Taxonomic revision of *Ocimum* (Lamiaceae) in Argentina

Author(s): Nataly O'Leary
Source: The Journal of the Torrey Botanical Society, 144(1):74-87.
Published By: Torrey Botanical Society
URL: http://www.bioone.org/doi/full/10.3159/TORREY-D-14-00074.1

Journal of the Torrey Botanical Society 144(1): 74–87, 2017.

Taxonomic revision of *Ocimum* (Lamiaceae) in Argentina[1]

Nataly O'Leary[2]
Instituto de Botánica Darwinion, Labardén 200. CC 22 (B1642HYD), San Isidro, Buenos Aires, Argentina

Abstract. In Argentina *Ocimum* is represented by four species: *Ocimum campechianum*, *Ocimum nudicaule*, *Ocimum ovatum*, and *Ocimum selloi*. Complete descriptions for each of these taxa and illustrations, as well as a key for their identification, together with distribution maps in Argentina are given. Four new synonyms are here proposed, and lectotypes are here designated for the following species: *Lumnitzera carnosa, Ocimum balansae, Ocimum hassleri* var. *acutatum, Ocimum micranthum, Ocimum neurophyllum, O. nudicaule*, *O. ovatum, O. selloi, O. selloi* var. *angustifolium*, *O. selloi* f. *serratum*, and *O. selloi* f. *subintegrifolium*.

Keywords: Argentina, Lamiaceae, *Ocimum*, taxonomy

Ocimum L. (Lamiaceae) is an aromatic genus belonging to the almost exclusively tropical tribe Ocimeae Dumort. Pushpangadan and Bradu (1995) recognize 160 species; however, Paton *et al*. (1999) recognize 64 species in an overview of classification and relationships within *Ocimum*. This major discrepancy clearly demonstrates that generic circumscription is problematic. *Ocimum* occurs naturally in tropical and subtropical America, Africa, and Asia. There is no complete taxonomic revision of the genus, only regional reviews including Epling (1937) for South America, Paton (1992) for Africa, Albuquerque and Andrade (1998) for northeastern Brazil, and Suddee *et al*. (2005) for continental Southeast Asia, or floristic treatments as Wiggins and Porter (1971) for the Galapagos Islands, Standley and Williams (1973) for Guatemala, or Walsingham and Paton (2012) for the flora Mesoamericana. *Ocimum* has important economic and medicinal species. For example, *Ocimum basilicum* L. (basil) is a well-known culinary herb. The ethanol extracts of some *Ocimum* species have anti-inflammatory, carminative, and antispasmodic analgesic properties (Vanderline *et al*. 1994).

In Argentina, just one *Ocimum* species has been treated in the regional floras of Entre Ríos (Crespo 1979) and Jujuy (Pontiroli 1993). Recently, Zuloaga *et al*. (2008) mentioned four species in a checklist for Argentina. However, no entire taxonomical revision of *Ocimum* exists in Argentina. The present study provides a complete and actualized description for each of the recognized *Ocimum* species that grow in Argentina, as well as a key for their identification, together with illustrations of each accepted taxa and geographical distribution maps, plus discussion notes about new synonyms and typification resolution.

Materials and Methods. This revision is based on herbarium specimens from the following herbaria: Instituto de Botánica Darwinion (SI), Museo Argentino de Ciencias Naturales "Bernardino Rivadavia" (BA), Instituto Nacional de Tecnología Agropecuaria (BAB), Instituto de Botánica del Nordeste (CTES), and Missouri Botanical Garden (MO) (Thiers 2014). Flower measurements were taken from material rehydrated by boiling. Fruit measurements were taken from dried specimens. The descriptive terminology of morphological features follows Hickey (1974). The use of the following terms for pubescence follows Lawrence (1951): hispid, hirsute, pilose, and puberulous. The term ''nutlet'' is here employed to describe a one-seeded unit, derived from a bicarpellate ovary.

For typification matters, specimen images were studied using the JSTOR Global Plant Initiative online platform (http://plants.jstor.org/), or online herbaria databases such as G (http://www.ville-ge.

[1] This research was financially supported by Consejo Nacional de Investigaciones Científicas y Técnicas (CONICET grant number PIP 00537/13). Special thanks are given to curators of the following herbaria—Museo Argentino de Ciencias Naturales "Bernardino Rivadavia" (BA), Instituto Nacional de Tecnología Agropecuaria (BAB), Instituto de Botánica del Nordeste (CTES), Field Museum of Natural History (F), Missouri Botanical Garden (MO), Instituto de Botánica Darwininion (SI), and Museum of Evolution (UPS) for the help in finding type material, as well as to Francisco Rojas and Marcelo Moreno, from the Instituto de Botánica Darwinion, for the illustrations.

[2] Author for correspondence: noleary@darwin.edu.ar

doi: 10.3159/TORREY-D-14-00074.1

Received for publication September 18, 2014, and in revised form April 29, 2016; first published December 7, 2016.

ch/musinfo/bd/cjb/chg/index.php?lang=fr) or W (http://herbarium.univie.ac.at/database/search.php), or else digital images were directly requested to the different herbaria curators.

Illustrations were prepared by M. Moreno and F. Rojas from SI. Fig. 5B, G, and J were taken from Crespo (1979: 314, fig. 146) and Fig. 5A, H, I, and K were taken from Pontiroli (1993: 136, fig. 57). Geographic distributions and habitats of different taxa were determined from herbarium specimens. An index of collectors is supplied in the appendix.

Taxonomic Treatment

Ocimum L., Sp. Pl. 2: 597. 1753. Type species: *Ocimum basilicum* L. (designated by N. L. Britton and C. F. Millspaugh, *The Bahama Flora*: 380, 1920).

Subshrubs or annual or biannual herbs, generally aromatic. Stems tetragonal. Leaves opposite, simple, generally petiolate. Inflorescences composed of several opposite 3–6-flowered cymes (whorls), subtended by persistent or deciduous bracts, the bract scar sometimes developing into a bowl-shaped, gland-like structure which functions as an auxiliary nectary. Calyx tubular or funnel-shaped, nerved, two-lipped, the superior lip with a round tip, the inferior lip with four lobes with acuminate apices, the two lateral lobes triangular, and the two median lobes subulate, glabrous in the inner surface. Calyx usually enlarges slightly in fruit. Corolla two-lipped, the tube included in the calyx, dorsally gibbous at the midpoint, the superior lip four-lobed, the inferior lobe entire, flat, or slightly concave. Stamens four, didynamous, exerted, the superior pair attached near corolla base, glabrous or basally pubescent, the inferior pair attached near the corolla mouth, the anthers divergent, sometimes parallel. Style bifid, the stigmatic branches subequal, subulate, the ovary disk equally four-lobed. Nutlets four, spherical to ellipsoid or obovoid, the surface reticulate or smooth.

Distribution and Habitat. *Ocimum* is pantropical, however it is most species-rich in dry areas of Africa. In Argentina there are four native species, found in the northern part of the territory, mostly in Chaqueña, Espinal, and Paranaense phytogeographic provinces (Cabrera and Willink 1980), growing in grasslands and open fields, with sandy or rocky soils, sometimes found in damp or low lands, roadsides, forests, and marginal fields.

Key to the species of *Ocimum* in Argentina

1. Leaf internodes less than 0.5 cm, the leaves in a basal rosette, sub-sessile; inflorescence peduncles 10–18 cm long . . . . . *Ocimum nudicaule*
1′. Leaf internodes longer than 0.5 cm, the leaves cauline (not in a basal rosette), petiolate; inflorescence peduncles 0.5–4 cm long 2
   2. Inflorescence bracts deciduous early in anthesis, the bract scar developing into a bowl-shaped, auxiliary nectary . . . . . *Ocimum selloi*
   2′. Inflorescence bracts persistent and conspicuous in anthesis and in fruit 3
      3. Annual or biannual herb, 40–60 cm high, the roots not xylopodiferous, the leaves membranaceous, the inflorescence whorls spaced 0.8–2 cm apart. . . . . *Ocimum campechianum*
      3′. Subshrub or biannual herb, 30–40 cm high, roots xylopodiferous, the leaves coriaceous, the inflorescence whorls spaced 0.2–1 cm apart . . . . . *Ocimum ovatum*

1. ***Ocimum campechianum*** Mill., Gard. Dict. (ed. 8) 5. 1768. TYPE: Mexico, Campeche, Calakmul, 1730, *W. Houston s.n*. (HOLOTYPE: BM 000815874!). Fig. 2.

Ocimum micranthum Willd., Enum. Pl. 2: 630. 1809. TYPE: [South America] "S. Am., no date, *A. Humboldt s.n.*" (LECTOTYPE [here designated]: B 11070-01!; ISOLECTOTYPES B 11070-02!, B 11070-03!).

Ocimum flexuosum Thunb., Pl. Bras. 2: 23. 1818. TYPE: BRAZIL. Minas Gerais, January–February 1815, in Mus. Westin., *G. W. Freyreiss s.n*. (HOLOTYPE: UPS-THUNB 013762!). **syn. nov.**

Ocimum guatemalense Gand., Bull. Soc. Bot. France 65: 67. 1918. TYPE: Guatemala, Alta Verapaz, ad Cubilquitz, 1907, *H. von Türckheim 1113* (HOLOTYPE: LY 2327!).

Annual or biannual herb, 40–60 cm high, stems reddish or purple, woody at the base, glabrous to slightly puberulous. Leaves ovate to elliptic, 2–10 × 1–4 cm, membranaceous, petiole 0.2–4 cm long,

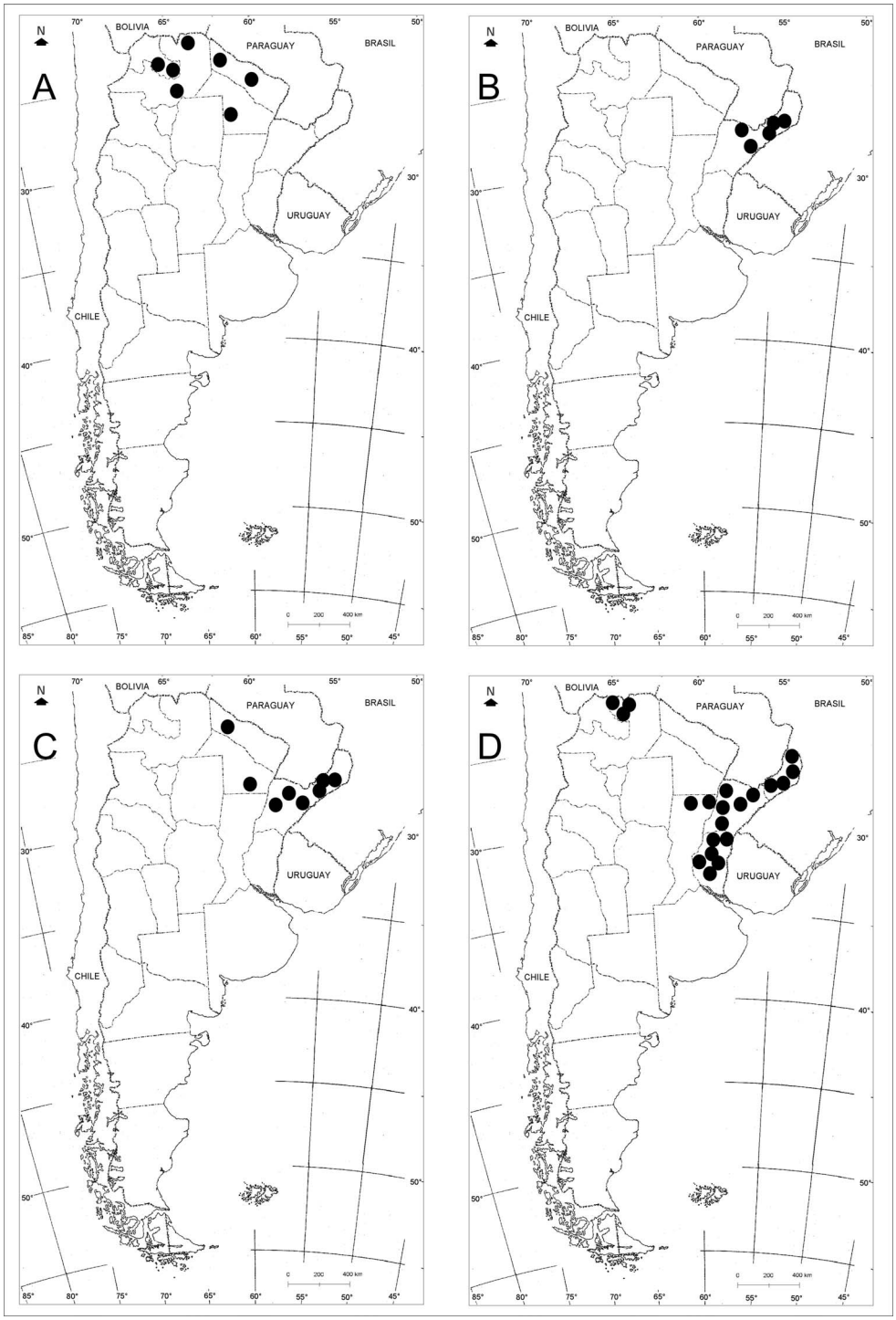

FIG. 1. Distributions of the species of *Ocimum* in Argentina. (A) *Ocimum campechianum*. (B) *Ocimum nudicaule*. (C) *Ocimum ovatum*. (D) *Ocimum selloi*.

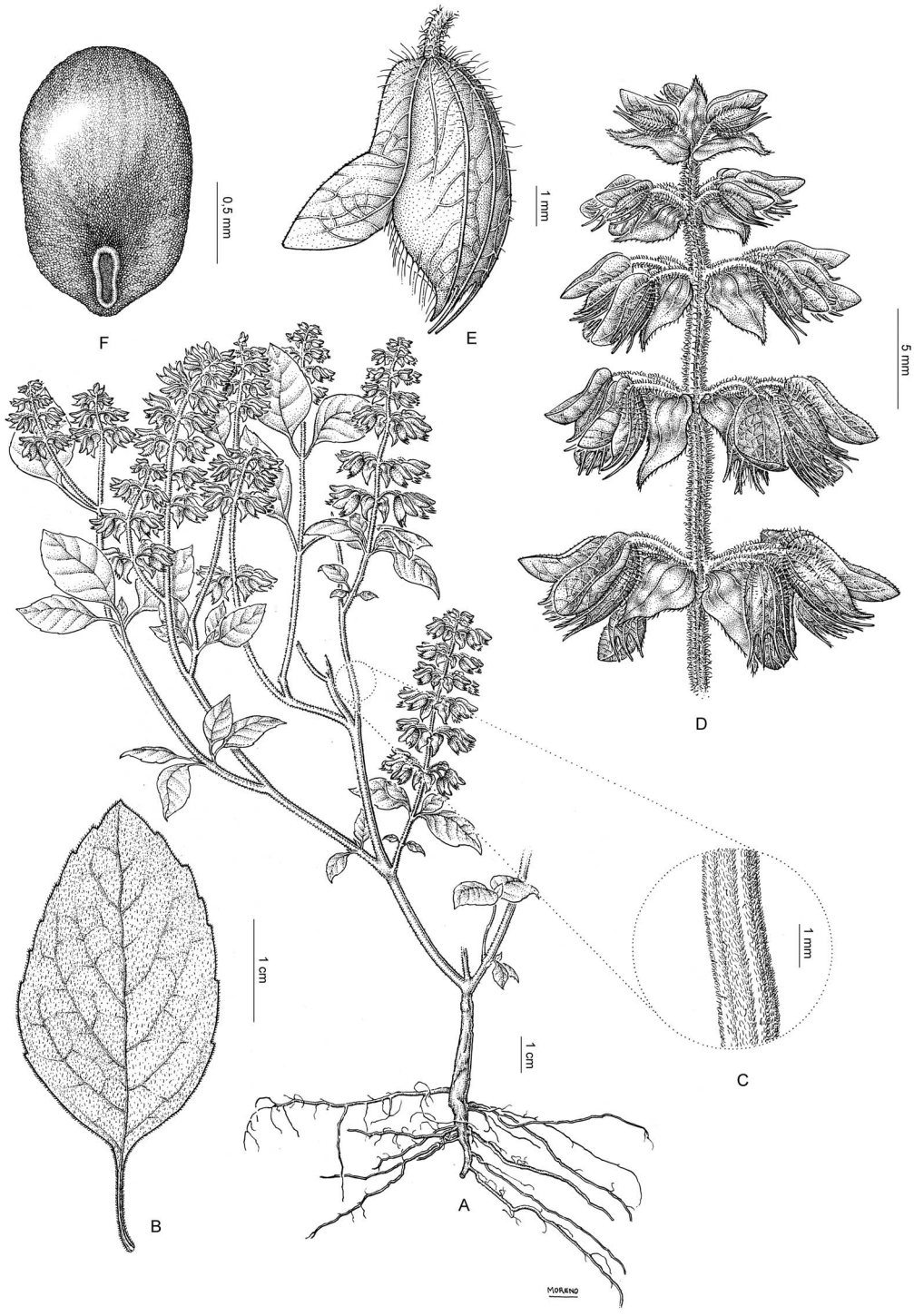

FIG. 2. *Ocimum campechianum*. (A) Habit. (B) Leaf, adaxial surface. (C) Detail of stem pubescence. (D) Detail of inflorescence nodes with persistent bracts. (E) Fruiting calyx. (F) Nutlet. (From *Cabrera 30289,* Instituto de Botánica Darwinion.)

base cuneate, apex acute, margin with irregular, slightly impressed teeth, adaxial surface light green, abaxial surface darker green, glabrous or puberulous on the veins, both surfaces with glandular dots. Inflorescence composed of six-flowered whorls, spaced 0.8–2 cm apart, grouped in bracteate pseudo-racemes, to 8 cm long in anthesis, to 15 cm long in fruit, with a short peduncle, 1.5–2 cm long in anthesis and in fruit. Bracts ovate or subrhomboidal, persistent, with acute apices; flower pedicels hispid, 1–1.5 mm long in flower, becoming reflexed in fruit, 4–7 mm long. Calyx 2.5–3 mm long in anthesis, to 8 mm long in fruit, margins hispid. Corolla white, lilac or violet, 3–4 mm long. Stamens glabrous, 5–6 mm long. Style 5 mm long. Nutlets obovoid, 1.5–2 mm long, brown, smooth.

DISTRIBUTION AND HABITAT. *Ocimum campechianum* is distributed from Florida and Mexico to northern Argentina in the provinces of Salta, Jujuy, Chaco and Formosa (Fig. 1A). It is very common in Central America and northern South America where it is a frequent weed in crop fields. It inhabits dry areas, sometimes with rocky soils, exceptionally found in humid soils.

DISCUSSION. Both *O. campechianum* and *O. ovatum* have persistent inflorescence bracts. However, the species differ in that *O. campechianum* is taller (40–60 cm high), stems are totally glabrous to slightly puberulous, and it has more lax inflorescences, while *O. ovatum* is smaller (30–40 cm high), stems are hirsute, and it has dense inflorescences.

There are three herbarium specimens that correspond to the type of *O. micranthum* in herbarium B, so here one of them is selected as lectotype following McNeill (2014).

As recently stated by Rodrigues de Moraes *et al*. (2014), *O. flexuosum* Thunb. is a validly published name (Juel 1918), that has been overlooked by the specialists. In relation to the type material of this name, Stafleu and Cowan (1986) explain that the collector G. Freyreiss was employed between 1815 and 1818 by Lorentz Westin, which clarifies why most Freyreiss' plants in the Thunberg herbarium carry both names.

The analysis of the type material of *O. flexuosum* evidences it is cospecific with *O. campechianum*. Rodrigues de Moraes *et al*. (2014) considered *O. flexuosum* a synonym of both *Ocimum carnosum* (Spreng.) Link and Otto ex Benth. and *Ocimum selloi* Benth.; however, the Freyreiss collection (UPS 013762) has persistent inflorescence bracts that correspond with the type of *O. campechianum*, being deciduous early in anthesis in *O. carnosum /O. selloi*. As a result, in the present work *O. flexuosum* is considered as a new synonym of *O. campechianum*.

SELECTED SPECIMENS EXAMINED. ARGENTINA. **Chaco**: 1921, *Rothkugel 70* (SI); Chacabuco, Gral. Necochea, 15 Nov 2008, *Scarpa 775* (BA). **Formosa**: Matacos, Ing. G. N. Juárez, 2 Jun 1980, *Harley 12894* (CTES, SI); Patiño, Paso Ayala, N de Sargento Leyes, 25 Mar 1992, *Fortunato 3135* (SI). **Jujuy**. Dr. Manuel Belgrano, entre El Cadillal y Palpalá, 19 Mar 1979, *Cabrera 30289* (SI); Santa Bárbara, límite Jujuy-Salta, zona Chaqueña, 13 Apr 2008, *Slanis 106 4-2008* (SI); San Pedro, Cuesta de la Lajitas, 24 Jan 1976, *Cabrera 27546* (MO, SI). **Salta:** Gral. José de San Martín, 15 km O Hickmann, Pozo El Milagro, 9 Dec 1972, *Maruñak 562* (CTES); Metán, ruta 5 E de ruta 9, 27 Jan 2007, *Paula-Souza 7988* (CTES, SI).

2. ***Ocimum nudicaule*** Benth., Labiat. Gen. Spec. 14. 1832.): TYPE: Brazil, sine loc., *F. Sellow* s.n. (LECTOTYPE [here designated]: K 000485562!). Fig. 3.

Eriope nudicaulis Briq., Bull. Trav. Soc. Bot. Genève 5: 116. 1889. TYPE: Paraguay, Paraguarí, Cordillera de Peribebuy, Jun 1883, *B. Balansa 4560* (HOLOTYPE: G 307467!; ISOTYPE: G 307444!).

Subshrub or biannual herb, up to 35 cm high, stems with brief leaf internodes, less than 0.5 cm apart, xylopodiferous root. Leaves in a basal rosette, blade obovate to ovate, 5–15 × 2–11 cm, coriaceous, subsessile, petiole 0.2–0.8 cm long, base cuneate, apex obtuse, margin regularly crenate serrate, abaxial surface with hirsute pubescence mainly on the veins and margin. Inflorescence composed of six-flowered whorls, spaced 1–2.5 cm apart, grouped in bracteate pseudoracemes, to 10 cm long in anthesis, to 20 cm long in fruit, with a peduncle 10–18 cm long in anthesis and in fruit. Bracts small, ovate inconspicuous, deciduous early in anthesis, bract scar developing into a bowl-shaped auxiliary nectary; flower pedicels puberulous, 2–4 mm long in anthesis and in fruit. Calyx 4 mm long in anthesis, to 7–8 mm long in fruit, subglabrous, margins pilose. Corolla lilac or dark violet, 8 mm long. Stamens 8–9 mm long. Style 10 mm long.

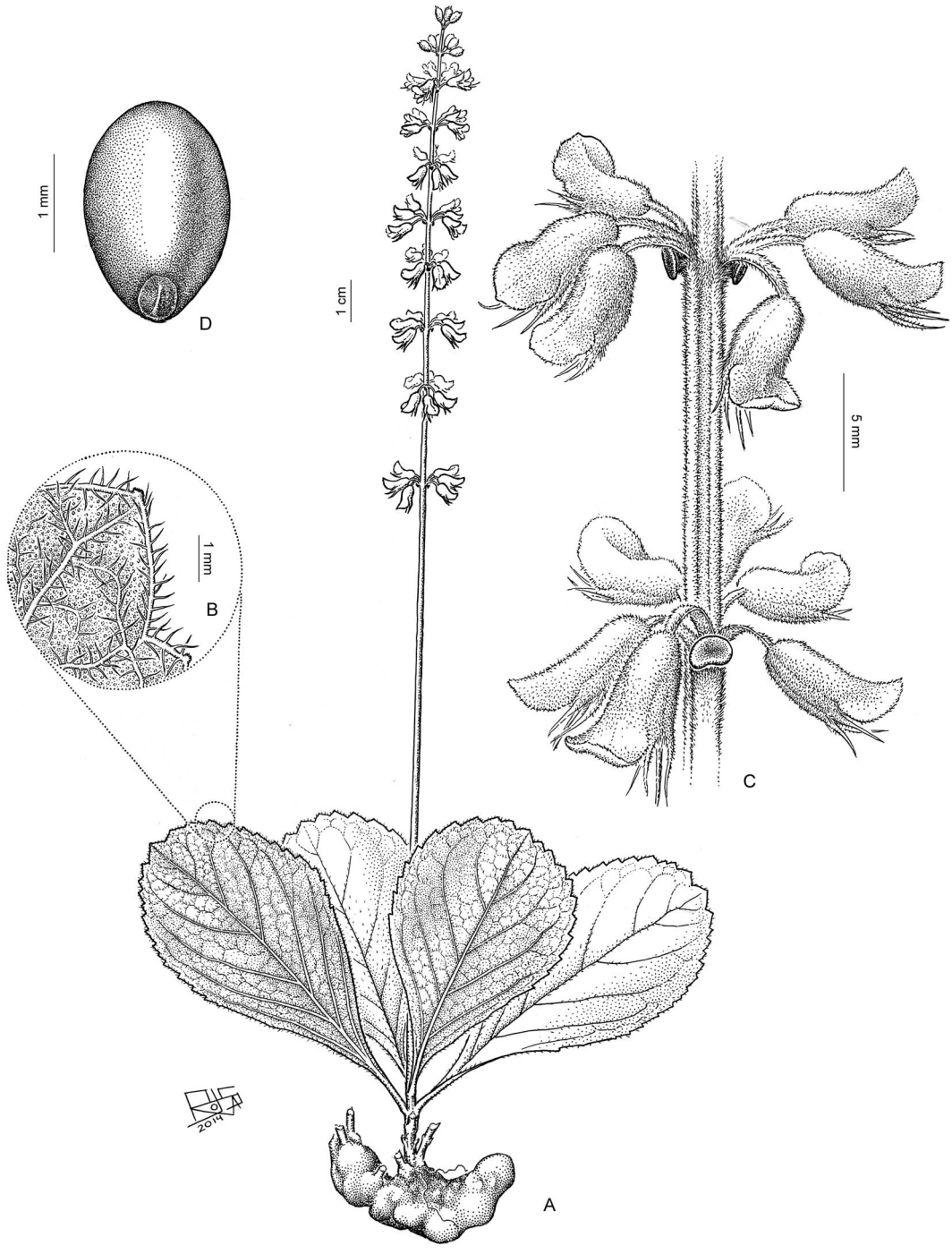

FIG. 3. *Ocimum nudicaule*. (A) Habit. (B) Detail of pubescence on the abaxial leaf surface. (C) Detail of inflorescence nodes with bract scars developing into bowl-shaped auxiliary nectaries. (D) Nutlet. (From *Montes 2200*, Instituto de Botánica Darwinion.)

Nutlets obovoid, 1.5 mm long, light brown, smooth.

DISTRIBUTION AND HABITAT. *Ocimum nudicaule* is distributed in Paraguay, southern Brazil in the state of Paraná, and northeastern Argentina. In Argentina it is found in the northeastern part of the territory, in the provinces of Misiones and Corrientes (Fig. 1B). It grows in grasslands, being frequent in the Cerrado.

DISCUSSION. The lectotype selected by Epling (1937) for *O. nudicaule* was housed at Berlin and has been destroyed (photograph F neg. 17811!). A new lectotype is here selected (Art. 9.11, McNeill *et al*. 2012) from original material found at herbarium K, a material that had been referred to as an isotype by Epling (1937).

SELECTED SPECIMENS EXAMINED. ARGENTINA. **Corrientes**: Santo Tomé, ruta 40, 2 km de entrada a Garrucho, 23 Apr 1996, *Zuloaga 5804* (SI). Ituzaingó, 12 km E ciudad, camino a San Carlos, 19 Feb 1999, *Sosa 21* (CTES). **Misiones**: Apóstoles, San José, 14 Oct 1978, *Renvoize 3132* (SI). Concepción, Campos de San Lucas, 29 Sep 2004, *Múlgura 4066* (SI). Candelaria, Santa Ana, 21 Sep 1946, *Montes 2200* (SI); ruta prov. 3, 8 km de ruta 12, 30 Apr 1997, *Morrone 2228* (MO, SI). Posadas, 23 Dec 1907, *Ekman 1846* (MO). San Ignacio, Santo Pipó, 26 Sep 1947, *Schwarz 4834* (MO).

3. ***Ocimum ovatum*** Benth., Labiat. Gen. Spec. 13. 1832. TYPE: Brazil, sine loc., *F. Sellow* s.n. (LECTOTYPE [here designated]: K 485558!) Fig. 4.

Ocimum balansae Briq., Mém. Soc. Phys. Genève 32(2, 10): 37. 1897. TYPE: Paraguay, Villa Rica, "dans les pres," 14 Sept. 1874, *B. Balansa 986* (LECTOTYPE [here designated]: P 720628!; ISOLECTOTYPE: F 0061038F!, K 485557!, US 00121955!).

Ocimum neurophyllum Briq., Bull. Herb. Boissier ser. 2, 7: 623. 1907. TYPE: Paraguay, propre Concepción "Picada Isabel," Oct., *E. Hassler 7643* (LECTOTYPE [here designated]: G 307469!; ISOLECTOTYPE: G 307470!, K 485556!, NY00621891!, UC 935104!).

Subshrub or biannual herb, 30(–40) cm high, stems hirsute, xylopodiferous root. Leaves ovate, 2.5–4 × 1–3 cm, coriaceous, petiole 0.5–1 cm long, base obtuse, apex sub obtuse to acute, margin entire to slightly serrate, abaxial surface with conspicuous veins with hispid pubescence, principally over veins, adaxial surface hirsute. Inflorescence composed of six-flowered whorls, spaced 0.2–1 cm apart, grouped in bracteate pseudoracemes, to 3–6 cm long in anthesis, to 10 cm long in fruit, with a short peduncle, 0.5–2 cm long in anthesis and in fruit. Bracts foliose, subrhomboidal, persistent and conspicuous, with acute apices, 4–8 × 4–8 mm; flower pedicels hispid, 2 mm long in anthesis, to 8 mm long in fruit. Calyx 3.5–4 mm long in anthesis, to 8–10 mm in fruit, hispid. Corolla lilac, violet or pink, 5 mm long. Stamens glabrous, 5–6 mm long. Style 6 mm long. Nutlets obovoid, 1.5–1.8 mm long, light brown, smooth.

DISTRIBUTION AND HABITAT. *Ocimum ovatum* is found in eastern Bolivia, Paraguay, southern Brazil, and northeastern Argentina. Within Argentina it is found in the northeastern provinces of Misiones, Corrientes, Chaco and Formosa (Fig. 1C). It grows in sunny open fields, with sandy or rocky soils, or in understory.

DISCUSSION. The holotype of *Ocimum ovatum* was housed at Berlin and was destroyed (photograph F neg. 17812!). A lectotype was chosen from original material housed at herbarium K (Art. 9.11, McNeill *et al*. 2012).

Briquet (1897: 37, 1907: 623) described *O. balansae* and *O. neurophyllum* and in both cases the author mentioned more than one material (syntypes). A lectotype was selected in each case, from original material, specimens found at P and G, respectively (Art. 9.5, McNeill *et al*. 2012).

The following three taxa were referred to as synonyms of *O. ovatum* (Zuloaga *et al*. 2008). However, the study of the type material evidences that these taxa are not cospecific with *O. ovatum*, and are here excluded from the synonymy. These three taxa are not present in Argentina.

(1) *Ocimum procurrens* Epling, Repert. Spec. Nov. Regni Veg. Beih. 85: 182. 1936. TYPE: Brazil, Rio Grande do Sul, Cachoeira, "in campis apricis inter Baccharides," 16 Feb 1893, *O. Malme 600* (HOLOTYPE: S R7956!).

REMARKS. This taxon grows in southern Brazil. Inflorescences are similar to *O. nudicaule*, however leaves are not in a rosette.

(2) *Ocimum hassleri* Briq., Bull. Herb. Boissier ser. 2, 7: 624. 1907. TYPE: Paraguay, sine loc., *E. Hassler 4380* (LECTOTYPE (designated by Epling 1937, Repert. Spec. Nov. Regni Veg. Beih. 85: 183, 1937): G 307447!; ISOLECTOTYPES:

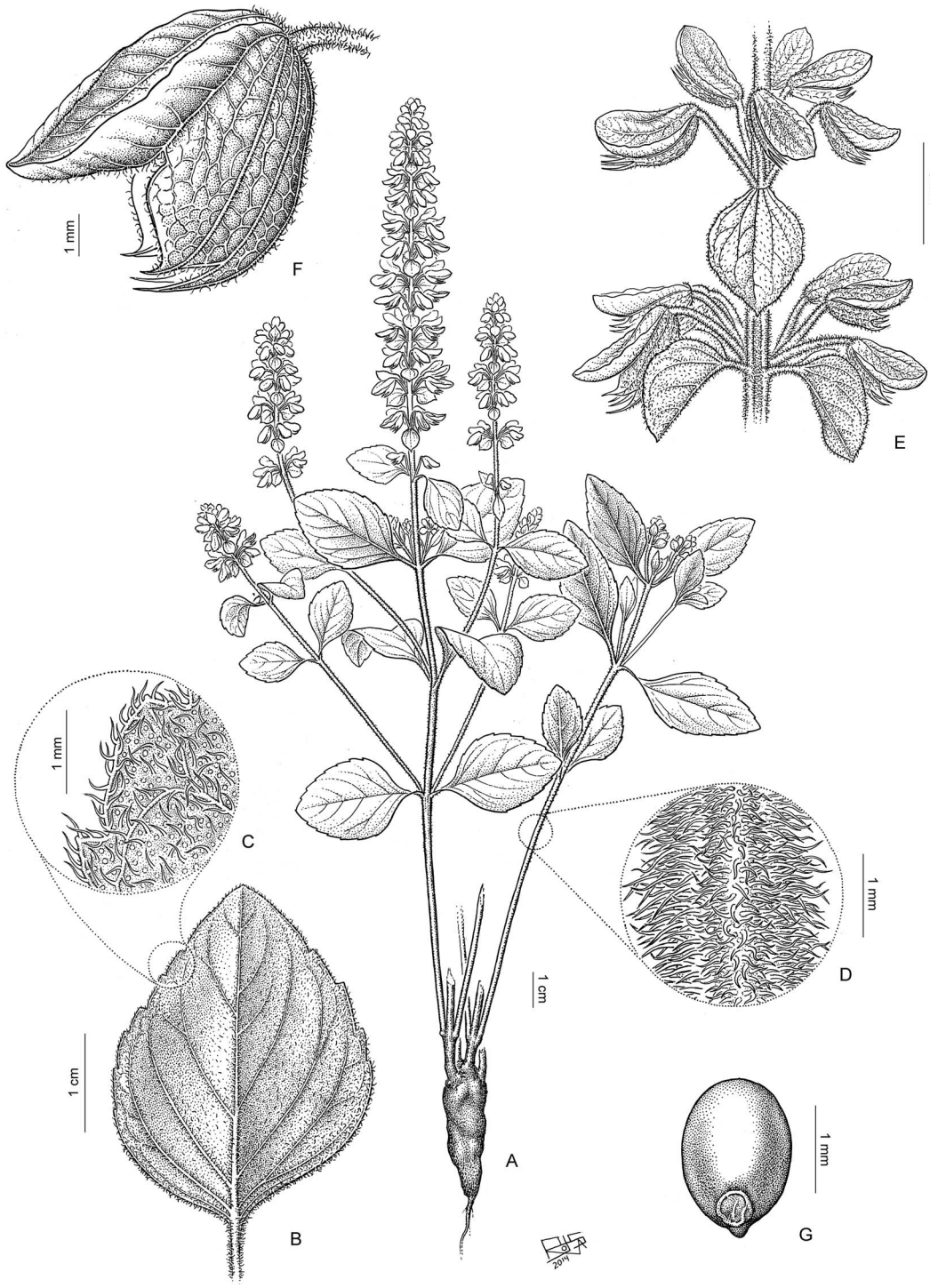

FIG. 4. *Ocimum ovatum*. (A) Habit. (B) Leaf, adaxial surface. (C) Detail of pubescence on the abaxial leaf surface. (D) Detail of stem pubescence. (E) Detail of inflorescence nodes with persistent bracts. (F) Fruiting calyx. (G) Nutlet. (From *Schwarz 748*, Instituto de Botánica Darwinion.)

BM 76979!, F 61039F, G 307445!, G 307446!, K 485555!, NY 0429366!, P 634430!, P 720640!).

REMARKS. Briquet (1907: 624) names this taxon *O. hassleri* var. *obtusifolium* Briq., however this is a nomenclatural synonym of *O. hassleri*, given that it shares the same type. This taxon is endemic to the Cerrado from Paraguay. It is similar to *O. ovatum*; however, it differs because *O. hassleri* has sessile leaves, with entire margin; leaves are petiolate with slightly serrate margin in *O. ovatum*.

(3) *Ocimum hassleri* Briq. var. *acutatum* Briq., Bull. Herb. Boissier ser. 2, 7: 624. 1907. TYPE: Paraguay, "in campo Apepu, Tapiraguay, Aug," *Hassler 4245a* (LECTOTYPE [here designated]: G 307460! (photo F neg. 28955!); ISOLECTOTYPE: G 307459!).

REMARKS. Briquet (1907: 624) mentions more than one specimen in the prologue, so a lectotype was selected among the syntypes. This variety only differs from typical *O. hassleri* in having narrower leaves.

SELECTED SPECIMENS EXAMINED. ARGENTINA. **Chaco**: Mayor Luis J. Fontana, 13 Sep 1972, *Bordón* s.n. (CTES 408514). **Corrientes**: Bella Vista, cerca Río Paraná, 1 Dec 1945, *Boelcke 1631* (SI). Ituzaingó, E de ruta 12, camino a San Carlos, 1971, *Krapovickas 18129* (BA). Santo Tomé, entrando a Garruchos, 23 Nov 1987, *Zuloaga 3136* (SI). San Miguel, esteros del Ibera, 6 Oct 1986, *Niederlein 1035* (BA). **Formosa**: Matacos, Ing. G. N. Juárez, 20 Feb 1983, *Arenas 2230* (SI). **Misiones:** Apóstoles, Azara, 23 Jan 1983, *Guaglianone 923* (SI). Candelaria, Bella Vista, 2 Mar 1945, *Schwarz 748* (MO, SI). Concepción, Barra Concepción, 8 Mar 1927, *Zotta* s.n. (BA 27/82). Posadas, arroyo Mártires, 22 Feb 1945, *Schwarz 720* (SI). San Ignacio, Santo Pipó, 6 Sep 1950, *Diem 1567* (SI).

4. ***Ocimum selloi*** Benth., Labiat. Gen. Sp.: 707. 1832. *Ocimum selloi* Benth. var. *genuinum* Briq., Bull. Herb. Boissier ser. 2, 7: 622. 1907. nom. inval. TYPE: Brazil, sine loc., *F. Sellow* (LECTOTYPE [here designated]: K 000485565!; ISOLECTOTYPE: W 114406!). Fig. 5.

Lumnitzera carnosa Spreng., Syst. Veg. 4(2): 223. 1827. *Ocimum carnosum* (Spreng.) Link and Otto ex Benth., Labiat. Gen. Sp.: 11. 1832. *Ocimum selloi* Benth. var. *carnosum* (Spreng.) Briq., Bull. Herb. Boissier ser. 2, 7: 622. 1907. TYPE: "ex Herb. Curt Sprengel; ex Herb. J.A. Schmidt" (LECTOTYPE [here designated]: HBG 518415!).

Ocimum tweedianum Benth., Prodr. 12: 38. 1848. *Ocimum selloi* Benth. var. *tweedianum* (Benth.) Briq., Bull. Herb. Boissier, ser. 2, 7: 622. 1907. TYPE: Uruguay, "in sylvis humidis ad fl. Uruguay," *J. Tweedie* s.n. (HOLOTYPE: K 485552!) **syn. nov.**

Ocimum selloi Benth. var. *angustifolium* Briq., Bull. Herb. Boissier, ser. 2, 7: 622. 1907. TYPE: Paraguay, "in Valle fluminis Yaca ad ripam fluminis in arenosis, Jan," *E. Hassler 7039* (LECTOTYPE [here designated]: G 307728!; ISOLECTOTYPES: G 307727!, G 307730!, G 307733!, P 0720637!, P 0634425!).

Ocimum selloi Benth. f. *subintegrifolium* Briq., Bull. Herb. Boissier, ser. 2, 7: 622. 1907. TYPE: Paraguay, Grand Chaco, Santa Elisa, 1903, *E. Hassler and T. Rojas 2680* (LECTOTYPE [here designated]: G 307740!; ISOLECTOYPES: G 307738!, G 307739!, G 307741!, G 307742!, MO 1260145!, P 720636!, S08-15335!) **syn. nov.**

Ocimum selloi Benth. f. *serratum* Briq., Bull. Herb. Boissier, ser. 2, 7: 622. 1907. TYPE: Paraguay, Concepción, Oct. *E. Hassler 7635* (LECTOTYPE [here designated]: G 307713!; ISOLECTOYPES G 307712!, G 307737!) **syn. nov.**

Ocimum graveolens Larrañaga, Escritos 1: 411. 1922. TYPE: Unknown. *nom. illeg*.

Ocimum montevideanum Larrañaga, Escritos 3: 58. 1924. TYPE: Unknown. *nom. illeg*

Subshrub or biannual herb, up to 80 cm high, stems erect, pilose pubescence toward the apical part, glabrous at the base, xylopodiferous root. Leaves subrhomboidal to ovate, 1.5–9 × 1–4.5 cm, membranaceous, petiole 1–4 cm long, base attenuated, apex acute, margin entire to irregularly serrate, adaxial surface glabrous, abaxial surface with brief pubescence over veins and margin. Inflorescence composed of six-flowered whorls, spaced 1–2 cm apart, grouped in bracteate pseudoracemes, to 3 cm long in anthesis, to 15–20 cm long in fruit, with a short peduncle, 2–4 cm long in anthesis and in fruit. Bracts small, ovate, inconspicuous, deciduous early in anthesis; bract scar developing into a bowl-shaped auxiliary nectary; flower pedicels puberulous, 1.5–3 mm long in anthesis and in fruit, somewhat reflex in fruit. Calyx 2.5–3 mm long in anthesis, to 10 mm long in fruit, subglabrous to hispid. Corolla pink, blue, or dark violet, 3.5–6 mm long. Stamens 5 mm long, the superior pair pilose at the base, the inferior pair glabrous. Style 7 mm long. Nutlets

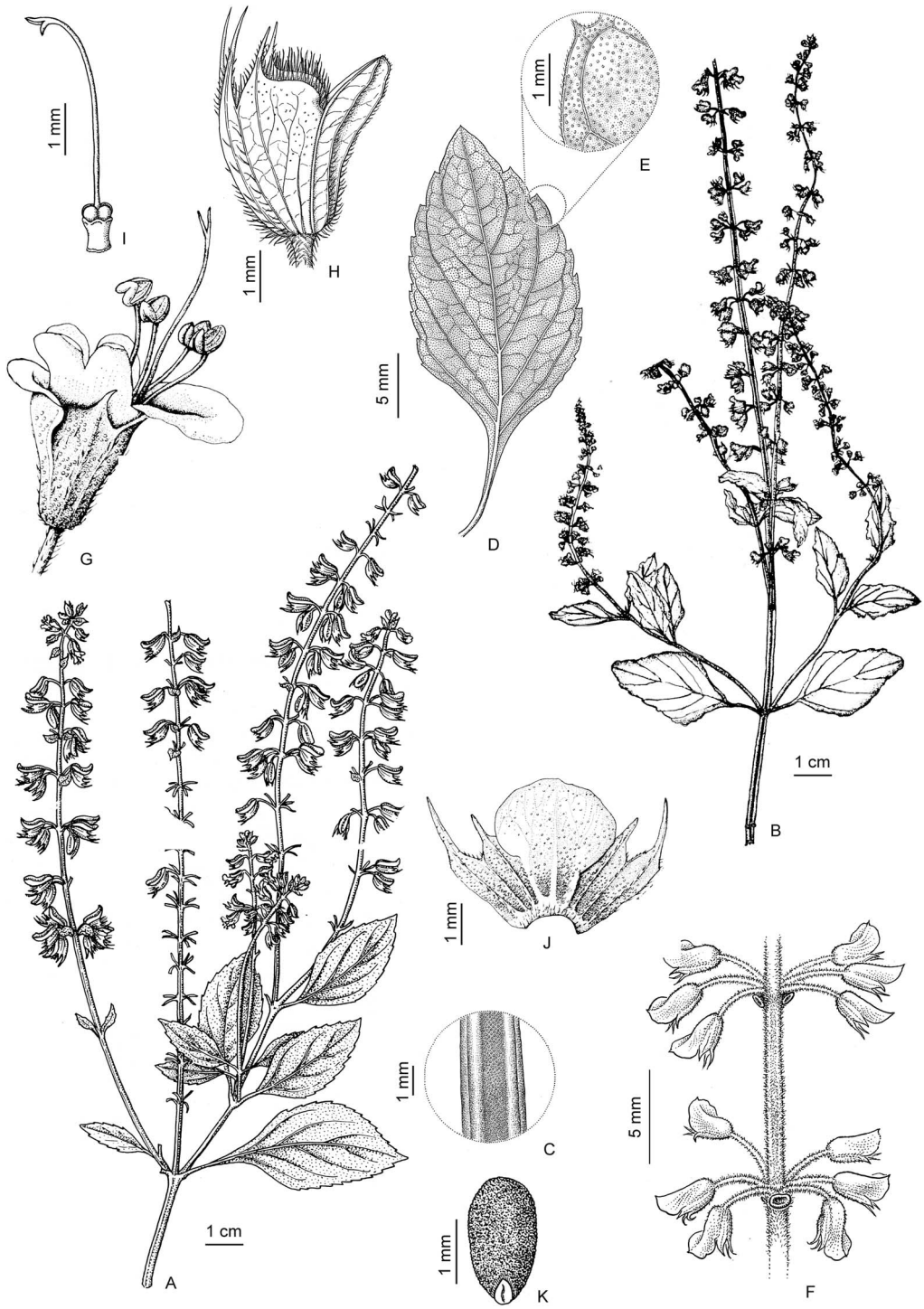

FIG. 5. *Ocimum selloi*. (A) Branch with infructescence. (B) Branch with inflorescence. (C) Detail of stem pubescence. (D) Leaf, abaxial surface. (E) Detail of pubescence on the abaxial leaf surface. (F) Detail of inflorescence nodes with bract scars developing into bowl-shaped auxiliary nectaries. (G) Flower. (H) Fruiting calyx. (I) Gynoecium. (J) Expanded calyx. (K) Nutlet. (A, B, G, H, I, J, K from *Burkart 21378*, Instituto de Botánica Darwinion; C, D, E, F from *Montes 2193*, Instituto de Botánica Darwinion).

obovoid, 1.5–2 mm long, light brown, slightly striate to reticulate.

COMMON NAMES. Albahaca de campo, albahacón, bergamota, anís de campo.

DISTRIBUTION AND HABITAT. *Ocimum selloi* is distributed from Mexico and Central America to Argentina, where it is found in northeastern Argentina, and also in northwestern Argentina in the province of Salta (Fig. 1D). It is also present in Uruguay. It is a very aromatic herb with unpleasant smell; it grows in damp, low, or stony roadsides, forests, and marginal fields.

DISCUSSION. The holotype of *Ocimum selloi* Benth. was housed at B, and was destroyed. Williams (1972: 108) mentions the phototype of *O. selloi* is F 17813, which is a photo from the Berlin destroyed specimen. However, this is not a formal lectotypification.

Recently, Rodrigues de Moraes *et al*. (2014) mentioned material from herbaria HAL and K as syntypes. Consequently, a lectotype is in this present work designated from original material housed at K.

Walsingham and Paton (2012) designate a neotype (K 000485567) for *Lumnitzera carnosa* Spreng. since the type was probably a plant cultivated in Berlin, from seeds brought from Montevideo by Sellow, which is now destroyed. However, Stafleu and Cowan (1985) state Sprengel's Labiateae types were sold to J. A. Schmidt in Heidelberg. There is a specimen at herbarium. HBG which bears a label: "*Lumnitzera carnosa* 1825 ex J.A. Schmidt"; this is probably the only original material from this taxon, and is here considered a suitable lectotype, following McNeill (2014).

A lectotype was selected for *Ocimum selloi* var. *angustifolium* Briquet since four different sheets from the specimen collected by Hassler 7039 were found at herbarium G, and the chosen material bears a label that reads exactly the same as the protologue: "In valle fluminis Y-aca ad ripam fluminis in arenosis, jan" and has Briquet's handwriting with the name of the species: "*Ocimum selloi* Benth. var. *angustifolium* Briquet det J Briquet 1907."

A lectotype was selected for *O. selloi* f. *subintegrifolium* Briq. since the author mentioned two different collections (syntypes) in the protologue: Hassler and Rojas 2680 and Hassler 3808. In herbarium G there are five sheets collected by Hassler and Rojas 2680 and three sheets collected by Hassler 3808. The selected lectotype bears Briquet's handwriting with the name of the species: "*Ocimum selloi* Benth. var. *tweedianum* Briq. f. *subintegrifolium* det. J Briquet 1907." A similar situation happened with the lectotype selected for *O. selloi f. serratum* Briq. The author also mentioned two different collections (syntypes) in the protologue: Hassler 7635 and Hassler 8680. In herbarium G there are three sheets collected by Hassler 7635 and three sheets collected by Hassler 8680. The selected lectotype bears Briquet's handwriting with the name of the species: "*Ocimum selloi* Benth. var. *tweedianum* Briq. f. *serrata* det. J Briquet 1907."

Ocimum selloi var. *genuinum* Brq. is not a validly published name following Article 24.3 (McNeill *et al*. 2012) since it indicates the taxon containing the type of the name of the next higher-ranked taxon: *O. selloi* sensu stricto.

The types of *Ocimum graveolens* Larrañaga and *O. montevideanum* Larrañaga do not exist (M. García, curator from Museo Nacional de Historia Natural (MVM), personal communication). Both are illegitimate names, and were treated by Epling (1937) as synonyms of *O. selloi* and *O. tweedianum*, respectively, so are here considered in this discussion.

Briquet (1907: 622) highlights similarities and differences between *O. selloi* Benth. and *O. carnosum* (Spreng.) Link and Otto ex Benth., reaching to the conclusion that both should be treated as different varieties of a same accepted species, *O. selloi*. Subsequent authors (Crespo 1979, Breedlove 1986, Pontiroli 1993, Hokche *et al*. 2008, Zuloaga *et al*. 2008, Walsingham and Paton 2012, Jørgensen *et al*. 2014) have considered *O. selloi* as conspecific with *O. carnosum*. Recently, Walsingham and Paton (2012), and later on Jørgensen *et al*. (2014), for the *Flora Mesoamericana* and the *Catálogo de Plantas Vasculares de Bolivia*, respectively, consider *O. carnosum* to be the valid name for this species. However, this name has been traditionally considered as a synonym of *O. selloi* by most authors (Crespo 1979, Breedlove 1986, Pontiroli 1993, Hokche *et al*. 2008, Zuloaga *et al*. 2008). In the present work, following Art. 11.5 from McNeill *et al*. (2012), we consider the traditionally employed name *O. selloi* as accepted and valid, given both names have both the same priority and the first

author to consider both names as synonyms chose *O. selloi* (Crespo 1979).

Paton *et al*. (1999) consider *O. tweedianum* Benth. a synonym of *O. ovatum*. However, the analysis of the type material evidences *O. tweedianum* has deciduous inflorescence bracts, being persistent in *O. ovatum*. As a consequence, in this treatment *O. tweedianum* is considered as a synonym of *O. selloi*, given that the only difference with the type of *O. selloi* is the more abundant pubescence in the former type specimen. The holotype of *O. tweedianum* corresponds to a plant with more pubescent leaves and stems than the most frequently found specimens of *O. selloi*; for example similar in pubescence to *Van der Sluÿs 1260* (SI).

The study of the type material of *O. selloi* f. *subintegrifolium* and of *O. selloi* f. *subserratum* evidences both are synonyms of typical *O. selloi*.

Selected Specimens Examined. ARGENTINA. **Corrientes**: Capital, Inta Sombrerito, 13 May 2004, *Barboza 995* (CORD). Curuzú-Cuatiá, Dec 1965, *Van der Sluÿs 1260* (SI). Empedrado, El Descabezudo, 13 Mar 1958, *Pedersen 4829* (MO). Ituzaingó, Saltos de Apipé, 1 Sep 1979, *Arbo 2352* (MO). Mercedes, La Elisa, 7 Feb 1925, *Millán 370* (SI). Monte Caseros, Ruta 14 entre Libertad y Pucheta, 29 Apr 1987, *Sáenz 311* (MO). Paso de los Libres, cruce ruta 23 sobre río Miriñay, 4 Nov 1973, *Boelcke 5246* (SI). Santo Tomé, Colonia Garabí, 3 Dec 1970, *Krapovickas 17036* (BA, CTES, MO). **Entre Ríos:** Concepción del Uruguay, Jan 1947, *Martínez Crovetto 4028* (CTES, MO). Colón, Ao. Pons, 10 Apr 1960, *Burkart 21895* (SI). Concordia, Pto. Yeruá, 30 Jan 1973, *Burkart 29468* (SI). Federación, Ea. La Matilde, 23 Nov 1976, *Troncoso 1336* (SI). Federal, Federal, 15 Feb 1917, *Hauman* s.n. (BA 1034). Feliciano, San José de Feliciano, Ea. Emilia, 15 Feb 1973, *Nicora 7708* (SI). Gualeguaychú, Gualeguaychú, 5 Jan 1932, *Burkart 4277* (SI). La Paz, Ao. Feliciano, ruta 126, *Burkart 21378* (SI). Paraná, María Grande, 20 Dec 1957, *Gautier 260* (SI). Tala, Rosario del Tala, 14 Apr 1963, *Sorarú 51* (SI). Villaguay, Chacra Gallo, 17 Apr 1981, *Bottino 48* (MO). **Misiones.** Cainguás, predio UNLP, picada cerca Balneario municipal, 10 Mar 2000, *Biganzoli 966* (SI). Candelaria, Santa Ana, camino a las ruinas jesuíticas, 27 Jan 1976, *Romanczuk 494* (SI), Santa Ana, 16 Sep 1946, *J. E. Montes 2193* (SI). Gral. Manuel Belgrano: Salto Tolador, 7 Nov 1985, *Múlgura 453* (SI). Iguazú, Parque Nacional Iguazú. Sendero Macuco, 6 Aug 1991, *Vanni 2671* (CTES). Leandro N. Alem, 2 km N Cerro Azul, 10 Mar 1969, *Krapovickas 15067* (BA, CTES). Lib. Gral. San Martín, Predio UNLP, Valle del Ao. Cuña Pirú, 19 Jul 1998, *Biganzoli 129* (MO, SI). Montecarlo, Ruta Provincial 212, Arroyo Paranay Guazú, 7 Mar 2000, *Deginani 1749* (SI). San Javier, Ao. Itacanavé, 1984, *Zuloaga 1941* (SI). San Ignacio, 3 Feb 1947, *Montes 824* (BA). San Pedro, Pque. Provincial Moconá, Saltos del Moconá, picada detrás de la casa del guardaparque, 26 Feb 1995, *Zuloaga 5000* (MO, SI). **Salta**. Iruya, Isla de Cañas, 3 Dec 2007, *Cabral 773* (CTES, SI). Orán, El Cedral, 30 Nov 1913, *F. Rodriguez 1077* (CTES, MO). Santa Victoria, entre Finca Arazayal y ruta 50, 4 Dec 2005, *Arbo 9047* (CTES). **Santa Fé**. Gral. Obligado, Sur de Tartagal, 8 Aug 1978, *Lewis 798* (CTES). Vera, noroeste de Los Cerritos, 19 Nov 1997, *Pensiero 5288* (SI).

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zusammengestellt von H. O. Juel. Arbeten utgifna med understöd af Vilhelm Ekamns universitetsfond, Uppsala, 21. A.–B. Akademiska Bokhandeln, Uppsala, Sweden; Otto Harrassowitz, Leipzig, Germany, in Kommission. 462 p.

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Appendix. Index to collectors.

Ocimum campechianum (1); *O. nudicaule* (2); *O. ovatum* (3); *O. selloi* (4).

Arbo 2352 (4), 9047 (4). Arenas 2230 (3). Bacigalupo 784 (4). Baez 44 (4)

Barboza 995 (4). Boelcke 1631 (3), 5246 (4). Biganzoli 129 (4), 138 (4), 803 (4), 852 (4), 966 (4). Bordón. s.n. CTES 408514 (3). Bottino 48 (4). Burkart 1077 (4), 4277 (4), 14316 (4), 20562 (4), 21378 (4), 21895 (4), 23109 (4), 24015 (4), 24236 (4), 25413 (4), 25423 (4), 25785 (4), 26040 (4), 26370 (4), 28416 (4), 29468 (4). Cabral, E. 773 (4). Cabrera 27546 (1), 30289 (1). Carnevali 1567 (3), 2240 (3). Castellanos s.n. BA 31/1297 (4). Correa 7885 (4). Deginani 1749 (4). Diem 1567 (3). Ekman 1846 (2). Ferraro 1013 (4). Fortunato 3135 (1). 3427 (1). Gautier 260 (4). Giberti 122 (4). Guaglianone 923 (3). Harley 12894 (1). Hassler 1903 (4). Hauman s.n. BA 1034 (4), s.n. BA 24/493 (2), 912 (4), 918 (3). Keller 249 (4), 1285 (4), 2206 (4), 2626 (4), 2662 (4), 4574 (3), 5333 (2), 5493 (4), 5649 (4), 7974 (2), 8084 (4), 9516 (3), 10449 (4). Krapovickas 12068 (3), 14975 (4), 15067 (4), 15149 (2), 17036 (4), 18129 (3), 25043 (4), 25631 (3), 26159 (2), 27499 (4), 28800 (2), 29468 (4), 41023 (4), 46710 (1). Kujawska s.n. BA 92071 (4), s.n. BA 92080 (4), s.n. BA 92093 (4), 51 (4), 119 (4). Lewis 798 (4). López, A. 66 (4). Martínez Crovetto 4028 (4), 10316 (4). Maruñak 562 (1). Millán 370 (4). Montes s.n. BA 69002 (4), 14B (3), 102 (4), 505 (4), 824 (4), 2193 (4), 2200 (2), 2202 (3), 2504 (4), 14657 (4), 15102 (4). Morrone 712 (4), 773 (4), 2227 (3), 2228 (2). Mroginski. 210 (4), 372 (4). Müch 1007 (4). Múlgura 453 (4), 1682 (3), 2222 (2), 2229 (3), 2262 (3), 4066 (2), 4361 (3). Naboulet 282 (4). Nicora 3261 (4), 4483 (4), 4540 (4), 5290 (4), 5362 (4), 7708 (4). Niederlein 525 (3), 1033 (3), 1035 (3). Partridge s.n BA 65082 (2). Paula-Souza 7236 (4), 7988 (1), 8023 (1). Pedelaborde 12088 (4). Pedersen 4829 (4), 7247 (4). Pensiero 5288 (4). Perrone s.n. BA 54575 (4),

s.n. BA 54577 (4). Quarín 2031 (4). Renvoize 3132 (2). Rodriguez s.n. BA 16291 (4), 49 (3), 466 (4), 740 (4), 917 (2), 921 (3), 1077 (4). Romanczuk 494 (4), 706 (4). Rothkugel 70 (1). Ruiz Moreno 411 (4). Sáenz 311 (4). Sanchez 813 (4). Saravia Toledo 14647 (4). Scarpa 351 (1), 775 (1). Schinini 5362 (4), 5596 (3), 12830 (4), 14474 (4), 17292 (4), 17530 (4), 36808 (2), 36873 (4). Schulz, A. G. 6998 (4), 16984 (3). Schwarz 720 (3), 748 (3), 772 (4), 4834 (2). Slanis 1064-2008 (1). Sorarú 51 (4). Sosa 21 (2). Suero s.n. BAA 12808 (4). Tressens 2481 (4), 2833 (3), 4894 (4), 5698 (4), 5731 (4). Troncoso 1336 (4), 2538 (4), 3714 (4). Tur 946 (4). Van de Venne (4). Van der Sluÿs 1260 (4). Vanni 868 (4), 2671 (4), 3897 (3). Zapata s.n. SI 20913 (4). Zotta s.n. BA 27/82 (3). Zuloaga 636 (3), 792 (4), 1161 (4), 1941 (4), 3110 (4), 3136 (3), 4964 (4), 5000 (4), 5804 (2).