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A REVISION OF THE SOUTH AMERICAN BORAGINOIDEAE.

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Cauca. The species is a very distinct one and is widely separated from its congeners in Mexico, California and Chile.

### 17. *Pectocarya* DC.

Calyx cut to base, accrescent, divaricate at maturity. Corolla tubular; lobes ascending, imbricate, small; throat with small intruded appendages; stamens included, short, attached at middle of tube; filaments short; anthers oblong or elliptical. Style very short; stigma capitate. Ovules 4. Nutlets 4, obovate to linear, divaricate, paired, usually margined, pubescent with uncinata hairs, apically affixed to a low very broadly pyramidal gynobase.—Slender spreading annual herbs with the lower leaves opposite and linear. Flowers in leafy-bracted very elongate false racemes which constitute the bulk of the plant.—DC. in Meisner, Gen. i. 279; ii. 188 (1840); Brand, Pflanzenr. iv. Fam. 252, i. 94 (1921). *Ktenospermum* Lehm. Del. Sem. Hort. Hamb. 17 (1837), nom. nudum; (*Ctenospermum*) Post & Kuntze, Lex. 152 (1904). *Gruvelia* A. DC. Prodr. x. 119 (1846).

A very distinct genus of west American herbs. In his recent treatment of the genus Brand, l. c., recognizes only 3 species, viz., *P. setosa* Gray of North America and *P. pusilla* (A. DC.) Gray and *P. lateriflora* (Lam.) DC. of both North and South America. I am convinced, however, that what he has called *P. lateriflora* is an aggregate of 7 recognizable entities which have technical fruit-characters, distinct ranges and characteristic habits of growth. I am treating the 4 of these forms which occur in South America as species, and believe that the North American forms should be treated likewise.

#### KEY TO SPECIES.

- Nutlets equally divergent, much compressed, obviously angular and rhomboidal in outline.....1. *P. pusilla*.  
 Nutlets divergent in pairs, thickish, not obviously angular nor rhomboidal in outline.  
 Back and sides of nutlets armed with coarse subterete subulate appendages tipped with uncinata hairs.....2. *P. anomala*.  
 Back of nutlets smooth or at most papillate, margin with a lacerately or pectinately cut wing-margin bearing uncinata hairs.  
 Fruit dimorphic, that produced at base of plant with reflexed subpersistent nutlets obviously different from the divaricate nutlets produced by the normal fruit of the middle and upper stems.....3. *P. dimorpha*.  
 Fruit of one sort, that produced at the base of the plant similar to that on the upper stem.  
 Nutlets linear, 2.5–3 mm. long, sides parallel.....4. *P. gracilis*.  
 Nutlets obovate or obovate-oblong.



Nutlet-body 2–2.5 mm. long, with medial dorsal ridge.

5. *P. lateriflora*.

Nutlet-body 1.5–2 mm. long, lacking medial dorsal ridge.....

6. *P. boliviana*.

1. ***Pectocarya pusilla*** (A. DC.) Gray. Plant small and slender, strigose, with erect or ascending simple stems; leaves linear or oblong-linear, obtuse, 0.5–2 cm. long, 1–2 mm. broad, sparsely strigose; flowers all chasmogamic; corolla short salverform with ascending lobes; nutlets 4 or fewer, rhomboidal or rhomboid-obovate, homomorphous, radially arranged, 1.8–2.3 mm. long, 1.5–2 mm. broad; margin acute but wingless, ciliate with unciniate hairs.—Proc. Am. Acad. xii. 81 (1876); Reiche, Anal. Univ. Chile cxxi. 247 (1907) and Fl. Chile v. 205 (1910); Brand, Pflanzenr. iv. Fam. 252, i. 96, fig. 1g (1921); Johnston, Contr. Gray Herb. lxx. 38 (1924). *Gruvelia pusilla* A. DC. Prodr. x. 119 (1846); Clos in Gay, Fl. Chile iv. 482, t. 52 bis, fig. 3 (1849). *P. chilensis*, var. *californica* Torr. Pacif. R. R. Rep. iv. 124 (1857); Johnston, l. c. lxxv. 43 (1925). *P. pusilla*, var. *flagillaris* Brand, l. c.

CHILE. VALPARAISO: dry slope, [? Punta de] La Playa Ancha, Aug. 1830, *Bertero 212* (G, NY).

This species although based upon material from central Chile seems to be very rare there. Brand, l. c., reports a collection made at Rancagua by Philippi. There are, however, no collections of the species in the Philippi Herbarium in the Museo Nacional nor in the herbarium of the Instituto Pedagógico at Santiago. In fact with the exception of the Philippi collection cited by Brand, the species is not known to have been collected in Chile for nearly a century. It is, however, well known from central and northern California where it has been frequently collected.

2. ***P. anomala*** Johnston. Stems slender, finely strigose, not numerous, erect or ascending; leaves filiform-linear, 1–3 cm. long, 0.7–1 mm. broad, appressed short hispid-villous; flowers all chasmogamic; corolla short salverform with ascending lobes; nutlets densely pubescent, the pubescence short soft and unciniate; body of nutlet obovate-oblong, 1.5–1.7 mm. long, ca. 0.7 mm. broad, without a proper margin, back and upper sides producing subulate subterete appendages 0.6–1 mm. long that are terminated with uncinately tipped bristles.—Contr. Gray Herb. lxx. 35 (1924).

PERU. AREQUIPA: sandy pampa on south slope of El Chachani, 2400 m. alt., March 1920, *Hinckley 41* (G, TYPE); open gravelly soil above Arequipa 2500–2600 m. alt., April 1925, *Pennell 13165* (G, FM).



An extremely well marked species known only from the vicinity of Arequipa, Peru. It seems to be most related to *P. lateriflora*, but is quickly separated from that species by the lack of a definite margin on its nutlets and by the peculiar subterete subulate appendages that cover them.

3. ***P. dimorpha*** (Johnston), comb. nov. Stems slender but stiffish, prostrate or widely ascending, numerous, finely and closely strigose, somewhat canescent; leaves filiform-linear, 1–3 cm. long, 0.5–1 mm. broad, canescent, finely strigose and occasionally short-hispid; corolla short-salverform with ascending lobes; fruits dimorphic, those of the cleistogamic flowers (borne at the base of the stems) all reflexed and with narrow margins; nutlets of the chasmogamic flowers (borne along the stems) with body oblong or narrowly obovate-oblong, ca. 2 mm. long, 0.8–1.1 mm. broad, tending to be heteromorphous with the abaxial one or one of each opposing pair tending to be less broadly margined, slightly smaller, more pubescent and more persistent than the others; margins of the nutlets of the normal fruits very much reduced or more characteristically well developed, ascending or erect and frequently much incurved, pectinately or lacerately cleft or divided or even dentate with the lobes triangular to subulate and terminated by uncinately tipped bristles.—*P. gracilis*, var. *dimorpha* Johnston, Contr. Gray Herb. lxx. 37 (1924).

CHILE. ATACAMA: Vallenar, Oct. 1914, *Rose 19331* (US); Rio de Laguna Grande east of Vallenar, 2140 m. alt., *Johnston 5891* (G); Valle de Carrizal, Sept. 1885, collector not given (MS); Yerba buena, 1885, *R. Godoi de Collao* (MS); Bandurrias, 1885, *Geisse* (MS, G); Atacama Desert [? Bandurrias], *Geisse 59* (NY); Quebrada de Chancoquin north of Copiapó, 1885, *Gigoux* (G); gravelly bench in hills north of Copiapó, 600 m. alt., *Johnston 5025* (G); Copiapó, Sept. 1885, *San Roman* (MS); Desert of Atacama [Caldera-Copiapó region!], *Morong 1282* (G, TYPE; NY, ISOTYPE). ANTOFAGASTA: a small colony on a very dry rocky hillside at western end of Llano Colorado, Dept. of Taltal, *Johnston 5656* (G).

The present plant is perhaps most related to *P. gracilis*, but is quickly distinguished by its stiffer stems, shorter more heteromorphous nutlets and presence of cleistogamous flowers at base of stem. Its range is north of that of *P. gracilis*, covering the western part of the province of Atacama and extreme southern Antofagasta. It is a very distinct species and certainly worthy of recognition.

4. ***P. gracilis*** (R. & P.) Johnston. Stems very slender, numerous, prostrate or widely ascending, finely and closely strigose, canescent; leaves filiform-linear or narrowly oblance-linear, 1–3(–4) cm. long, 0.6–1.5(–1.8) mm. broad, numerous, closely fine-strigose; flowers all chasmogamic; corolla short-salverform with ascending lobes; nutlets



homomorphous or only obscurely heteromorphous; nutlet-body linear-oblong or somewhat spatulate-oblong, 2.5–3 mm. long, 0.6–1 mm. broad, with the erect or strictly ascending margin pectinately parted or divided into subulate or narrowly triangular teeth each terminated by an uncinately tipped bristle.—Contr. Gray Herb. lxx. 36 (1924). *Myosotis gracilis* R. & P. Fl. Peruv. ii. 5 (1799). *Echinosperrum gracile* Lehm. Asperif. i. 129 (1818). *Rochelia gracilis* R. & S. Syst. iv. 111 (1819). *Cynoglossum lineare* R. & P. l. c. 6. *P. linearis* DC. Prodr. x. 120 (1846). *P. chilensis* DC. l. c.; Clos in Gay, Fl. Chile iv. 480, t. 52 bis, fig. 2 (1849). *P. gracilis*, var. *genuina* Johnston, l. c. *P. lateriflora* of Reiche, Anal. Univ. Chile cxxi. 247 (1907) and Fl. Chile v. 205 (1910), in largest part.

ARGENTINA. SANTA CRUZ: fields near Rio Gallegos, March 11, 1882, *Spegazzini* (G). RIO NEGRO: vicinity of General Roca, 250–360 m. alt., Sept. 28, 1914, *Fischer 123* (G, US, FM); fields near Rio Negro, Nov. 19, 1904, *Berg* (G). MENDOZA: Frutillo, Oct. 1913, *Sanzin* (G).

CHILE. OHIGGINS: Rancagua, 1878, *no collector given* (MS). SANTIAGO: Santiago, *Claude-Joseph 684, 1496 and 2241* (US); Santiago, Sept. 1900, *Hastings 56* (US); Santiago, Sept. 1840, *Gay 1616* (MS); Cerro San Cristoral, Nov. 1854, *no collector given* (MS); San Cristoral, 1876, *no collector given* (MS); Cerro San Cristobal, Oct. 1924, *Montero 27* (G); Cerro San Cristobal, Aug. 1925, *Looser* (G); San Cristobal, 1913 and 1917, *Baeza* (IP); San Bernardo Sept. 1877, *no collector given* (MS); Santa Rita, Oct. 1879, *no collector given* (MS); Chacabuco, Sept. 1864, *no collector given* (MS); Tiltil, 1911, *Horst* (IP); Navia, 1914, *Baeza* (IP). VALPARAISO: Valparaiso, Sept. 30, 1895, *Buchtien* (US); Valparaiso, 1856, *Harvey* (G); Concon, *Poeppig* (NY). ACONCAGUA: San Felipe, Aug. 1921, *Claude-Joseph 1351* (US); Zapillar, 1912, *Horst* (IP); Palquico, Oct. 4, 1914, *Rose 19189* in pt. (US). COQUIMBO: vicinity of Illapel, Oct. 7, 1914, *Rose 19269* (US); La Cumbre, Oct. 15, 1914, *Rose 19349* (US); Coquimbo, Sept. 1885, *no collector given* (MS). ATACAMA: Rio Laguna Grande east of Vallenar, 2140 m. alt., *Johnston 6283* (G). INDEFINITE: locality not given, Aug. 9, 1917, *Skottsberg 722* (G); locality not given, *Bridges* (G); locality not given, *Bertero 211* (G, NY).

The species concerned here is the common one of central Chile. It is certainly *Cynoglossum lineare* R. & P., the type of which came from Santiago (Sancti Jacobi), where the present species is common. The type of *Myosotis gracilis* R. & P. is said to have come from Concepcion. Although Reiche gives the range of the plant as south to the province of Bio-Bio, I have not seen any collections from south of OHiggins.

In Argentina the species seems to be uncommon. Brand and Dusén report it from Rawson, Chabut. Spegazzini cites four localities in Santa Cruz, viz. Rio Gallegos, Rio Santa Cruz, San Julian and Rio Deseado. A *Pectocarya* cited by Brand from La Incurcijada, La Rioja, may represent the present species but from phytogeographical considerations would seem to be more probably *P. boliviana*.



Outside its range in central Chile and southern Argentina the species also occurs in southern California. It has a definite character and is quickly recognized by its very elongate linear nutlets. The subulate tothing of the nutlets in this species, more than in any other, merits the adjective "pectinate."

5. ***P. lateriflora*** (Lam.) DC. Stems ascending or erect, not very numerous, stiffish, finely appressed hispid-villous or strigose; leaves filiform-linear to narrowly lance-linear or linear-lanceolate, 1–5 mm. long, 1–2.5 mm. broad, usually definitely contracted towards both ends, appressed hispid-villous and usually somewhat canescent; flowers all chasmogamic; corolla short-salverform with ascending lobes; nutlets tending to be heteromorphous with the abaxial one usually more pubescent and roughened than the other ones which commonly are smooth and glabrate or sparsely pubescent; nutlet-body obovate or obovate-oblong, 2–2.5 mm. long, 1–1.8 mm. broad, with a definite medial dorsal ridge, margin becoming well developed spreading, pectinately and lacerately cleft or divided into subulate or narrowly triangular teeth terminated by uncinately tipped bristles.—Prodr. x. 120 (1846); Brand, Pflanzenr. iv. 252, i. 95 (1921); Johnston, Contr. Gray Herb. lxx. 35 (1924) and l. c. lxxiii. 76 (1924). *Cynoglossum lateriflorum* Lam. Encyc. ii. 239 (1786) and Planch. t. 92, fig. 2 (1791); Lehm. Asperif. i. 166 (1818). *Mattia lateriflorum* Don, Gen. Syst. iv. 310 (1838). *Rindera lateriflora* R. & S. [Syst. iv. 762 (1819)] ex Steud. Nom. Bot. ed. 2, ii. 460 (1841). *C. pilosum* R. & P. Fl. Peruv. ii. 6, t. 111b (1799); Lehm. l. c. 167. *M. pilosa* Don, l. c. *R. pilosa* R. & S. [l. c.] ex Steud. l. c. (?) *Ktenospermum linifolium* Lehm. Linnaea xii. Litt. 84 (1838), nom. nudum.

PERU. LIMA: open rocky hill, Amancaes, 200–400 m. alt., Pennell 14806 (G, FM); open sandy slope, Atocongo, 300–500 m. alt., Pennell 14791 (G, FM); open grassy knolls, Canta, 2800–2900 m. alt., Pennell 14583 (G, FM); Obrajillo, Wilkes Exped. (G, US); loose stony soil, Rio Blanco, 3600 m. alt., Macbride & Featherstone 675 (G, FM); rocky hillside, San Geronimo, Lima, 150 m. alt., Macbride 5907 (G, FM); mountains near Chosica, 1700 m. alt., Weberbauer 5330 (FM). AREQUIPA: fertile belt in hills back of Mollendo, Johnston 3534 (G); sandy slopes, desert hills, Mollendo, Hitchcock 22382 (US). MOQUEGUA: open mixed formation, Torata, 2200–2300 m. alt., Weberbauer 7396 (FM).

Characterized by its obovate definitely margined nutlets and comparatively coarse stems and leaves. It is a plant of the lomas and desert margins of western Peru. Brand reports a collection of Spruce's, no. 5309, from the Andes of Ecuador. Whether this northern collection represents the species, as here defined, I do not know.



6. *P. boliviana* (Johnston), comb. nov. Stem slender, decumbent or ascending, finely and closely strigose, canescent; leaves linear-filiform to linear, 1–3 cm. long, 0.8–1.5 mm. broad, strigose, canescent; flowers all chasmogamic; corolla short-salverform with ascending lobes; nutlets heteromorphous with the abaxial one usually slightly the most roughened and pubescent; nutlet-body obovate-oblong, without a medial ridge, 1.5–2 mm. long, the spreading margin pectinately divided into numerous juxtaposed or more commonly few distant subulate teeth which are tipped by uncinata bristles.—*P. gracilis*, var. *boliviana* Johnston, Contr. Gray Herb. lxx. 37 (1924) and l. c. lxxiii. 76 (1924).

BOLIVIA. POTOSI: Chiguana, 3700 m. alt., *Asplund* 3897 (US, TYPE); Atocha, 3700 m. alt., *Asplund* 5896 (US). ORURO: Challapata, 3900 m. alt., *Asplund* 5895 (US). LA PAZ: General Campero, 4200 m. alt., *Asplund* 5894 (US).

This species is closely related to *P. lateriflora* of western Peru, but is a smaller and more slender plant of the puna. Its nutlets are smaller, transversely rugose, lack a definite medial dorsal ridge and have a margin that is commonly much dissected and frequently represented only by several distant subulate teeth. Brand, Pflanzenr. iv. Fam. 252, i. 95 (1921), reports *P. lateriflora* from Incrucijada in La Rioja, Argentina, upon the basis of a collection by Hieronymus & Niederlein (no. 466). This collection may represent *P. boliviana*.