2000-2200 meters. Johnston thought that the "immediate relatives for the species are obscure," which seems to be the case.

REPRESENTATIVE SPECIMENS: MEXICO. Nuevo León: *Hinton et al.* 21351 (TEX), 22117 (TEX), 22912 (TEX); *Mueller* 173 (F, MEXU, TEX), 174 (F, MEXU, TEX), 287 (GH, TEX), 563 (GH, TEX), 2871 (GH, LL, TEX); *Pennell* 17114 (PH); *Smith* M191 (TEX); *Taylor* 191 (F). Tamaulipas: *Meyer* 2756 (GH).

3. *MACROMERIA EXSERTA* Don, Edinb. New Phil. J. 13:239. 1832.

TYPE: MEXICO. w/o locality, 1787-1804, *Sessé & Moçino s.n.* (HOLOTYPE: Lambert Herbarium, not seen).

Echium longiflorum Sessé & Moçino, Pl. Nov. Hisp. 20. 1888. TYPE: MEXICO. w/o locality, 1787-1804, *Sessé & Moçino s.n.* (HOLOTYPE: MA; Possible fragment of holotype: GH!).

Macromeria exserta Don var. *imparata* Macbride, Contr. Gray Herb. 49:22. 1917. TYPE: MEXICO. Oaxaca: w/o locality, 1842, *M. Ghiesbreght s.n.* (HOLOTYPE: GH!; Isotype: US!).

This, the generitype, is a very distinctive widespread species (Figure 2) and was treated by Macbride (1917) as the sole member of *Macromeria*. Johnston (1924, 1954a) effectively challenged this concept, noting the many characters

Figure 1 (above). Distribution of *Macromeria alba* (closed triangle), *M. barbiger* (open circles), *M. guatemalensis* (closed circles), and *M. hintoniorum* (open triangles).

Figure 2 (below). Distribution of *Macromeria exserta* (open circles).

that relate *M. exserta* to those species of *Macromeria* which Macbride positioned in *Onosmodium*.

The var. *imparata* has been proposed as a name for forms of the species having an appressed pubescence; such forms occur throughout most of the range of the species and do not form a meaningful morphogeographic element.

REPRESENTATIVE SPECIMENS: MEXICO. Guerrero: *Alexander* XA 160 (MICH,NY); *Breedlove* 15823 (CAS-DS,MICH); *Hinton* 9442 (F,GH,NY,US); *Hinton* 14809 (GH,NY,US); *Moore* 9259 (GH,UC); *Rzedowski* 18512 (MEXU, MICH,TEX). Jalisco: *Fuentes* 601 (MO); *Goldsmith* 103 (F,GH,MO,US); *McVaugh* 12945 (GH,MICH). México: *Hinton* 1296 (GH,NY,US); *Hinton* 1435 (GH,NY); *Roe* 1643 (MICH,UC,US,WIS); *Rzedowski* 20759 (CAS-DS,LL,MICH,WIS). Michoacán: *Hinton* 13107 (F,GH,LL,MICH,NY,US); *Jack* 87 (LL,TEX); *Leavenworth* 1773 (F,MO); *Moore* 4028 (GH). Nayarit: *Mezias* 625 (CAS-DS,GH,UC,US); *Pennell* 19759 (GH,MEXU,PH). Oaxaca: *Anderson* 4818 (GH,MICH,MO,NY); *Breedlove* 12206 (CAS-DS,LL,MICH); *Conzatti* 4164 (GH,US); *Davidse* 9647 (MO,NY); *Marcks* (LL,WIS); *Pringle* 4870 (GH,MEXU,MO,NY,PH,UC,US). Sinaloa: *Breedlove* 43896 (CAS-DS).

4. *MACROMERIA GUATEMALENSIS* I.M. Johnst., J. Arnold Arb. 29:232.

1948. TYPE: GUATEMALA. San Marcos: south facing slope of Volcán Tajumulco, between Las Canoas and top of ridge, 7 mi from San Sabastián, 3300-3900 m, 16 Feb 1940, *J.A. Steyermark* 35898 (HOLOTYPE: GH; Isotype: F!).

Johnston (1954) inexplicably placed *Macromeria guatemalensis* in synonymy with *M. pringlei* with the notation that the former appears to differ from the latter "only in its more elongate, more decidedly fruticose stems and smaller (to 35 mm long) corollas. Possibly it may represent a southern variety of *M. pringlei*, but hardly a species distinct from it."

Nevertheless, Gibson (1970), in her treatment of the genus *Macromeria* for the Guatemalan flora, retained the species, as do I. In addition, its corolla pubescence is relatively sparse and widely spreading (vs. dense and appressed). There is an excellent illustration of this species in Gibson's treatment.

The only other collections of this taxon known to me are those of *Steyermark* 50069 (F) from the Sierra de los Cuchumatanes, Huehuetenango, Guatemala, cited in the original description and a Beaman collection (3852 [GH,UC]), also from the same sierras (Figure 1).

5. *MACROMERIA HINTONIORUM* B.L. Turner, *sp. nov.* TYPE:

MEXICO. Guerrero: Teotepec, ca. 12°27'N, 100°10'W, pine forest, 2750 m, 16 Jul 1939, *G.B. Hinton et al.* 14439 (HOLOTYPE: NY!; Isotypes: F!,NY!,US!).

Macromeria guatemalensi I.M. Johnst. similis sed corollis majoribus (4-6 cm longis vs. 3-4 cm longis), calycibus majoribus (12-16 mm longis vs. 7-10 mm longis), et foliis minoribus (plerumque 6-7 cm longis vs. 3-5 cm longis) differt.

Robust suffruticose herbs or shrubs 1-2 m high. Stems tan or reddish, pubescent with mostly broad-based widely incurved or spreading hairs up to 1.5 mm long. Leaves lanceolate, mostly 6-7 cm long, 1-2 cm wide, gradually reduced upwards; petioles 0.5-2.0 mm long; blades 3-nervate from above the base, rarely $\pm$ subpinnately nerved, sparsely strigose on both surfaces, the apices gradually acuminate. Flowers arranged terminal or subaxillary in cymose panicles, the pedicels mostly 5-12 mm long. Sepals linear-lanceolate, 12-16 mm long, 1-2 mm wide, strigose on both surfaces. Corollas "yellow", 4-6 cm long, pilose with spreading hairs, the lobes erect, 10-12 mm long, 5-6 mm wide, acute to narrowly obtuse, glabrous or nearly so on the inner surfaces; corolla tubes markedly narrowed at the base for 1.5-2.0 cm, abruptly flaring into a narrowly funnelform throat 1.5-2.5 cm long, the corolla glabrous within. Stamens with filaments free for 10-12 mm, the anthers ca. 2 mm long, glabrous, yellow, extending to the tips of the corolla lobes, attached to the glabrous filaments at ca. the middle. Style branches 4-5 cm long, glabrous, the apices minutely bifid, each branch terminated by an orbicular stigmatic swelling. Nutlets ca. 3.5 mm high, 2.5 mm wide, decidedly beige in color.

This taxon, because of its suffruticose shrubby habit, coarse pubescence and corolla shape seems closest to *Macromeria guatemalensis*, differing from the latter in having larger, full-yellow corollas (vs. pale yellow and 4-6 cm long vs. 3-4 cm long), longer sepals (12-16 mm long vs. 7-10 mm long), and mostly larger leaves (6-7 cm long vs. 3-5 cm long). *Macromeria hintoniorum* is known from only three collections, two from Guerrero and one from Oaxaca (cited below). The latter has somewhat smaller flowers, but otherwise matches well the other specimens.

SPECIMENS EXAMINED: MEXICO. Guerrero: W of Puerto El Gallo along road to Toro Muerto, 2530 m, *Breedlove* 65042 (CAS). Oaxaca: Distr. Etla, near village of "Huanchinomgo", 1842, *Ghiesbreght* 122 (GH).

6. *MACROMERIA HISPIDA* Mart. & Gal., Bull. Acad. Brux. 11:339. 1844. *Macromeria longiflorum* Sessé & Moçino ex D. Don var. *hispida* (Mart. & Gal.) A.DC., *Prodr.* 10:68. 1846. *Onosmodium longiflorum* (Sessé & Moçino ex D. Don) Macbride var. *hispidum* (Mart. & Gal.) Macbride, Contr. Gray Herb., n.s. 49:21. 1917. TYPE: MEXICO. Michoacán: near Morelia, Cerro de Quinzeo, 6500-8000 ft, 1840-1844, *Galleotti* 1917 (HOLOTYPE: BR; Isotype fragment: GH!).

Macbride (1917) treated this taxon as a variety of *Macromeria longiflorum*, but as noted by Johnston (1945) it appears relatively closely related to *M. exserta*, largely distinguished from the latter by its less zygomorphic corollas and straight short filaments of the stamens. In my opinion it stands much closer to *M. leontis* I.M. Johnst. and *M. pringlei*, the latter relationship also suggested by Johnston.

Johnston (1954a) notes the taxon to be known "only from the state of Michoacán, especially near Morelia and Patzcuaro," but subsequent collections have shown the species to occur over a much larger area (Figure 3).

REPRESENTATIVE SPECIMENS: MEXICO. Jalisco: *Diguet s.n.* (MICH); *Gregory 208* (GH,MEXU,MICH,NY). Michoacán: *Arsene 2775* (GH,US); *Kenoyer A287* (F,MICH); *Pringle 5606* (MEXU,US); *Torke 286* (LL,NY). Nayarit: *McVaugh 16577* (GH,MEXU, MICH). Sinaloa: *Dehesa 1517* (US), *1527* (US); *Ortega 282* (MEXU).

7. *MACROMERIA LEONTIS* I.M. Johnst., J. Arnold Arb. 16:188. 1935.

TYPE: MEXICO. Nuevo León: "ascent into Taray", ca. 15 mi SW of Galeana, ca. 8000 ft, 6 Jun 1934, *C.H. & M.T. Mueller 754* (HOLOTYPE: GH!; Isotype: TEX!).

This is a strikingly beautiful species what with its large yellow blossoms; indeed, recent collections from near Aramberri, Nuevo León (*Hinton et al. 23060*) have remarkably large corollas, up to 7 cm long (with lobes sharply reflexed), the lobes ca. 12 mm long, and as wide).

Johnston (1954a), while noting its "very distinct" nature, thought its relationship to be closest to *Macromeria longiflora* and *M. pringlei*. It appears to be equally close to *M. hispida*, as noted under the latter.

REPRESENTATIVE SPECIMENS: MEXICO. Nuevo León: *Hinton et al. 2520* (MICH), *17566* (TEX), *18523* (TEX), *19395* (TEX), *21026* (GH,TEX), *22277* (TEX), *23060* (TEX); *Mueller 594* (GH,MICH,TEX). Tamaulipas: *Stanford 3110* (ARIZ,CAS-DS,GH,NY,UC).

8. *MACROMERIA LONGIFLORA* Sessé & Mocino ex D. Don, Edinb. New

Phil. J. 13:239. 1832. *Onosmodium longiflorum* (Sessé & Mocino ex D. Don) Macbride, Contr. Gray Herb. 49:21. 1917. TYPE: MEXICO. w/o locality, 1787-1804, *Sessé & Mocino 1738* (HOLOTYPE: Lambert Herbarium; Probable photoholotype and fragment: GH!; Probable isotype: F!). Johnston (1949, J. Arnold Arb. 30:109) gives the type locality as "Mountains between Zitacuaro and Malucatepec," based upon information presented in Sessé & Mocino's *Fl. Mex.* 32. 1893, although the type material lacks such data.

Figure 3. Distribution of *Macromeria hispida* (open circles), *M. leontis* (open triangles), and *M. pringlei* (closed circles).

Macromeria discolor Benth., *Pl. Hartw.* 49. 1840. *Onosmodium discolor* (Benth.) Macbride, *Contr. Gray Herb.* 49:20. 1917. TYPE: MEXICO. w/o locality, *Graham s.n.* (HOLOTYPE: K).

Lithospermum flavum Sessé & Moçino, *Fl. Mex.* ed. 2, 32. 1893. TYPE: MEXICO. Michoacán: w/o date, *Sessé & Moçino s.n.* (HOLOTYPE: MA).

This is a widespread variable species represented by numerous specimens in herbaria. It is readily distinguished from most other species of *Macromeria* by its orange or orangish corollas and upper leaf surfaces which are minutely scabridulous.

REPRESENTATIVE SPECIMENS: MEXICO. Colima: *Goldsmith 60* (GH,UC,US), *65* (CAS,F,GH,NY,UC); *Jones 326* (US). Durango: *Breedlove 59048* (CAS); *Maysilles 8250* (MEXU,MICH,NY,TEX). Guanajuato: *Rubio 14* (MICH). Hidalgo: *Moore 3105* (WIS). Guerrero: *Rzedowski 18513* (CAS-DS,MICH); *Straw 1084* (GH,MEXU,MICH,UC); *Tillett 637-139* (CAS-DS,GH,MICH,US). Jalisco: *González 238* (MICH,WIS); *McVaugh 15996* (GH,MICH); *Reveal 4097* (MEXU,MICH); *Rzedowski 27516* (CAS-DS,F,LL,MO,NY,US,WIS); *Wilbur 1795* (MICH). México: *Hinton 4452* (F,GH,US); *Hinton 8257* (F,GH,LL,NY,US); *Rzedowski 28272* (CAS-DS,KANS,MICH,TEX,US); *Rzedowski 34254* (CAS-DS,MEXU,NY). Michoacán: *Hinton 15274* (ARIZ,F,GH,LL,MO,NY,US); *Hinton 15981* (MICH,NY,US); *Iltis 471* (MICH,TEX,UC,WIS); *Leavenworth 286* (F,GH,MICH,NY); *Pringle 4146* (F,GH,MEXU,PH,UC,US). Nayarit: *Breedlove 61496* (CAS); *Rose 2184* (US), *3520* (US). Oaxaca: *Anderson 4741* (GH,MICH,MO); *Conzatti 4183* (GH,US); *Diggs 2313* (WIS); *Lorence 4654* (F,MEXU).

9. *MACROMERIA NOTATA* I.M. Johnst., *J. Arnold Arb.* 35:13. 1954. TYPE: MEXICO. Nuevo León: Ascent of Sierra Infernillo, ca. 15 mi SW of Galeana, "Common over small areas just below the peak.", 9000-10000 ft, 16 Jun 1934, *C.H. & M.T. Mueller 830* (HOLOTYPE: GH!; Isotypes: F!,MICH!,TEX!).

As noted by Johnston (1954a) this is a very distinctive taxon what with its "densely glanduliferous plaits which extend from the upper part of the throat out upon each of the corolla lobes." He compared such plaits with the faucal appendages that characterize many species of *Lithospermum*. *Macromeria notata* also has a distinctive *Lithospermum*-like habit, the plants being low stiffly erect perennials, with unbranched stems, and arising from thick rootstocks, and with rhizomes that exude a purplish stain upon the sheets to which they are attached. This latter phenomenon is often observed in species of *Lithospermum* but I have not noted this in other species of *Macromeria*.

REPRESENTATIVE SPECIMENS: MEXICO. Coahuila: *Henrickson* 16129 (TEX). Nuevo León: *Bell* 17867 (UC); *Dorr* 2272 (TEX); *Hinton et al.* 18287 (TEX); *Mueller* 2238 (F,GH,MICH,TEX,US); *Pennell* 17123 (PH,US).

10. *MACROMERIA PRINGLEI* Greenm., Proc. Amer. Acad. Arts 34:570. 1899. *Onosmodium pringlei* (Greenm.) Macbride, Contr. Gray Herb. 49:20. 1917. TYPE: MEXICO. Hidalgo: Sierra de Pachuca, 10,000 ft, 4 Aug 1898, *C.G. Pringle* 6949 (HOLOTYPE: GH!; Isotypes: F!,MEXU!, PH,UC!,US!).

Johnston (1954a) erroneously cited the type as *Pringle* 11044, but only a single sheet is cited in Greenman's protologue, that being *Pringle* 6949. Johnston also placed his *Macromeria guatemalensis* in synonymy with *M. pringlei* with the statement that "Possibly it may represent a southern variety of *M. pringlei*, but hardly a species distinct from it." My evaluation of the Guatemalan taxon is otherwise: it appears as distinct as most other specific taxa of the group concerned. *Macromeria pringlei* is largely confined to spruce-fir forests of Hidalgo and closely adjacent Veracruz from mostly 2000-3000 meters (Figure 3).

REPRESENTATIVE SPECIMENS: MEXICO. Hidalgo: *Cota* 3008 (TEX); *Garcia* 975 (CAS,F,MEXU,LL,NY,TEX); *Hernández* 123 (CAS,MEXU,TEX); *Rzedowski* 26767 (CAS-DS,LL,MICH); *Lyonnet* 1095 (MEXU); *Pringle* 11094 (F,LL,NY,US); *Puga* 3000 (MEXU). Veracruz: *Hernández* 19401 (F), 20890 (MEXU); *Miller* 1358 (NY).

11. *MACROMERIA VIRIDIFLORA* A.DC., Prodr. 10:68. 1846. TYPE: MEXICO. w/o locality, 1787-1804, *Sessé & Moçino* 5131 ["*Lithospermum longifolium* No. 24"]. (HOLOTYPE: M; Fragment holotype: F!, GH!; Photoholotype: GH!,MICH!).

Two regional intergrading varieties of this well-marked species are recognized, as follows:

1. Corollas mostly 6-8 cm long; southernmost Arizona (Cochise, Santa Cruz, Pinal, and Pima counties) and northwestern México. ... var. *viridiflora*
1. Corollas mostly 3.5-6.0 cm long; southcentral and northern Arizona and New Mexico. var. *thurberi*

a. *MACROMERIA VIRIDIFLORA* A.DC. var. *VIRIDIFLORA*

Johnston (1954a) has provided an excellent description of this taxon, the distribution of which is shown in Figure 5. In the Santa Catalina and Chiricahua Mountains of southern Arizona populations occur in which plants intermediate between the two varieties are found. Johnston in his discussion of var. *thurberi* also alludes to such intermediates.

REPRESENTATIVE SPECIMENS: MEXICO. Chihuahua: *Bye* 7839 (LL,TEX); *Jones s.n.* (CAS,F,GH,US); *LeSueur* 895 (ARIZ,CAS,F,TEX,UC,US); *Straw* 1696 (GH,MICH,UC), 1921 (CAS,MICH); *Townsend* 62 (F,GH,NY,TEX,UC,US). Durango: *Diaz* 251 (NY,TEX); *Maysilles* 7027 (MICH,NY), 7363 (MICH), 7515 (MICH), 8347 (MICH); *Tenorio* 703 (CAS,MEXU), 1063 (NY). Sinaloa: *Gentry* 6374 (ARIZ). Sonora: *Pennell* 19607 (NY,PH); *Phillips* 673 (GH,MICH); *White* 3155 (ARIZ,GH,MICH).

UNITED STATES. Arizona: Cochise Co.: *Blumer* 1817 (ARIZ,CAS-DS,F,GH,NY,US). Pima Co.: *Pringle s.n.* [23 Jul 1884] (NY,PH,WIS). Pinal Co.: *Peebles* 2244 (US). Santa Cruz Co.: *McClintock* 5847 (ARIZ,CAS,UC).

b. *MACROMERIA VIRIDIFLORA* A.DC. var. *THURBERI* (A. Gray) I.M.

Johnst., J. Arnold Arb. 12. 1954. *Onosmodium thurberi* A. Gray, *Syn. Fl. N. Amer.* 2(1):205. 1878. *Macromeria thurberi* (A. Gray) Mackenzie, Bull. Torrey Bot. Club 32:496. 1905. TYPE: U.S.A. New Mexico. Grant Co.: "Copper Mines", Aug 1851, *C. Wright* 1106 (LECTOTYPE [selected here]: GH!; Isolectotypes: GH!,NY!).

Johnston (1954a) noted that "The differences in flower size are geographically correlated and sufficiently striking to merit nomenclatorial [sic] recognition," a statement with which I agree. The distribution of each is shown in Figure 5.

REPRESENTATIVE SPECIMENS: UNITED STATES. New Mexico: Catron Co.: *Gentry* 2280 (CAS-DS,KANU,NY,TEX). Grant Co.: *Metcalfe* 1042 (CAS,F,GH,NY,UC). Lincoln Co.: *Wootton* 217 (CAS-DS,GH,NY,UC,US). Mora Co.: *Arsene* 18580 (US). Otero Co.: *Correll* 39249 (LL,NY). San Miguel Co.: *Sagalyn* 97 (GH). Sierra Co.: *Metcalfe* 1942 (US). Arizona: Apache Co.: *Schmidt* 75 (ARIZ), 104 (ARIZ), 132 (ARIZ). Coconino Co.: *MacDougal* 323 (ARIZ,GH,NY,PH,UC,US). Gila Co.: *Johnson s.n.* (ARIZ). Graham Co.: *Lemmon s.n.* (UC). Greenlee Co.: *Barr* 68-332 (ARIZ). Navajo Co.: *Ferris* 10099 (CAS,DS,GH,MICH,UC).

Figure 4. Distribution of *Macromeria longifolia* (open circles), and *M. notata* (closed circles).

Figure 5. Distribution of *Macromeria viridiflora*: var. *thurberi* (open circles), and var. *viridiflora* (closed circles).

ACKNOWLEDGMENTS

I am grateful to Guy Nesom for the Latin diagnosis and to him and Piero Delprete for reviewing the paper.

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