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# A Synopsis of the South American *Weberbaueria* (Brassicaceae)

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**ABSTRACT.** Twenty-two species are recognized in *Weberbaueria* (Brassicaceae), and a key to distinguish them is given. *Weberbaueria dillonii*, *W. scabrifolia*, and *W. violacea* are described and illustrated, and their distinguishing characters from nearest relatives are discussed. The new combinations *W. peruviana* and *W. lechleri* are proposed. *Sisymbrium petraeum* and *S. fastigiatum* are reduced to synonymy of *W. lechleri*.

**RESUMEN.** Se reconocen veintidos especies en *Weberbaueria* (Brassicaceae), y se presenta una clave para distinguirlos. Se describen e ilustran *Weberbaueria dillonii*, *W. scabrifolia* y *W. violacea* y se discuten los caracteres que las distinguen de otras especies cercanas. Se proponen nuevas combinaciones de *W. peruviana* y *W. lechleri*. Los nombres *Sisymbrium petraeum* y *S. fastigiatum* se reducen a sinónimos de *W. lechleri*.

**Key words:** Brassicaceae, *Sisymbrium*, South America, *Stenodraba*, *Weberbaueria*.

*Weberbaueria* O. E. Schulz (Brassicaceae), a genus widely distributed in Peru, Bolivia, Argentina, and Chile (Appel & Al-Shehbaz, 2003), was recently revised and its boundaries critically delimited (Al-Shehbaz, 1990a, 1990b). The present paper continues this revision, recognizing 22 species in *Weberbaueria*, including three new species and two new combinations. The two names transferred herein to *Weberbaueria*, *W. peruviana* (DC.) Al-Shehbaz and *W. lechleri* (Fournier) Al-Shehbaz, were originally described in *Sisymbrium* L.

*Sisymbrium* was believed to have one of its major

centers of diversity in South America (Schulz, 1924; Al-Shehbaz, 1988), but that opinion has been shown to be incorrect (Warwick et al., 2002), and the genus is considered to be restricted primarily to the Old World, with only one species, *S. linifolium* Nuttall, native to the New World (western North America). Ravenna (1981) and Boelcke and Romanczuk (1984) placed in *Stenodraba* O. E. Schulz some species recognized here as *Weberbaueria*. Schulz (1924, 1936) separated *Stenodraba* from *Weberbaueria* solely on the absence instead of the presence of bracts. This is an unreliable feature for the delimitation of genera in Brassicaceae, and numerous other genera (e.g., *Cardamine* L., *Draba* L., *Rorippa* Scopoli, *Sisymbrium*) have species with or without bracts (Appel & Al-Shehbaz, 2003). As indicated by Al-Shehbaz (1990a), *Stenodraba* does not merit recognition.

In the enumeration below, the information provided includes the bibliographic citation of each species and its type collections. If the species is known from collections other than the type, one representative collection for every major locale is cited. For the full synonymy and typification of species 2, 3, 7, 8, 10, 12, 18–21, see Al-Shehbaz (1990a). For a detailed description of *Weberbaueria* and full account of its generic synonyms and their types, see Al-Shehbaz (1990a).

**Weberbaueria** Gilg & Muschler, Bot. Jahrb. Syst. 42: 481. 1909. TYPE: *Weberbaueria densiflora* (Muschler) Gilg & Muschler = *Weberbaueria spathulifolia* (A. Gray) O. E. Schulz.

KEY TO THE SPECIES OF *WEBERBAUERA*

- 1a. Plant, including fruit, densely covered with malpighiaceae trichomes; petals often pubescent . . . . . 21. *W. trichocarpa*
- 1b. Plants glabrous or with simple and/or stalked forked trichomes, rarely with malpighiaceae trichomes and then only on basal leaves; fruit glabrous or rarely sparsely pubescent with simple trichomes; petals glabrous.
- 2a. Inflorescence bracteate throughout, rarely uppermost flowers ebracteate.
- 3a. Petals violet, 6.5–7.5 × 3–3.5 mm . . . . . 22. *W. violacea*
- 3b. Petals white, 2–3.5(–5) × 0.7–2(–2.5) mm.
- 4a. Plants densely scabrous with appressed antrorse trichomes; basal leaves entire, densely scabrous adaxially, glabrous abaxially . . . . . 16. *W. scabrifolia*
- 4b. Plants glabrous or pilose with spreading trichomes; at least some leaves dentate, repand, lyrate, or pinnatifid, all glabrous or pubescent but never scabrous.
- 5a. Basal leaves not ciliate at base, sometimes glabrous or with forked trichomes . . . . . 18. *W. spathulifolia*
- 5b. Basal leaves conspicuously ciliate (at least basally) or densely covered with simple trichomes.
- 6a. Fruit apex attenuate; style 1–3 mm long; petals 3.5–5 mm long . . . . . 7. *W. herzogii*
- 6b. Fruit apex obtuse; style to 0.2 mm long; petals 2.5–3.5 mm long.
- 7a. Basal and lowermost cauline leaves lyrate-pinnatifid, ciliate; stems and leaves glabrous; cauline leaves and bracts entire or repand; seeds 3 to 5 per locule . . . . . 1. *W. bracteata*
- 7b. Basal and lowermost cauline leaves denticulate or dentate, not ciliate; stems and leaves densely pilose or hirsute; cauline leaves and bracts coarsely dentate; seeds 6 to 15 per locule.
- 8a. Cauline leaves and bracts sessile; stems retrorsely pilose; fruits glabrous; pedicels pilose; petals 2–2.5 mm wide . . . . . 6. *W. dillonii*
- 8b. Cauline leaves and bracts petiolate; stems hirsute; fruits hirsute; pedicels glabrous; petals 0.7–1 mm wide . . . . . 14. *W. peruviana*
- 2b. Inflorescences ebracteate, rarely lowermost few flowers bracteate.
- 9a. Sepals persistent into fruit; fruit sparsely pubescent with retrorse simple trichomes . . . . . 15. *W. retropilosa*
- 9b. Sepals soon caducous; fruit glabrous.
- 10a. Petals yellow; fruit septum perforate; leaves adaxially densely sericeous . . . . . 13. *W. perforata*
- 10b. Petals white; fruit septum complete; leaves glabrous or differently pubescent.
- 11a. Basal leaves numerous; petioles persistent, straw-colored, 3–3.5 cm long, ca. as long as blade, overlapping and forming a dense crown . . . . . 5. *W. densifolia*
- 11b. Basal leaves few to several; petioles soon caducous or if persistent, then not straw-colored, less than 3 cm long, shorter than blades, not forming a dense crown.
- 12a. Stems several-branched above; plants with some dendritic trichomes at least on stems and sepals.
- 13a. Basal leaves ciliate with simple trichomes, pubescent with dendritic trichomes . . . . . 12. *W. parvifolia*
- 13b. Basal leaves not ciliate, exclusively with malpighiaceae trichomes. . . . . 10. *W. lechleri*
- 12b. Stems simple above; plants glabrous or with simple and/or forked trichomes.
- 14a. Basal and cauline leaves not ciliate, sometimes glabrous or with some branched trichomes.
- 15a. Leaves fleshy, glabrous; petals 6.5–8 mm long; caudex thick, 1.5–2 cm diam. . . . . 17. *W. smithii*
- 15b. Leaves not fleshy, often pubescent or rarely glabrous; petals 2–3.5 (–4) mm long; caudex slender, almost always less than 1 cm diam.
- 16a. Basal leaves filiform to narrowly linear; cauline leaves coarsely dentate-serrate; trichomes minute, 0.03–0.1(–0.15) mm long . . . . . 11. *W. minutipila*
- 16b. Basal leaves oblong, ovate, lanceolate, or spatulate, very rarely linear; cauline leaves entire to repand or dentate; trichomes coarser, (0.2–)0.4–0.7(–1.1) mm long . . . . . 18. *W. spathulifolia*
- 14b. Basal and cauline leaves ciliate with simple trichomes.
- 17a. Basal leaves pinnatifid; inflorescence 1- to 3-flowered; petals less than 2 mm long; stems less than 2 cm tall . . . . . 4. *W. cymosa*
- 17b. Basal leaves entire, rarely dentate or sinuate; inflorescence (3- or)4- to 10(to 15)-flowered; petals 2–5.5 mm long; stems more than 2 cm tall.
- 18a. Basal leaves semiterete, thick, linear . . . . . 20. *W. suffruticosa*
- 18b. Basal leaves flat, thin, oblong to oblanceolate or spatulate, rarely linear-lanceolate.
- 19a. Style obsolete or rarely to 0.6 mm long in fruit.

- 20a. Fruit torulose; infructescence lax racemes; fruiting pedicel slender, divaricate, 4–8(–12) mm long; basal leaves entire, to 1.5 mm wide . . . . . 9. *W. lagunae*
- 20b. Fruit smooth; infructescence usually dense, subumbellate; fruiting pedicels stout, subappressed, 1.5–4.5(–7) mm long; basal leaves usually dentate, 2–4.5(–6) mm wide . . . . . 3. *W. colchaguensis*
- 19b. Style 1–3 mm long in fruit, if shorter than fruits conspicuously flattened.
- 21a. Leaves abaxially with trichomes shorter than those adaxially or on margin; fruit torulose; stems usually leafless; petioles of basal leaves stout, swollen . . . . . 8. *W. imbricatifolia*
- 21b. Leaves abaxially glabrous; fruit smooth; stems 1- to 4-leaved; petioles of basal leaves slender, not swollen.
- 22a. Basal leaves entire; petals (3.5–)4–5 mm long; style (0.8–)1.5–2 mm long in fruit . . . . . 19. *W. stenophylla*
- 22b. Basal leaves dentate; petals 2.5–3.5 mm long; style 0.5–0.9(–1.1) mm long in fruit. . . . . 2. *W. chillanensis*

**1. *Weberbaueria bracteata*** (O. E. Schulz) J. F. Macbride, *Candollea* 5: 356. 1934. *Pelagatia bracteata* O. E. Schulz, *Pflanzenreich* IV. 105(Heft 86): 192. 1924. TYPE: Peru. Ancash: Pallasca, Cordillera of Pelagatos, 4600 m, 23 Jan. 1920, A. Weberbauer 7234 (holotype, B; isotypes, F, G).

*Distribution.* Known only from the type collection.

**2. *Weberbaueria chillanensis*** (Philippi) Al-Shehbaz, J. Arnold *Arbor.* 71: 244. 1990. *Draba chillanensis* Philippi, *Anal. Univ. Chile* 2: 377. 1862. TYPE: Chile. [Región IX] Termas de Chillán, s.d., *Philippi s.n.* (holotype, SGO).

*Distribution.* Argentina (Prov. Mendoza) and Chile (Región VIII and IX).

*Representative specimens.* ARGENTINA. **Mendoza:** Malargüe, Baños del Azufre, 19 Jan. 1941, *Castellanos s.n.* (BA). CHILE. **Región VIII:** Volcán Peteroa, *Werdermann 604* (B, BM, E, F, G, GH, K, M, MO, NY, S, U, UC, Z). **Región IX:** Ñuble, Cordillera de Chillán, *Jaffuel 3722* (GH).

**3. *Weberbaueria colchaguensis*** (Barnéoud) Al-Shehbaz, J. Arnold *Arbor.* 71: 241. 1990. *Cardamine colchaguensis* Barnéoud, in Gay, *Fl. Chile* 1: 115. 1846. TYPE: Chile. [Región VII] Colchagua, Cordillera del Cajón del Azufre, cerca de volcán de Talcarégué, 8000–9000 ft. [2438–2743 m], s.d., *C. Gay 171* (holotype, P; isotype, G).

*Distribution.* Argentina (Prov. Mendoza, Neuquén, and Río Negro) and Chile (Región IV, Metropolitana, VII, VIII, X, XI, and XII).

*Representative specimens.* ARGENTINA. **Mendoza:** Laguna Atuel, *Böcher, Hjerting & Rahn 1976* (C, MO). **Neuquén:** Los Lagos, Filo Machete al Co. Rothleugal, *Dierre 929* (LIL). **Río Negro:** Cordón del Río Colorado, Cerro Gorra, 19 Feb. 1940, *Moreau s.n.* (BA). CHILE. **Región IV:** Choapa, La Vega Redonda, E of La Vega Escondida, *Morrison 16995* (DS, G, K, MO, S, UC). **Región Metropolitana:** Rio Blancos, *Frödin 580* (UPS). **Región VII:** Colchaqua, Las Damas, *Philippi 91b* (SGO). **Región VIII:** Curicó, El Valle de los Ciegos, near volcano of Peteroa, *Bridges 1120* (BM, E). **Región X:** Cautín, Villarica, *Neger s.n.* (M). **Región XI:** Osorno, Paso Puyehue, *Sparre & Constance 10812* (UC). **Región XII:** Cerro Agudo, 50°49'S, 72°57'W, *Arroyo & Squeo 870017* (CONC).

**4. *Weberbaueria cymosa*** Al-Shehbaz, J. Arnold *Arbor.* 71: 239. 1990. TYPE: Bolivia. La Paz: Murillo, near Palca, base of Illimani, 4800–5000 m, 25 Feb. 1979, A. Ceballos, A. Chapin, J. Fernández-Casas & E. Valdéz-bermeijo 543 (holotype, G).

*Distribution.* Endemic to Bolivia (Depto. La Paz).

*Representative specimens.* BOLIVIA. **La Paz:** Murillo, La Paz-El Alto-Valle de Zongo, 16°17'S, 68°7'W, *Beck 21752* (LPB, MO).

The species is known thus far only from the two collections cited above.

**5. *Weberbaueria densifolia*** Al-Shehbaz, J. Arnold *Arbor.* 71: 229. 1990. TYPE: Argentina. Prov. Catamarca: Depto. Santa María, Sierra del Aconquija, 4600 m, 20 Feb. 1925, *S. Venturi 6610* (holotype, US).

*Distribution.* Argentina (Prov. Catamarca) and Bolivia.

*Representative specimens.* ARGENTINA. **Catamarca:** Catamarca, *Rodríguez 1360* (MO). BOLIVIA. Without locality, *Navarro Sánchez 1147* (MO).

The species is known thus far only from the three collections cited above.

**6. *Weberbaueria dillonii*** Al-Shehbaz, sp. nov.  
TYPE: Peru. La Libertad: Bolívar, Ascenso Nevado de Cajamarquilla, 3000 m, 7°08'S, 77°42'W, 10 Nov. 2001, *I. Sánchez V., M. Dillon & G. Iberico 11172* (holotype, MO; isotypes not seen, CPUN, F). Figure 1.

Herba perennis retrorse pilosa, 15–25 cm alta. Folia basalia rosulata, petiolata, oblonga vel oblanceolata, 2–6 × 0.7–1.5 cm, denticulata, retrorse pilosa; folia caulina sessilia, oblonga vel ovata, grosse dentata. Racemi 20–50-flori, omnino bracteati; pedicelli fructiferi 4.5–6.5 mm longi, sigmoidei vel recurvati, retrorse pilosi. Sepala oblonga, 2.5–3 × 0.7–1 mm; petala alba, late obovata, 3–3.5 × 2–2.5 mm. Fructus lineares vel oblongo-lineares, 8–12 × 1.5–2 mm, glabri, curvati; stylus 0.1–0.2 mm longus; semina oblonga, 1–1.3 × 0.6–0.7 mm; cotyledones incumbentes.

Perennial herbs, retrorsely pilose throughout except for petals and fruits; caudex with petiolar remains of previous years; trichomes simple, retrorse; stems 15–25 cm long, erect or ascending, densely pilose with appressed retrorse trichomes, usually a few from the base, simple or branched above, densely pilose with appressed retrorse trichomes. Basal leaves rosulate; petiole 1–3 cm long, pubescent as stems; leaf blade oblong to oblanceolate, 2–6 × 0.7–1.5 cm, densely and retrorsely pilose on both sides, base cuneate to attenuate, margin denticulate, apex subacute; middle cauline leaves sessile, oblong to ovate, 1–2 cm × 4–8 mm, base cuneate, margin coarsely dentate, apex acute, pubescent as basal leaves. Raceme 20- to 50-flowered, bracteate throughout, dense, slightly elongated in fruit; bracts sessile, cuneate to subauriculate at base, similar to cauline leaves but progressively smaller upward; fruiting pedicels 4.5–6.5 mm long, sigmoid and slightly recurved, retrorsely pubescent. Sepals oblong, 2.5–3 × 0.7–1 mm, not saccate at base, sparsely pubescent below apex, ascending; petals white, broadly obovate, 3–3.5 × 2–2.5 mm, not clawed, apex rounded; filaments 2–2.5 mm long; anthers oblong, ca. 0.5 mm long. Fruits linear to oblong-linear, 8–12 × 1.5–2 mm, glabrous, curved, slightly flattened at a right angle to the septum; valves smooth, not veined; septum complete; style 0.1–0.2 mm long; stigma entire; seeds 8 to 10 per locule, oblong, brown, 1–1.3 × 0.6–0.7 mm; funicles slender along entire length; cotyledons incumbent.

*Weberbaueria dillonii*, which is known only from the type collections, is named in honor of Michael Dillon, one of the collectors of the type material who has done extensive fieldwork in Peru. It belongs to a group of four other species with fully bracteate racemes. It is most closely related to *W. peruviana*, from which it is easily distinguished by having sessile cauline leaves and bracts, retrorsely pilose stems and leaves, glabrous fruits, pilose fruiting pedicels, and broadly obovate petals 2–2.5 mm wide. *Weberbaueria peruviana* has petiolate cauline leaves and bracts, hirsute stems and leaves, sparsely to densely hirsute fruits, glabrous fruiting pedicels, and narrowly spatulate petals 0.7–1 mm wide.

The new species resembles (in its small petals < 4 mm long, minute styles to 0.2 mm long, and bracteate racemes) *Weberbaueria bracteata* (O. E. Schulz) J. F. Macbride, a species known only from the type collection made by August Weberbauer on January 1920 from Depto. Ancash and which has not yet been re-collected. From this, *W. dillonii* is distinguished by having densely and retrorsely pilose stems and leaves, denticulate and non-ciliate basal leaves, coarsely dentate cauline leaves and bracts, broadly obovate petals 2–2.5 mm wide, sigmoid and slightly recurved fruiting pedicels, linear to oblong-linear and curved fruits, veinless valves, and eight to ten seeds per locule. By contrast, *W. bracteata* has glabrous stems and leaves, lyrate-pinnatifid and ciliate basal and lowermost cauline leaves, entire or repand cauline leaves and bracts, spatulate petals ca. 1 mm wide, ascending fruiting pedicels subappressed at base to rachis, oblong and straight fruits, prominently veined valves, and three to five seeds per locule.

From the other two Peruvian species of *Weberbaueria* with fully bracteate racemes, *W. spathulifolia* (A. Gray) O. E. Schulz and *W. herzogii* (O. E. Schulz) Al-Shehbaz, *W. dillonii* is separated by having stems and leaves densely and retrorsely pilose (instead of glabrous or sparsely pubescent with spreading trichomes) and funicles slender along the entire length (instead of distinctly flattened at base). From *W. spathulifolia* it is also separated by having exclusively simple instead of forked and submalpighiaceae trichomes mixed with simple ones, and from *W. herzogii* it differs by the minute style 0.1–0.2 mm long instead of (0.8–)1.2–2.5 mm long.

**7. *Weberbaueria herzogii*** (O. E. Schulz) Al-Shehbaz, *J. Arnold Arbor.* 71: 236. 1990. *Sarcodraba herzogii* O. E. Schulz, *Notizbl. Bot. Gart. Berlin-Dahlem* 10: 563. 1929. TYPE: Bolivia Felsplatten der Hügel über dem Titi-

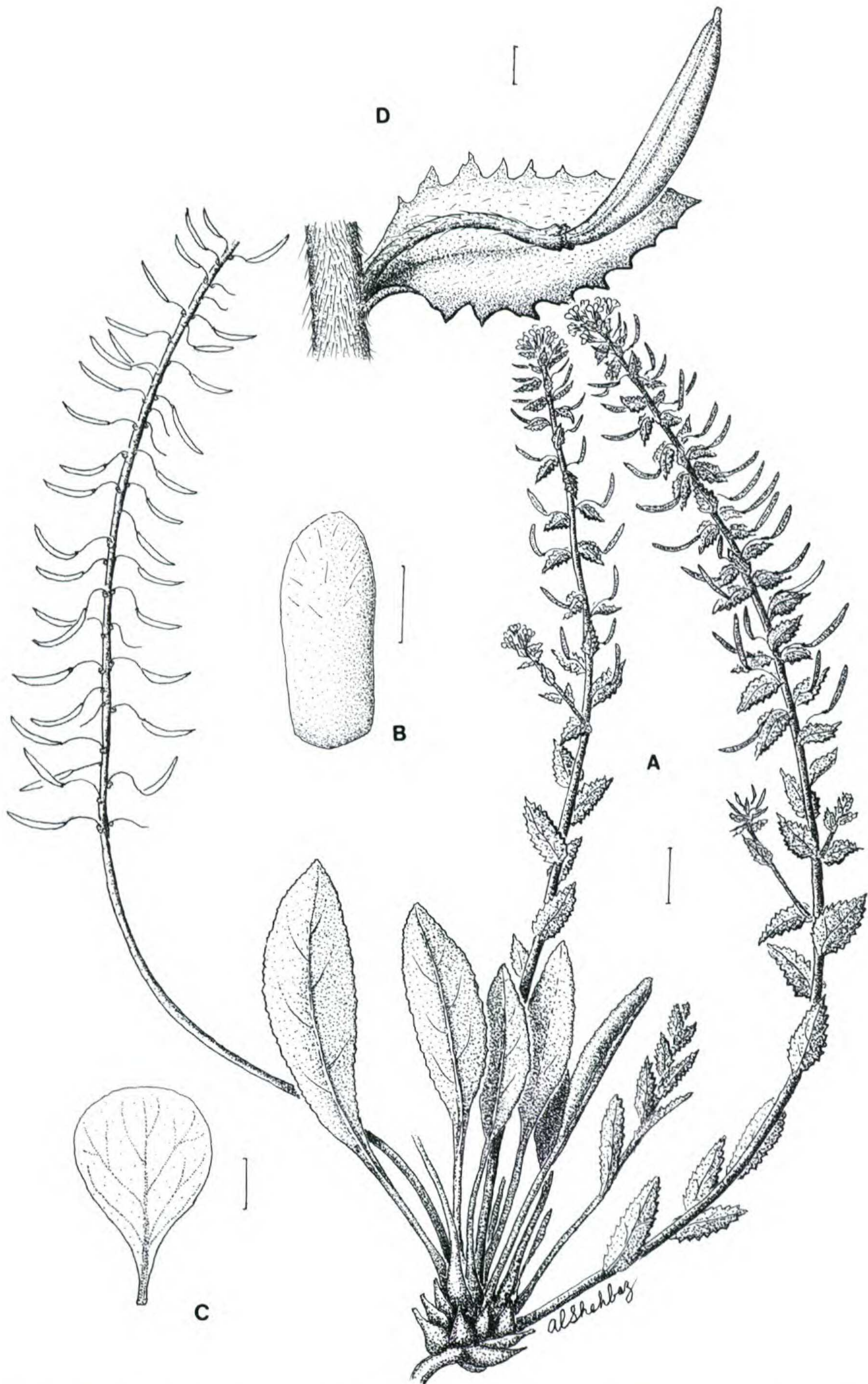


Figure 1. *Weberbaueria dillonii* Al-Shehbaz. —A. Plant with remains of infructescence (left) of previous season. —B. Sepal. —C. Petal. —D. Bract, fruiting pedicel, and fruit. Drawn from the MO holotype (*I. Sánchez V., M. Dillon & G. Iberico 11172*) by Al-Shehbaz. Scale: A = 1 cm, B–D = 1 mm.

cacasee bei Guagqui, ca. 3900 m, s.d., *T. Herzog 2510* (holotype, B; isotypes, G, S, Z).

*Distribution.* Argentina (Prov. Jujuy), Bolivia (Depto. La Paz and Potosí), and Peru (Depto. Puno).

*Representative specimens.* ARGENTINA. **Jujuy:** Humahuaca, Esquinas blancas, between Tres Cruces and Humahuaca, *Ruthsatz 13/18* (GH). BOLIVIA. **La Paz:** Ingavei, Guaqui, *Asplund 2226* (S, UPS). **Potosí:** Frias, ca. 25 km N of Yocalla towards Ventanilla, *Wood 11743* (K, MO). PERU. **Puno:** Puno, *Shepard 38* (GH, US).

**8. *Weberbaueria imbricatifolia*** (Barnéoud) Al-Shehbaz, *J. Arnold Arbor.* 71: 247. 1990. *Draba imbricatifolia* Barnéoud, in Gay, *Fl. Chile* 1: 158. 1846. TYPE: Chile. [Región IV] Cordillera de Coquimbo, 12,000 ft. [3658 m], *C. Gay s.n.* (holotype, P; isotype, B).

*Distribution.* Argentina (Prov. San Juan) and Chile (Región IV, V, and VI).

*Representative specimens.* ARGENTINA. **San Juan:** Dept. Iglesia, 31 km W of Arrequeintin, 15 Feb. 1985, *Hunziberg & Gamero s.n.* (OS). CHILE. **Región IV:** Coquimbo, Cordillera de Combarbalá, Laguna Tibia, 31°17'S, 70°45'W, *Jiles 4864* (CONC, M). **Región V:** Pectorca, 5 km S of Junta de Piuquenes, Río Sobrante, *Morrison 17290* (DS, K, UC). **Región VI:** Santiago, Andes of San José, *Gay 1028* (SGO).

**9. *Weberbaueria lagunae*** (O. E. Schulz) Al-Shehbaz, *J. Arnold Arbor.* 71: 246. 1990. *Stenodraba suffruticosa* (Barnéoud) O. E. Schulz var. *lagunae* O. E. Schulz, *Notizbl. Bot. Gart. Berlin-Dahlem* 10: 469. 1928. TYPE. Chile. Vallenar, Cordillera Laguna Chica, ca. 4000 m, Jan. 1924, *E. Werdermann 262* (holotype, B; isotypes, BM, CONC, E, F, G, GH, K, MO, UC).

*Distribution.* Endemic to Chile (Región III).

*Representative specimens.* CHILE. **Región III:** vicinity of Laguna Valeriano, *Johnston 6065* (CONC, GH, US).

**10. *Weberbaueria lechleri*** (Fournier) Al-Shehbaz, comb. nov. Basionym: *Sisymbrium lechleri* Fournier, *Rech. Crucif.* 129. 1865. TYPE: Chile. Terra Pehuenchorum, Dec. 1854, *W. Lechler 3080* (holotype, P; isotypes, G[2], K, P[2]).

*Sisymbrium petraeum* Philippi, *Linnaea* 28: 668. 1856, non *S. petraeum* (L.) Delarbre, *Fl. Auv.* ed. 2: 349. 1800. Syn. nov. *Stenodraba glareosa* Ravenna, *Nordic J. Bot.* 1: 141. 1981. TYPE: Chile. [Prov. Ñuble] "in Andibus prope oppidum Chillán," *R. A. Philippi s.n.* (holotype, SGO 49254).

*Sisymbrium fastigiatum* Philippi, *Anal. Univ. Chile* 41: 670. 1872. Syn. nov. TYPE: Chile. [Prov. Santiago]:

Mina Cristo, valley of Maipo, *B. Dávila s.n.* (lectotype, designated by Muñoz-Schick (1973: 30), SGO 45138).

*Distribution.* Argentina (Prov. Neuquén and Río Negro) and Chile (Región IX).

*Representative specimens.* ARGENTINA. **Neuquén:** Cerro Colohuincul, *Comber 876 E* (K). **Río Negro:** Bariloche, lago Moreno Este, *Hosseus 107* (BAF). CHILE. **Región IX:** Cordillera of Chillan, 1856–1857, *P. Germain s.n.* (G, K, W).

Muñoz-Schick (1973) designated the above lectotype of *Sisymbrium fastigiatum*, but Ravenna (1981) overlooked that lectotypification and erroneously designated another one of Dávila's collections (SGO 47168) as the lectotype. Ravenna (1981) treated *S. petraeum* Philippi, *S. lechleri*, *S. caespitosum* Philippi, and *S. fastigiatum* as four independent species that he placed in the genus *Stenodraba* O. E. Schulz, but the alleged differences given by him are trivial and quantitative in nature. All are indistinguishable in every aspect, especially in their trichomes, which are malpighiaceous on the basal leaves and dendritic on the stems, cauline leaves, and sepals. The density of trichomes is quite variable in *Weberbaueria lechleri*, and the holotype has malpighiaceous trichomes restricted to the margins of basal leaves, whereas the isotypes have such trichomes on both leaf surfaces. As indicated above, *Stenodraba* does not merit recognition independent of *Weberbaueria*.

Schulz (1924) first placed *Weberbaueria lechleri* in *Heterothrix* (B. L. Robinson) Rydberg and later (Schulz, 1936) in *Pennellia* Nieuwland, but he used the illegitimate later homonym *Sisymbrium petraeum* Philippi as the basionym for his combinations. As indicated by Al-Shehbaz (1990c) and Rollins (1980), the generic name *Heterothrix* is an illegitimate later homonym for a genus in the Apocynaceae, and the correct name for the mustard genus is *Pennellia*. *Pennellia* differs from *Weberbaueria* by having a cup-shaped calyx with purple sepals about as long as the petals. *Weberbaueria* has an oblong calyx with green sepals distinctly shorter than the petals.

**11. *Weberbaueria minutipila*** Al-Shehbaz, *J. Arnold Arbor.* 71: 231. 1990. TYPE: Peru. Puno: San Román, Puno–Arequipa road at km 112.8, ca. 4 km (air) E of Tinocopalca (km 119.5), ca. 10 km W of road turnoff to Sta. Lucía (at km 101), ca. 4000 m, 12 Jan. 1963, *H. H. & C. M. Iltis with D. & V. Ugent 1455* (holotype, GH; isotype, WIS).

*Distribution.* Bolivia (Depto. La Paz) and Peru (Depto. Arequipa, Puno).

*Representative specimens.* BOLIVIA. **La Paz:** Valle Chuquiaguillo, *Asplund 1888* (S, UPS). PERU. **Arequipa:** Arequipa, S of Sta. Lucía on road from Puno to Arequipa, ca. 4–5 km E of Sta. Lucía, *Iltis & Ugent 1415* (WIS).

**12. *Weberbaueria parvifolia*** (Philippi) Al-Shehbaz, J. Arnold Arbor. 71: 248. 1990. *Sisymbrium parvifolium* Philippi, Linnaea 28: 667. 1856. TYPE: Chile. Cordillera de Linares, s.d., *Germain s.n.* (holotype, SGO).

*Distribution.* Argentina (Prov. Neuquén) and Chile (Región Metropolitana, VII, and VIII).

*Representative specimens.* ARGENTINA. **Neuquén:** Cordillera del Viento, cruzada de Tricao, Malal al Cajón de Butaló, *Boelcke et al. 11565* (BAA, SI). CHILE. **Región Metropolitana:** Monumento Natural el Morado, *Price 1409* (MO). **Región VII:** Colchagua, San Fernando, Termas El Falco, *Montero 6043* (SI). **Región VIII:** Curicó, Termas del Flaco (Andes de Colchagua), *Aravena 33349* (G, GH, MO).

**13. *Weberbaueria perforata*** Al-Shehbaz, Ann. Missouri Bot. Gard. 77: 841. 1990. TYPE: Peru. Cuzco: Nevado Auzangate [as Ausangate], 71°24'W, 13°38'S, 4800 m, 11 May 1957, *R. Hirsch P1255* (holotype, GH).

*Distribution.* Known only from the type collection.

**14. *Weberbaueria peruviana*** (DC.) Al-Shehbaz, comb. nov. Basionym: *Sisymbrium peruvianum* DC., Syst. Nat. 2: 477. 1821. TYPE: Peru. *H. Ruiz & J. A. Pavón s.n.* (holotype, BM; isotypes, B, G-DC).

*Distribution.* Argentina (Prov. Catamarca, Jujuy, and Tucumán), Bolivia (Depto. Chuquisaca, Cochabamba, La Paz, Oruro, and Potosí), and Peru (Depto. Ayacucho, Cuzco, Huancavelica, Lima, Puno, and Tacna).

*Representative specimens.* ARGENTINA. **Catamarca:** Cerro Overo, *Brücher 95017* (M). **Jujuy:** Humahuaca, Mina Aguilar, 14 km N of Molina de Minera Aguilar, *Hunziker et al. 10568* (SI). **Tucumán:** Tafi, cumbres Calchaquies, Co. Bayo, 26°43'S, 65°42'W, *Gómez-Sosa & Múlgura 204* (MO, SI). BOLIVIA. **Chuquisaca:** Zudañez, Cordillera de los Sombreros, along Icla and Azurduy road, *Wood & Carretero 16149* (K, MO). **Cochabamba:** Quillacollo, camino Sipe Sipe a Kami, cuenca del valle de Cochabamba, *Beck et al. 18064* (MO). **La Paz:** 47.2 km NE of Peñas on road to Valle Hichucota, *Solomon 4957* (GH, MO). **Oruro:** Sajama, Curahura de Carangas, 10 km SW on backroad, 68°25'W, 17°50'S, *Johns 83-39* (F, LPB, MO). **Potosí:** 10 km S of Potosí, *West 6359* (GH, MO). PERU. **Ayacucho:** Luncanas, Pampa Galeras, *Tovar 6704*

(MO). **Cuzco:** Urubamba, Chichero, Cuper, Qoriwayrachina, 72°0'W, 13°25'S, *C. & E. Franquemont 314* (F). **Huancavelica:** Morococha, *Grant 7573* (A, F). **Lima:** Huarochiri, laguna de Tuctucocha, *Cerrate 1866* (GH). **Puno:** Macusani, road from Ollachea to Macusani, 70°30'W, 13°53'S, *M. & K. Weigend 2000/120* (MO). **Tacna:** Tarata, Corillera del Barroso, *Torre et al. 2135* (MO).

As a result of its exclusion from *Sisymbrium* (Warwick et al., 2002) and the discovery herein of its nearest relative, *Weberbaueria dillonii*, *S. peruvianum* is appropriately transferred to *Weberbaueria* after being recognized in *Sisymbrium* since its discovery more than 180 years ago. In every aspect of morphology (see discussion under *W. dillonii*), the species is at home in *Weberbaueria*.

**15. *Weberbaueria retropilosa*** Al-Shehbaz, J. Arnold Arbor. 71: 234. 1990. TYPE: Bolivia. Depto. La Paz: Prov. Pacajes, Charaña, 4000 m, 2 Mar. 1921, *Asplund s.n.* (holotype, US).

*Distribution.* Endemic to Bolivia (Depto. La Paz).

*Representative specimens.* BOLIVIA. **La Paz:** Pacajes, Charaña, *Asplund 2700* (S, UPS).

The species is known thus far only from the two collections above.

**16. *Weberbaueria scabrifolia*** Al-Shehbaz, sp. nov. TYPE: Peru. Huánuco: Dos de Mayo, road from Pachas to Llata, 4030 m, 9°42'S, 76°47'W, flat puna, 18 Mar. 2001, *M. Weigend, K. Weigend, M. Binder & E. Rodriguez 5220* (holotype, M; isotype, MO). Figure 2.

Herba perennis, 3–6 cm alta. Folia basalia petiolata, oblonga, 7–20 × 3–9 mm, integra, superne antrorse scabra, inferne glabra; folia caulina sessilia, oblanceolata vel linearia, integra. Racemi 10–27-flori, omnino bracteati; pedicelli fructiferi 4–7 mm longi, recti, pubescentes. Sepala oblonga, 2.5–3 × ca. 1 mm; petala alba, spathulata, 3.5–4 × ca. 1.5 mm. Fructus lineares vel oblongo-lineares, 5–9 × ca. 1.5 mm, glabri, curvati; stylus ca. 1 mm longus; semina oblonga, ca. 1 × 0.5 mm; cotyledones incumbentes.

Perennial herbs; caudex slender, with leaf remains of previous years; trichomes simple, appressed, antrorse; stems 2 to 5 from base, unbranched, 3–6 cm long, decumbent or ascending, densely pubescent with appressed, antrorse trichomes to 0.6 mm long and to 0.04 mm wide at base. Basal leaves rosulate; petiole 4–10 mm long, ciliate; leaf blade oblong, 7–20 × 3–9 mm, abaxially glabrous, adaxially scabrous with antrorse, appressed trichomes to 0.4 mm long and to 0.12 mm wide at base, base cuneate, margin entire, apex obtuse; cauline leaves sessile or nearly so, oblanceo-

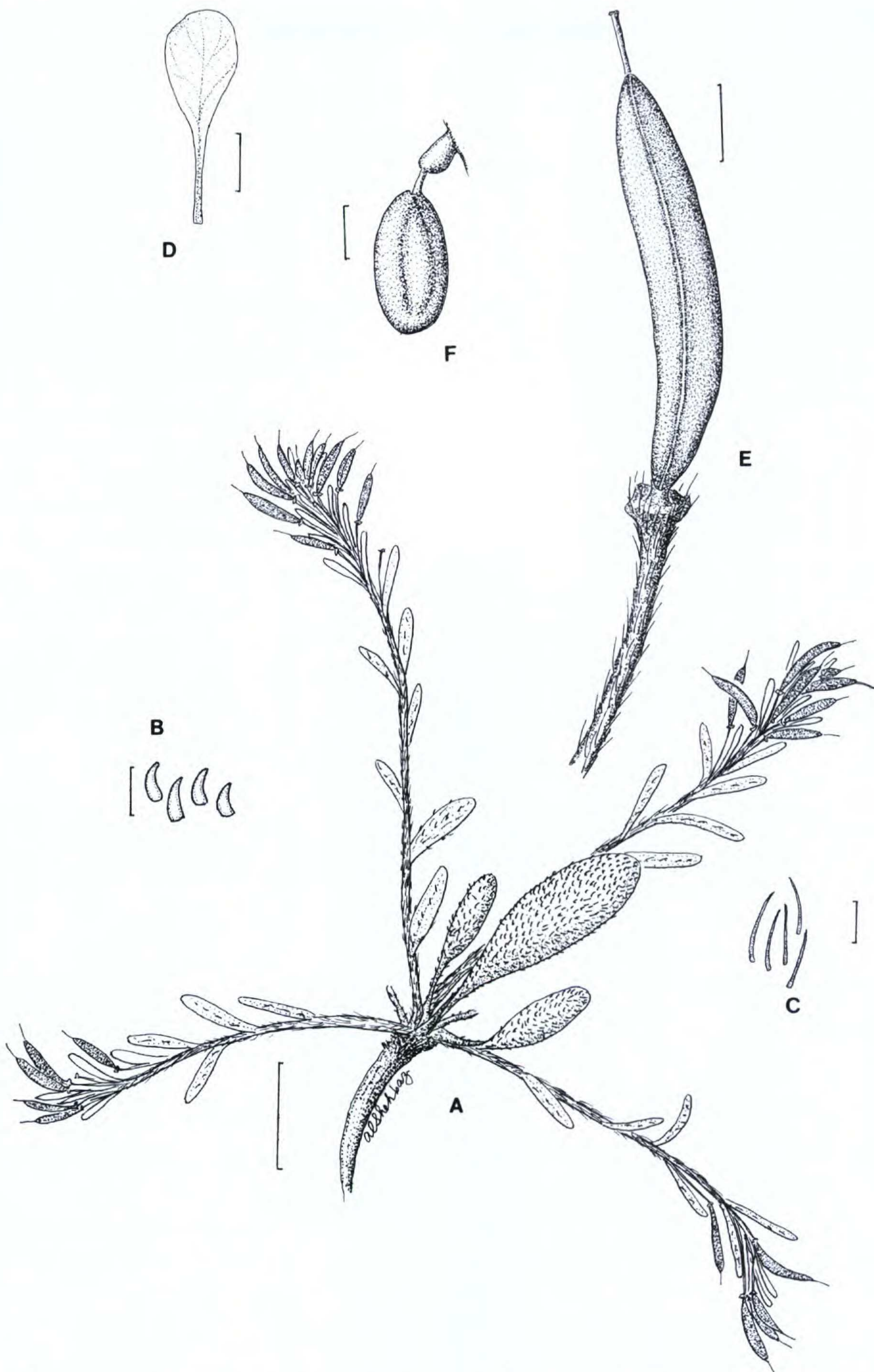


Figure 2. *Weberbaueria scabrifolia* Al-Shehbaz. —A. Plant. —B. Trichomes of adaxial surface of basal leaves. —C. Trichomes of stems and pedicels. —D. Petal. —E. Fruit and fruiting pedicel. —F. Seed and funicle. Drawn from the M holotype (*M. Weigend, K. Weigend, M. Binder & E. Rodriguez 5220*) by Al-Shehbaz. Scale: A = 1 cm, B, C = 0.4 mm, D–F = 1 mm.



late to linear, 5–10 × 1–4 mm, base attenuate, margin entire, upper ones and bracts ciliate and glabrous except midvein, trichomes longer and narrower than those of basal leaves. Raceme 10- to 27-flowered, bracteate throughout, dense, slightly elongated in fruit; bracts sessile, similar to cauline leaves but progressively smaller upward; fruiting pedicels 4–7 mm long, straight, suberect to ascending, antrorsely pubescent. Sepals oblong, 2.5–3 × ca. 1 mm, not saccate at base, sparsely pubescent, ascending; petals white, spatulate, 3.5–4 × ca. 1.5 mm, apex rounded, claw ca. 1.5 mm long; filaments ca. 2.5 mm long; anthers oblong, ca. 0.5 mm long. Fruits linear to oblong-linear, 5–9 × ca. 1.5 mm, glabrous, curved, terete; valves smooth, with a distinct midvein; septum complete; style ca. 1 mm long; stigma entire; seeds 5 to 12 per locule, oblong, brown, ca. 1 × 0.5 mm; funicles thickened at base; cotyledons incumbent.

*Weberbaueria scabrifolia*, which is known only from the type gathering, is easily separated from all species of the genus by its appressed, antrorse, simple trichomes much thicker and shorter on the basal leaves than on the rest of the plant and by having basal leaves glabrous abaxially and densely scabrous adaxially.

**17. *Weberbaueria smithii*** Al-Shehbaz, J. Arnold Arbor. 71: 233. 1990. TYPE: Peru. Ancash: Yungay, Huascarán National Park, Llanganuco Sector, Quebrada Ancosh at Portachuelo, 77°35'W, 9°03'S, 31 Dec. 1984, *D. N. Smith & K. Godwin 8894* (holotype, MO).

*Distribution.* Endemic to Peru (Depto. Ancash).

*Representative specimen.* PERU. **Ancash:** Yungay, Huascarán National Park, Llanganuco Sector, Quebrada Ancosh at Portachuelo, *Smith 11298A* (MO).

The species is known thus far only from the two collections above.

**18. *Weberbaueria spathulifolia*** (A. Gray) O. E. Schulz, Pflanzenreich IV. 105(Heft 86): 193. 1924. Basionym: *Sisymbrium spathulifolium* A. Gray, U.S. Expl. Exped. Phan. 15(1): 60. 1854. TYPE: Peru. [Junín]: Orbajillo, Wilkes Expedition, *Anonymous s.n.* (holotype, US; isotype, NY).

*Distribution.* Argentina (Prov. Catamarca, Jujuy, and La Rioja), Bolivia (Depto. La Paz, Oruro, and Potosí), and Peru (Depto. Ancash, Huancavelica, Junín, Moquegua, Pasco, Puno, and Santa Rosa).

*Representative specimens.* ARGENTINA. **Catamarca:** Río Potrero, *Sleumer 1905* (B). **Jujuy:** Humahuaca, Mina

Aguilar, *Sleumer 3402* (LIL). **La Rioja:** Sierra Famatina, Cueva de Pérez, *Hieronymus & Niederlein 376* (B). BOLIVIA. **La Paz:** Larecaja, vicinity of Combaya, *Mandon 914* (BM, G, P, K). **Oruro:** Abaroa, Challepata, *Asplund 3293* (UPS). **Potosí:** Frías, Cerro Potosí, *Petersen & Hjerting 1030* (C, LIL). PERU. **Ancash:** Carhuás, Huascarán National Park, Quebrada Los Cedros, *Smith, Valencia & Minaya 9924* (F, GH, MO). **Huancavelica:** Visco, *Macbride & Featherstone 590* (F, G, NY). **Moquegua:** Moquegua, above Torata, *Weberbauer 7471* (BM, F, G, US). **Pasco:** Cerro, Cerro de Pasco, *Macbride 3065* (CAS, F, US). **Puno:** Carabaya, Antapampa, *Vargas 6837* (F). **Santa Rosa:** Cuzco, *Stafford 512* (BM, K).

**19. *Weberbaueria stenophylla*** (Leybold) Al-Shehbaz, J. Arnold Arbor. 71: 245. 1990. *Draba stenophylla* Leybold, Anal. Univ. Chile 16: 679. 1859. TYPE: Chile. Cord. Santiago, Cerro Colorado, Mapocho Valley, 6000–7000 ft. [1829–2134 m], s.d., *Leybold s.n.* (lectotype, designated here, the plate accompanying the original publication).

*Distribution.* Endemic to Chile (Región VIII).

*Representative specimens.* CHILE. **Región VIII:** El Valle de los Ciegos, near volcano of Petreroa, *Bridges 1121* (BM, E, GH, K).

As indicated by Al-Shehbaz (1990a), no type material of this species has been found, and the well-illustrated plate accompanying the detailed original description of *Draba stenophylla* is designated herein as the lectotype.

**20. *Weberbaueria suffruticosa*** (Barnéoud) Al-Shehbaz, J. Arnold Arbor. 71: 247. 1990. *Draba suffruticosa* Barnéoud, in Gay, Fl. Chile 1: 157. 1846. TYPE: Chile. Cordillera Ovalle, 12,000 ft. [3658 m], *C. Gay s.n.* (holotype, P; isotype, B).

*Distribution.* Endemic to Chile (Región IV).

*Representative specimen.* CHILE. **Región IV:** Quebrada Larga [30°44'S, 70°23'W], *Jiles 3408* (CONC).

**21. *Weberbaueria trichocarpa*** (Muschler) J. F. Macbride, Candollea 5: 356. 1934. Basionym: *Eudema trichocarpum* Muschler, Bot. Jarhb. Syst. 40: 276. 1908. TYPE: Peru. Above Lima, near Alpamia [Alpamina], 4500 m, 2 Mar. 1904, *A. Weberbauer 5119* (holotype, B).

*Distribution.* Endemic to Peru (Depto. Ancash, Lima, and Pasco).

*Representative specimens.* PERU. **Ancash:** Pallasca, Conchucós, *Weberbauer 7229* (B, F, GH). **Lima:** Río Blanco, *Macbride 2990* (F, GH, MO, NY, US). **Pasco:** Cerro de Pasco, *Macbride 3073* (CAS, F, GH, MO, NY, US).

**22. *Weberbaueria violacea*** Al-Shehbaz, sp. nov.

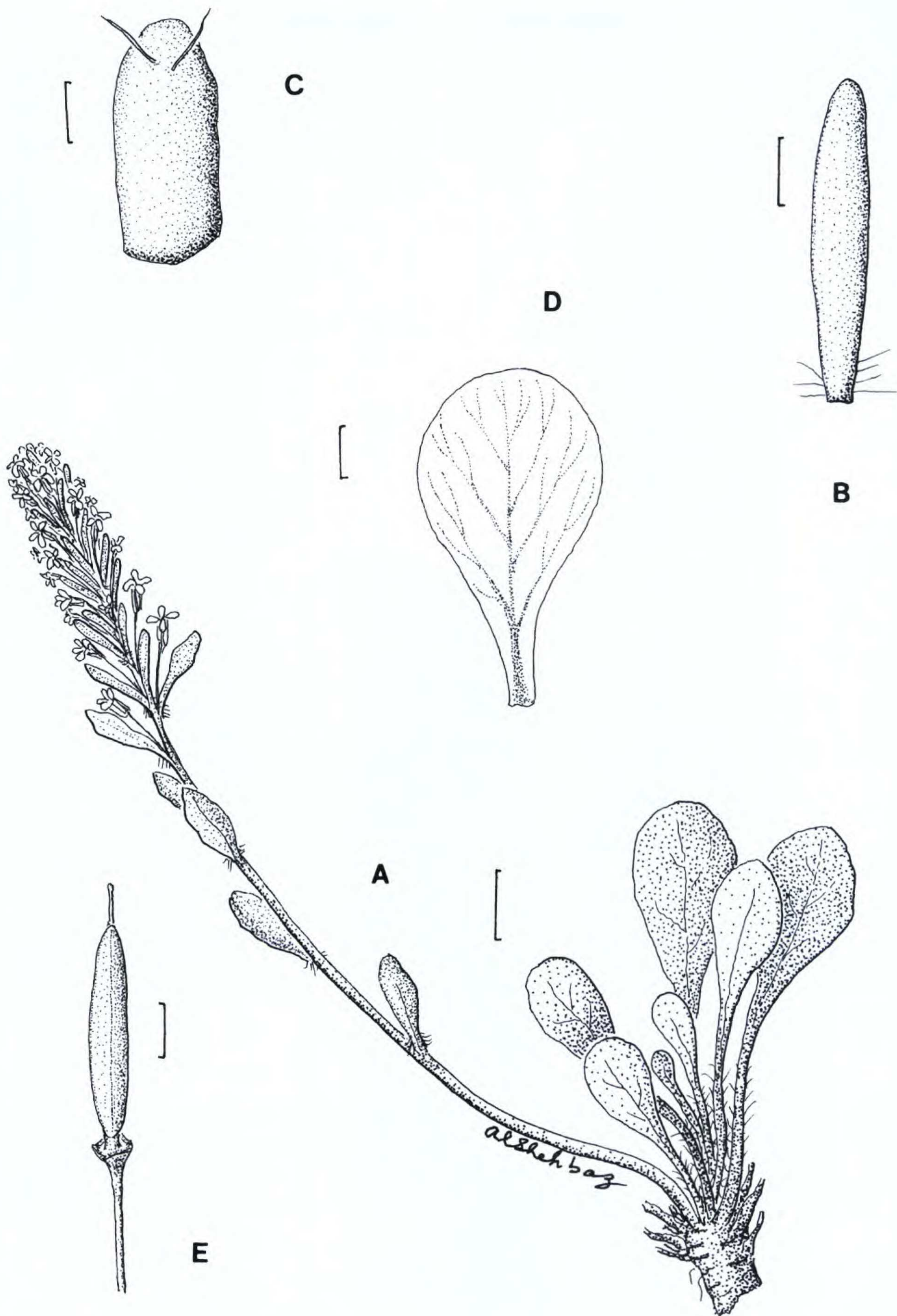


Figure 3. *Weberbaueria violacea* Al-Shehbaz. —A. Plant. —B. Bract. —C. Sepal. —D. Petal. —E. Young fruit. Drawn from the MO holotype (A. Sagástegui A. et al. 11175) by Al-Shehbaz. Scale: A = 1 cm, B–E = 1 mm.

TYPE: Peru. Cajamarca: Cajabamba, Cajabamba-Luchubamba, jalca vegetation, 3800 m, 17 Nov. 1983, A. Sagástegui A. et al. 11175 (holotype, MO; isotype, HUT). Figure 3.

Herba perennis, 4–15 cm alta. Folia basalia rosulata, petiolata, spathulata, 1.5–3.5 × 1–2.2 cm, integra vel repanda; folia caulina sessilia, oblonga vel oblanceolata, integra vel repanda, basi ciliata. Racemi 20–35-flori, omnino bracteati; pedicelli floriferi 7–10 mm longi, recti,

subappressi, glabri. Sepala oblonga, 4–5 × 1.5–2 mm; petala violacea, late obovata, 6.5–7.5 × 3–3.5 mm; stylus 1.5–2 mm longus.

Perennial herbs, subglabrous or sparsely pubescent along petiole and at base of cauline leaves; trichomes simple, spreading, to 1.5 mm long; caudex thick, simple; stems 4–15 cm long, decumbent or ascending, unbranched, glabrous. Basal leaves rosulate; petiole 0.5–3.5 cm long, ciliate; leaf blade spatulate, 1.5–3.5 × 1–2.2 cm, glabrous, base cuneate to attenuate, margin entire or repand, apex rounded; cauline leaves sessile, oblong, 6–20 × 1–5 mm, base cuneate, margin entire or repand, apex obtuse, sparsely ciliate at base. Raceme 20- to 35-flowered, bracteate throughout, dense; rachis straight, glabrous; bracts sessile, similar to cauline leaves but progressively smaller upward; flowering pedicels 7–10 mm long, erect to ascending, straight, subappressed, glabrous. Sepals oblong, 4–5 × 1.5–2 mm, not saccate at base, glabrous or with a few trichomes below apex, ascending; petals violet, broadly obovate, 6.5–7.5 × 3–3.5 mm, not clawed, apex rounded; filaments 2–3 mm long; anthers oblong, 0.6–0.8 mm long; style 1.5–2 mm long. Immature fruits linear, ca. 8 × 1 mm; valves glabrous, with a conspicuous midvein; seeds not seen.

*Weberbaueria violacea*, which is known only from the type collection, is readily distinguished from all other species of *Weberbaueria* by having violet, large petals 6.5–7.5 mm long and racemes bracteate throughout. All other species of the genus have white or rarely yellow (*W. perforata*) flowers almost always less than 5 mm long. The only exception is *W. smithii*, a species with ebracteate racemes and white flowers 6.5–8 mm long. Petal size and color easily separate the new species from those with fully bracteate racemes (see lead 2a in the key above).

*Weberbaueria violacea* is most closely related to *W. herzogii* and *W. scabrifolia*. All three differ from the remaining species of *Weberbaueria* by a combination of fully bracteate racemes, attenuate, slender

styles 1–3 mm long, and receptacle considerably wider than the pedicel.

*Acknowledgments.* I am much indebted to Olga Martha Montiel for translating the summary to Spanish, to Henk van der Werff for correcting the Latin, to Michael Dillon for sending his Peruvian collections of mustards for my study, and to Susanne Renner for sending a loan of South American mustards and for allowing a plant of the type collection of *Weberbaueria scabrifolia* be deposited at MO. I am grateful to Steve L. O’Kane Jr., Neil A. Harriman, and Victoria C. Hollowell for valuable comments on the manuscript. I thank the directors and curators of the herbaria cited above.

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