

A New Species of *Geranium* Sect. *Neoandina* (Geraniaceae) from Colombia

Author(s): Carlos Aedo

Source: The Journal of the Torrey Botanical Society, 134(4):534-539. 2007.

Published By: Torrey Botanical Society

DOI: <http://dx.doi.org/10.3159/07-RA-031.1>

URL: <http://www.bioone.org/doi/full/10.3159/07-RA-031.1>

BioOne (www.bioone.org) is a nonprofit, online aggregation of core research in the biological, ecological, and environmental sciences. BioOne provides a sustainable online platform for over 170 journals and books published by nonprofit societies, associations, museums, institutions, and presses.

Your use of this PDF, the BioOne Web site, and all posted and associated content indicates your acceptance of BioOne's Terms of Use, available at www.bioone.org/page/terms_of_use.

Usage of BioOne content is strictly limited to personal, educational, and non-commercial use. Commercial inquiries or rights and permissions requests should be directed to the individual publisher as copyright holder.

A new species of *Geranium* sect. *Neoandina* (Geraniaceae) from Colombia¹

Carlos Aedo^{2,3}

Real Jardín Botánico, Consejo Superior de Investigaciones Científicas, Plaza de Murillo 2, 28014 Madrid, Spain

AEDO, C. (Real Jardín Botánico, Consejo Superior de Investigaciones Científicas, Plaza de Murillo 2, 28014 Madrid, Spain). A new species of *Geranium* sect. *Neoandina* (Geraniaceae) from Colombia. J. Torrey Bot. Soc. 134: 534–539. 2007.—A new species, *Geranium alonsoi*, from Boyacá and Cundinamarca in Colombia is described and illustrated, and the key to the species of *Geranium* sect. *Neoandina* is upgraded.

Key words: *Geraniaceae*, *Geranium*, Colombia, taxonomy.

The genus *Geranium* L. comprises about 380 species distributed throughout most of the world. South America is the richest area of the world, with over 130 species. Most of these species belong in subg. *Geranium*. The exceptions are section *Brasiliensia* R. Knuth (Aedo 2001a) included in subg. *Erodioidea* (Picard) Yeo and some non-native representatives of subg. *Robertium* (Picard) Rouy (Aedo et al. 1998). The genus was monographed by Knuth (1912), but no recent revisions for South America are available. Aedo (2000, 2001b) revised *Geranium* in North America and Moore (1943) in Central America, but there are no native species in these revisions that occur south of Panama.

In pursuit of my aim to prepare a comprehensive monograph of the genus I have studied some groups of *Geranium* from South America (Aedo 2001a, Aedo et al. 2002, 2003, 2005). One of these taxonomic revisions was that of *Geranium* sect. *Neoandina* Aedo resulting in the recognition of 22 species (Aedo et al. 2002) of this section, plus one species of sect. *Azorelloida* Aedo & al., and two other of sect. *Paramensia* R. Knuth. Soon afterwards a new species endemic from Peru was added to sect. *Neoandina* (Aedo 2004). In this paper, a

new species of this section is described from unidentified specimens of *Geranium*.

Geranium alonsoi Aedo, sp. nov. TYPE: Colombia. Cundinamarca, Villapinzón, de Villapinzón a Umbita, 21 May 1998, *Fernández Alonso et al. 15573* (holotype, MA-641407; isotypes, COL! HUA!)

A simili *Geranium siboldioides* Benth. praecipue differt cymulis 2-4-plo longioribus quam adiacenti folio -in hoc autem cymulae nunquam 2-plo longiores quam adiacens folium.

Herbs 20–69 cm tall, perennial, procumbent. Rootstock 0.9–2.7 mm diam., ± vertical; with short vegetative stems. Leaf lamina 0.9–2.1 cm long, 1.3–2.3 cm wide, polygonal in outline, cordate, palmatifid (divided for 0.80–0.94 of its length), usually glabrous on both sides, with antrorse, eglandular cilia 0.1–0.2 mm long on the margin, each segment ending in 1–3 bristles 0.3–0.8 mm long, sometimes ± hairy on abaxial surface, not coriaceous (± herbaceous); segments 5, lanceolate, sometimes obtriangular (with lanceolate lobes), 0.7–1.2 mm wide at the base, 1(3)-lobed at the apex (ratio main-sinus length of the middle segment / middle-segment length = 0.46–0.58); petioles to 2.7 cm long, with retrorse, appressed, eglandular hairs 0.1–0.4 mm long; stipules 7.5–11.7 mm long, 1.1–2.5 mm wide, lanceolate (with a setaceous apex 2.8–4.3 mm long), papery, reddish, with eglandular hairs on abaxial surface and on the margin, glabrous adaxially, ending in 1–3 bristles 0.4–0.8 mm long. Inflorescence in 1-flowered cymules; peduncles 11–34.9 mm, with retrorse, appressed, eglandular hairs 0.1–0.4 mm long; bracteoles 5–9.2 mm long, 0.7–1.2 mm wide; pedicels 21–80 cm long, with retrorse, appressed, eglandular hairs

¹ This work was partly financed by the Spanish Government through research project CLG2004-00172.

² The author wish to thank M. Lainz for the Latin diagnosis, and S. Castroviejo for uncompromising support. I also thank the editor and two anonymous reviewers for helpful comments. The following herbaria are thanked for loans or access to material: COL, F, GH, HUA, MICH, MO, NY.

³ E-mail: aedo@rjb.csic.es

Received for publication July 9, 2007, and in revised form September 28, 2007.

0.1–0.4 mm long; ratio cymule length / leaf length = (1.9)2.6–4.2. Sepals 5–8.3 mm long, 1.9–2.8 mm wide (ratio pedicel length/sepal length = 4.2–13.1), 3-nerved, mucronate (with mucro 0.4–1.2 mm long), with scarious margins 0.1–0.4 mm wide, with scattered erect-patent, eglandular hairs 0.4–1.2 mm long on base of abaxial side and margin, minutely hairy adaxially, ending in 1–3 bristles 0.4–0.8 mm long. Petals 7.6–14.1 mm long, 3.4–7.3 mm wide (ratio petal length/petal width = 1.6–2.6), obovate, entire, without claw, hairy on both sides (mainly on the base of adaxial side), ciliate on the basal margin, with hairs 0.2–0.38 mm long, purplish. Filaments 2.8–4 mm long, not exerted, lanceolate, glabrous, or with few eglandular hairs 0.2–0.4 mm long on the abaxial side and margin; anthers 0.8–1.1 mm long, 0.6–1 mm wide. Nectaries glabrous. Gynoecium 3.8–6.1 mm long. Fruit 10.6–14.8 mm long; mericarps 2.2–3.3 mm long, 1.2–1.7 mm wide, with antrorse, \pm appressed, eglandular hairs 0.1–0.3 mm long; rostrum 6.4–9.4 mm long, without a narrowed, with erect-patent, eglandular hairs 0.2–0.3 mm long; stigmatic remains 1.2–2.1 mm long (ratio fruit length/stigmatic remains length = 6.4–8.3), with 5 glabrous lobes. Seeds 1.5–2 mm long, 0.9–1.3 mm wide; hilum 1/6 as long as the perimeter (Fig. 1).

Habitat and phenology. Paramo, in moss on wet sites along water courses or boggy areas dominated by shrubs and frailejons, 2900–3700 m. Flowering between May and October.

Distribution. Colombia (departments of Boyacá and Cundinamarca). Fig. 2.

Paratypes. BOYACÁ: Duitama, páramo de la Rusia, 5° 40' N, 73° 5' W, 14 May 1982, *Arrieta & Castillo 82* (COL), *Rodríguez & Rojas 47* (COL). Gambita, vereda el Carmen, páramo de la Rusia, 5° 40' N, 73° 5' W, 14 May 1982, *Valbuena & Harker 50* (COL). Machetá, Páramo de Güina, 5° 5' N, 73° 36' W, 2 Oct 1986, *Rangel et al. 4069* (MA). Páramo de Bijagual, 5° 28' N, 73° 11' W, 16 Oct 1963, *Espinal & Montenegro 1375* (COL). Páramo de Huina entre Belén y Susacón, 6° 10' N, 72° 46' W, 6 May 1959, *Barclay 7582* (COL), *Barclay & Juajibioy 7630* (COL). Páramo de la Rusia near La Osera, station 83 along road between Duitama and Charalá, 5° 40' N, 73° 5' W, 20 Aug 1953, *Langenheim*

3519 (COL, MICH). Páramo de Monguí, laguna Colorada, 5° 43' N, 72° 50' W, 1 Sep 1998, *Calleja et al. 202* (MA). Páramo Ruso, 5° 40' N, 73° 5' W, 12 July 1968, *Barkley 38C148* (GH). Quebrada de Becerra, NW de Duitama, 5° 40' N, 73° 5' W, 4 Aug 1940, *Cuatrecasas 10391* (F). Toca, vereda La Colorada, páramo de Santo Ecce Homo, 5° 34' N, 73° 12' W, 24 Apr 1982, *Bejarano 208* (COL). Tutasa, km 10 of the road to El Páramo, 6° 2' N, 72° 51' W, 23 Feb 1999, *Stancik & Medina 2430* (COL). Upper rio Surba, 15 NW of Duitama, 5° 55' N, 73° 7' W, 7 May 1944, *Fosberg 21901* (NY). Villa de Leyva, 5° 37' N, 73° 33' W, 20 July 1979, *Melampy 244* (MO). Santuario de Fauna y Flora de Iguaque, 5° 37' N, 73° 33' W, *Piragua et al. 28* (COL). Villa de Leyva, Santuario de Iguaque, 5° 37' N, 73° 33' W, 20 July 1979, *Melampy 242* (COL). CUNDINAMARCA: Villapinzón, 5° 13' N, 73° 31' W, May 1998, *Cortés & Sandra 1608* (COL), *Fernández et al. 15557* (MA), *Fernández et al. 15565* (MA).

Etymology. Named in honor of José Luis Fernández Alonso, co-collector of the type, as well as some paratypes.

Discussion. *Geranium alonsoi* is an endemic to Central Colombia. Of the *Geranium* that grow in Colombian paramos, it resembles most closely *G. sibbaldioides* subsp. *elongatum* (Wedd.) Aedo, from which it is easily distinguished by its longer cymules which much overlap adjacent leaves. Cymules of *G. alonsoi* present a well developed peduncle, a pair of bracteoles, and a pedicel, while in *G. sibbaldioides* subsp. *elongatum* cymules are restricted to a short pedicel. Additionally, leaves of *G. alonsoi* are glabrous or with scattered hairs on abaxial side and margin, and less deeply divided those of *G. sibbaldioides* subsp. *elongatum*, which has abundant hairs at least on abaxial side. Fruit of *G. alonsoi* is shorter than in *G. sibbaldioides* subsp. *elongatum*.

Geranium costaricense also resembles *G. alonsoi*. Upon closer inspection, however, the difference between them become apparent, with leaf segments 3-9-lobed at apex, not deeply divided, short cymules (ratio cymule length/leaf length = 0.4–1.4), and a rostrum with a narrowed apex in *G. costaricense* versus leaf segments 1(3)-lobed at apex, deeply divided, long cymules (ratio cymule length/leaf length = (1.9)2.6–4.2), and a rostrum without

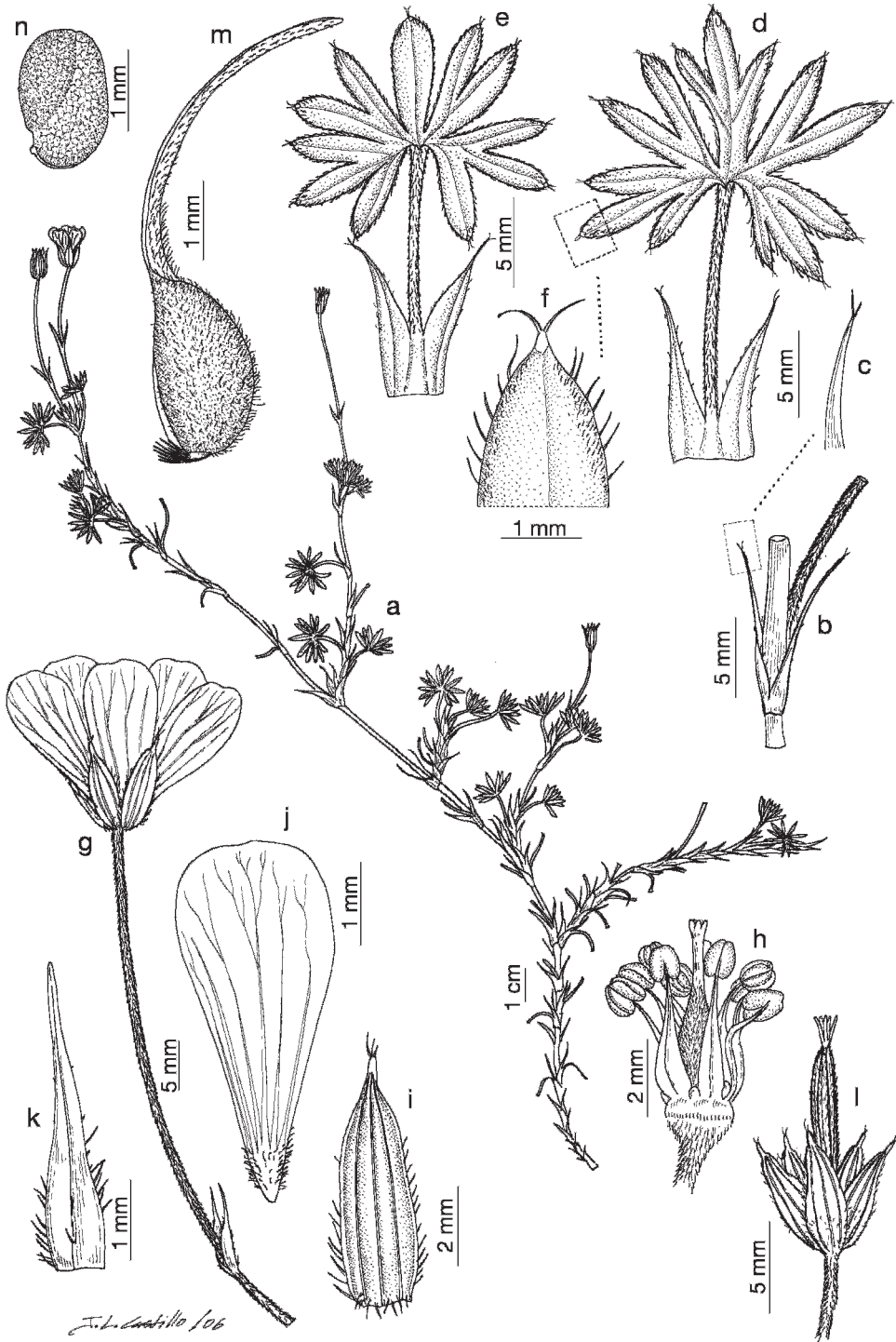


FIG. 1. *Geranium alonsoi*. **a**. Habit. **b**. Stipules. **c**. Stipule apex. **d–e**. Leaves. **f**. Leaf lobe apex. **g**. Cymule. **h**. Flower without petals and sepals. **i**. Sepal. **j**. Petal. **k**. Staminal filament. **l**. Fruit. **m**. Mericarp. **n**. Seed. (**a–c**, **e–f**: from Langenheim 3519, MICH; **d**, **j**: from Barclay 7582, COL; **g**, **i**, **k–l**: from Bejarano 208, COL; **m**, **n**: from Fernández Alonso et al. 15557, MA).

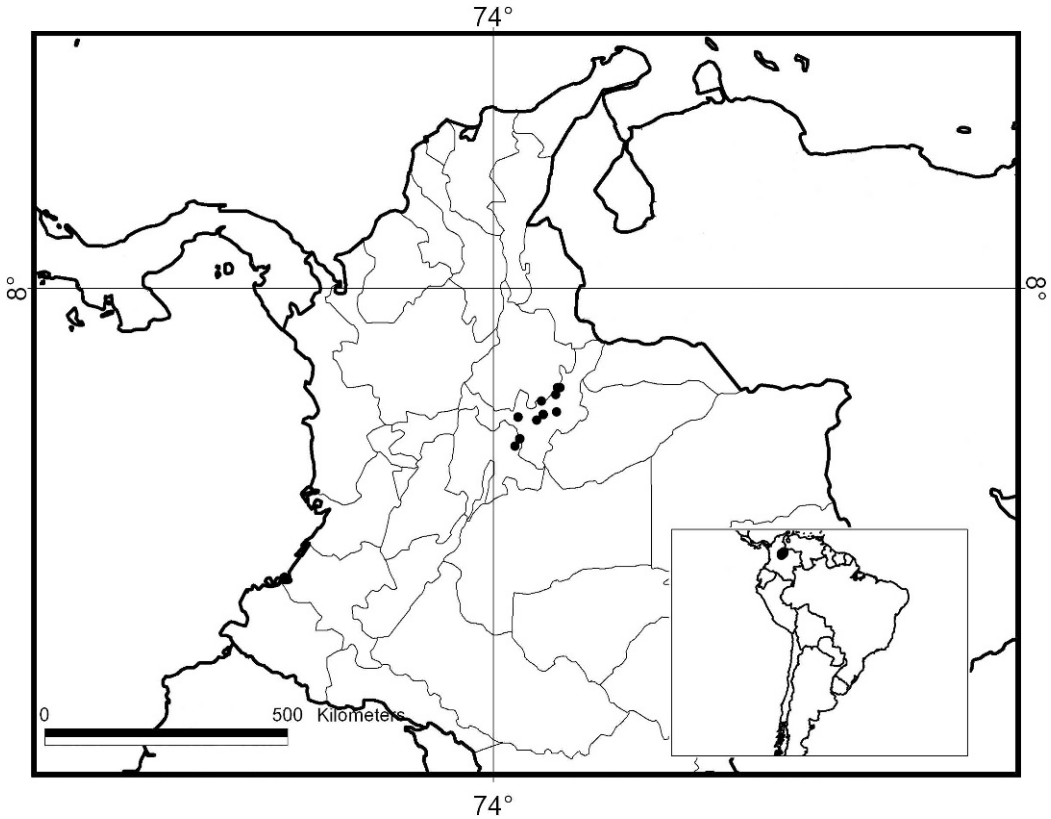


FIG. 2. Distribution of *Geranium alonsoi* Aedo.

narrowed apex in *G. alonsoi*. In addition, the geographical ranges of *G. costaricense* and *G. alonsoi* do not overlap at all: the first species is endemic to Costa Rica and Panama.

Species of *Geranium* sect. *Neoandina* known from Colombia, and more or less sympatric with *G. alonsoi*, are indicated in the key by an asterisk in order to facilitate identifications.

KEY TO THE SPECIES OF *GERANIUM* SECT. *NEOANDINA* AND SECT. *AZORELLOIDA*

- 1. Lamina white-sericeous at least above 2
- 2. Lamina sericeous above, glabrous beneath. **G. humboldtii** Spreng.
- 2. Lamina sericeous on both sides 3
- 3. Lamina digitate, with 3–5 segments; lateral segments upward
 **G. digitatum** R. Knuth
- 3. Lamina palmatifid to palmatisect; lateral segments patent or downward 4
- 4. Lamina palmatisect 5
- 5. Petiole sericeous, with antrorse hairs. 6
- 6. Petals 4–7 mm; nectaries glabrous; fruit rostrum without a narrowed apex **G. tovarii** Aedo
- 6. Petals 11–15 mm; nectaries hairy; fruit rostrum with a narrowed apex 1–1.5 mm long **G. weddellii** Briq.
- 5. Petiole sericeous, with patent or retrorse hairs. 7
- 7. Lamina 0.45–0.82 cm long; petioles with retrorse, ± appressed hairs 0.2–0.3 mm long; sepals 4.5–7.2 mm long with a mucro 0.5–0.9 mm long **G. ecuadoriense** Hieron.
- 7. Lamina 0.9–1.7 cm long; petioles with patent to retrorse (not appressed) hairs 0.8–1.6 mm long; sepals 7–9 mm long with a mucro

- ca. 0.3 mm long **G. sericeum** Willd. ex Spreng.
4. Lamina palmatifid 8
8. Middle and usually lateral leaf segments 3-lobed **G. ruizii** Hieron.
8. Middle and lateral leaf segments entire 9
9. Lamina 0.2–0.5(–0.6) cm long, with 5 segments; sepals without mucro **G. planum** Halloy
9. Not as above 10
10. Petals 7–10.5 mm long; fruit rostrum without a narrowed apex; lamina 0.42–0.7 cm long **G. crassipes** Hook. ex A. Gray
10. Petals 13–18 mm long; fruit rostrum with a narrowed apex; lamina 0.9–1.2 cm long **G. nivale** R. Knuth
1. Lamina glabrous to densely hairy, never sericeous 11
11. Lamina tridentate at the apex, with entire or rarely dentate teeth; petals emarginate **G. azurelloides** Sandwith*
11. Not as above 12
12. Lamina tripartite **G. campii** H.E. Moore
12. Lamina digitate, palmatifid or palmatisect 13
13. Lamina digitate, with 3–5 segments; lateral segments upward 14
14. Lamina glabrous or with antrorse cilia on the margin; middle leaf segment entire **G. maniculatum** H.E. Moore*
14. Lamina with patent cilia on the margin; middle leaf segment 3-lobed **G. rhomboidale** H.E. Moore*
13. Lamina palmatifid or palmatisect; lateral segments patent or downward . . . 15
15. Lamina palmatisect 16
16. Petiole with retrorse, appressed hairs; nectaries hairy; fruit rostrum with a narrowed apex 1 mm long **G. macbridei** Aedo
16. Petiole with patent hairs (sometimes glabrous); nectaries glabrous; fruit rostrum without a narrowed apex **G. multipartitum** Benth.*
15. Lamina palmatifid 17
17. Stipules scarious, stramineous, obtuse
- **G. stramineum** Triana & Planch.*
17. Stipules papery, reddish, lanceolate 18
18. Petiole with antrorse hairs **G. jaekelae** J.F. Macbr.
18. Petiole with patent to retrorse hairs 19
19. Cymules (1.9)2.6–4.2 times as long as adjacent leaves
- **G. alonsoi** Aedo
19. Cymules 0.5–1.6(1.8) times as long as adjacent leaves 20
20. Lamina hairy on one or both sides 21
21. Stipules not ending in bristle **G. pavonianum** Briq.
21. Stipules ending in 1–3 bristles 0.2–0.8 mm long 22
22. Without peduncles; middle segment of the leaf with 1(3) lobes at apex
- **G. sibbaldioides** subsp. **elongatum** (Wedd.) Aedo*
22. Peduncles 8–53 mm long; middle segment of the leaf with (3)4–9 lobes at apex
- **G. costaricense** H.E. Moore
20. Lamina glabrous except on the margins 23
23. Middle segment of the lamina entire, sometimes with a lateral tooth
- **G. sibbaldioides** Benth. subsp. **sibbaldioides***
23. Middle segment of the lamina 3-9-lobed at the apex . 24
24. Petiole with patent, eglandular hairs 0.2–0.7 mm long; petals 15–18 mm long **G. foreroi** Aedo*
24. Petiole with retrorse, appressed, eglandular hairs 0.1–0.4(0.7) mm long; petals 8.1–15.5 mm long. . 25

25. Lamina (1.7)1.9–2.8 cm wide, deeply divided (middle segment 3-9-lobed at the apex; ratio second sinus / middle-segment length = 0.33–0.53); rostrum 9–9.5 mm long, with a narrowed apex 0.5–1 mm long.
 **G. costaricense** H.E. Moore
25. Lamina 0.8–1.85 cm wide, shallowly divided (middle segment 3-lobed at the apex; ratio second sinus / middle-segment length = 0.1–0.38); rostrum 5–9 mm long, without a narrowed apex 26
26. Sepals with a mucro 0.6–1.2 mm long; petals 8.1–13.2 mm long, usually glabrous
 . . . **G. sibbaldioides** subsp. **beckianum** Aedo
26. Sepals with a mucro 0.3–0.7 mm long; petals 10.5–21 mm long 27
27. Petals hairy on both sides, mainly on the base of adaxial side; nectaries glabrous **G. paludosum** R. Knuth*
27. Petals glabrous; nectaries hairy
 **G. sagasteguii** Aedo

Literature Cited

- AEDO, C. 2000. The genus *Geranium* L. (*Geraniaceae*) in North America. I. Annual species. *Anales Jard. Bot. Madrid* 58: 39–82.
- AEDO, C. 2001a. Taxonomic revision of *Geranium* sect. *Brasiliensia* (*Geraniaceae*) *Syst. Bot.* 26: 205–215.
- AEDO, C. 2001b. The genus *Geranium* L. (*Geraniaceae*) in North America. II. Perennial species. *Anales Jard. Bot. Madrid* 59: 3–65.
- AEDO, C. 2004. A new species of *Geranium* sect. *Neoandina* (*Geraniaceae*) from Peru. *Harvard Papers Bot.* 9: 1–4.
- AEDO, C., F. MUÑOZ GARMENDIA, AND F. PANDO. 1998. World checklist of *Geranium* L. (*Geraniaceae*). *Anales Jard. Bot. Madrid* 56: 211–252.
- AEDO, C., J. J. ALDASORO, AND C. NAVARRO. 2002. Revision of *Geranium* sections *Azorelloida*, *Neoandina*, and *Paramensia* (*Geraniaceae*). *Blumea* 47: 205–297.
- AEDO, C., J. J. ALDASORO, L. SÁEZ, AND C. NAVARRO. 2003. Taxonomic revision of *Geranium* sect. *Gracilia* (*Geraniaceae*). *Brittonia* 55: 93–126.
- AEDO, C., C. NAVARRO, AND M. L. ALARCÓN. 2005. Taxonomic revision of *Geranium* sections *Andina* and *Chilensia* (*Geraniaceae*). *Bot. J. Linn. Soc.* 149: 1–68.
- KNUTH, R. 1912. *Geranium* L., p. 43–221, 575–583. In A. Engler [ed.], *Das Pflanzenreich* IV.129 (Heft 53). Engelmann, Leipzig.
- MOORE, H. E. 1943. A revision of the genus *Geranium* in Mexico and Central America. *Contr. Gray Herb.* 146: 1–108, 5 “Plate”.