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Studies on the flora of northern South America—I.

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CENTROPOGON, SECTION BURMEISTEROIDES

The genus *Burmeistera* Karst. is distinguished from *Centropogon* by the possession of green or greenish-yellow corollas of peculiar and characteristic shape and by the absence of terminal appendages from the two lower anthers. In *Centropogon*, these appendages are regularly present, and may consist either of a tuft of straight, separate, erect or reflexed hairs, or of a scale composed of accrescent hairs. The section *Burmeisteroides* is here constituted to include a group of species from the Andean region of northwestern South America with green or greenish corollas and with anther-appendages of villous or tomentose hairs. Differing from other species of *Centropogon* in these two features, they are also distinguished from *Burmeistera* by the longer and more slender corolla-tube, which is lobed to about the same depth on both upper and lower sides, and from most species of *Burmeistera* by the presence of conspicuous pubescence on the stem, foliage, flowers, or anthers.

The fruit is a dry, indehiscent berry, of the type prevalent in *Centropogon* and *Burmeistera*. This feature serves to differentiate the section from some species of *Siphocampylus* with green or yellowish flowers, such as *S. giganteus* and its relatives.

The older collections seem to include relatively few species of this section, but the recent explorations of Pennell, Killip, and Hazen have brought several undescribed species to light. The following are known to me from Colombia.

Sepals 18–50 mm. long, linear.

Calyx gamosepalous for 10–15 mm. above the base, 45–50 mm. long; sepals glabrous on the back; anthers very sparsely hirsute on the connectives near the base. . . . . *C. Andreanus.*

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Calyx chorisepalous, or weakly gamosepalous for 1-2 mm. above the base; anthers densely hirsute on the connectives distally.

Sepals glabrous on the back; leaf-pubescent about equally dense on the surface and veins beneath. . . . . *C. asservatus*.

Sepals villous on the back with flat crooked hairs; leaf-pubescent chiefly along the principal veins. . . . . *C. Lehmanni*.

Sepals not more than 11 mm. long.

Sepals oblong, united below, erect and foliaceous above. . . . . *C. caldasensis*.

Sepals linear to linear-oblong, separate, erect or spreading.

Stem appressed-pubescent. . . . . *C. Mutisianus*.

Stem pubescent with spreading hairs.

Sepals narrowly oblong, 2-3 mm. wide, thinly hirsute; leaves acuminate at base. . . . . *C. variabilis*.

Sepals linear, 1-2 mm. wide, densely hirsute; leaves broadly cuneate to obtuse below.

Leaves acuminate, acute at the base; sepals erect, 8 mm. long. . . . . *C. gravidus*.

Leaves obtuse, rounded at base; sepals spreading, 6 mm. long. . . . . *C. breviflorus*.

**Centropogon Andreanus** n. sp. Stem 2 m. high, the upper portion hollow, finely striate, glabrous to barely puberulent; petioles 25-45 mm. long; leaf-blades broadly elliptic-oblong, the largest 85 mm. wide and 210 mm. long, cuneate at base, abruptly acuminate at apex, broadest at the middle, finely denticulate (about 6 teeth to 1 cm. of margin) with minute, black, triangular teeth 0.5 mm. high, pubescent on the upper surface with pale, flat, crooked and contorted hairs averaging 1 mm. in length, more crowded along the midvein, pubescent beneath with similar hairs, about 0.8 mm. long and located chiefly on the veins, ciliate with hairs of the same type but with dark purple or black septa, scattered along the margin and collected in tufts of 6-12 on every serration; peduncles stout, axillary, 11-14 cm. long, essentially glabrous below, pubescent distally with hairs like those of the leaves; hypanthium depressed-globose, when pressed 12-17 mm. wide by three-fourths as high, nearly glabrous, 10-ribbed, 5 ribs prolonged into sepalar midveins, 5 forking below each sinus and entering both sepals; sepals united for the basal 10-15 mm., the lobes linear-triangular, glabrous on the surface, faintly veined, 30-35 mm. long, finely callous-denticulate, ciliate with tufts of hairs on the teeth; corolla 80 mm. long, its tube 60 mm. long, glabrous, the lobes strongly depressed and falcate; anthers barely exerted, glabrous or barely pilose on the connectives below, the two lower anthers strongly bearded at the apex.

The herbarium of the Royal Botanic Garden at Kew contains two sheets, both collected by André under his number 2799,



and agreeing precisely in every detail. One is labeled "Rio dos Brazos prope Popayan, 19 April 1876," the other "ad decliv. occident. mont. igniv. Corazon And. Ecuad. 3400 m., 10 Jun. 1876." The latter is the type, and bears a reference to the collector's illustration tab. CLXXX, but unfortunately plate CLXXXII is mounted with the plant.

**Centropogon asservatus** n. sp. A tall herb; stems hollow above, faintly angled, puberulent above, becoming glabrous and somewhat verrucose in age; internodes 2-3 cm. long; leaves thin, membranous, dull-green, oblong-elliptic, 8-11 cm. long, 2-3 cm. wide, acuminate, gradually cuneate at base into a narrowly winged petiole 1 cm. long, finely, sharply, and irregularly dentate (about 9 teeth per centimeter of margin) with triangular, callously mucronate teeth 0.4-1 mm. high, sparsely puberulent above with short, contorted, dark purple hairs, thinly pubescent on the venation beneath with flat, crooked, pale brown hairs, thinly ciliate with crooked hairs with black septa, veins not prominent, reticulate beneath; peduncles from the upper axils, 8-12 cm. long, thinly puberulent to nearly glabrous, erect or ascending; hypanthium obconic, 16-20 mm. high, 9-11 mm. wide at the summit when pressed, faintly nerved, nearly glabrous; sepals erect, narrowly linear above a narrowly triangular dilated base, about 5 cm. long, glabrous on the surface, remotely and minutely callous-denticulate, sparsely ciliate with crooked hairs with black septa; corolla-tube 28 mm. long, glabrous, gradually narrowed to the middle, thence dilated to the throat, the lobes narrowly triangular-falcate, depressed, 20 mm. long; filaments 10 mm. longer than the corolla-tube, subtomentose above; anthers 13 mm. long, subtomentose with white hairs below, hirsute with erect brown hairs on the connectives, the two lower strongly bearded at the apex; fruit a dry berry, ellipsoid, 3 cm. long, surmounted by the persistent sepals.

Type, *Pennell 927*, collected 3-6 Aug. 1917, in forests on the Rio Balsillas, Dept. Huila, Colombia, altitude 2000-2100 m., and deposited in the herbarium of the New York Botanical Garden. Other specimens are *Pennell 960* and *601*, Cordillera Oriental, east of Neiva, Dept. Huila, 1-8 Aug. 1917. Of these the latter has broader leaves, about three times as long as wide, with sepals 40 mm. long.

CENTROPOGON LEHMANNI Zahlbr. Four numbers in the herbarium of the New York Botanical Garden are referred to this species, although differing in some unimportant respects from each other and from the type. In *Lehmann 529*, without



data, and 882, forests of Popayán, 1700–2500 m., the leaf-blades are more than twice as long as broad and sharply cuneate at base and the thinly villous sepals are about 30 mm. long. In *Pennell and Killip 8087*, Rio Ortega, Dept. El Cauca, Colombia, 2 July 1922, and *Pennell 10,279*, Apia, Dept. Caldas, 4, 5 Sept. 1922, the leaf-blades are less than twice as long as wide and the densely villous sepals are only 20 mm. long. Zahlbruckner cited two sheets, *Lehmann 4754* and *Triana 1569*. I have seen the latter in the herbarium of the Museum at Paris and find it essentially intermediate between the two forms mentioned above.

***Centropogon caldasensis*** n. sp. Stem herbaceous, angled, hollow, puberulent above, becoming glabrous below, bearing numerous short axillary leafy branches; petioles 20–25 mm. long, slender, minutely puberulent; leaf-blades membranous, bright green, ovate-lanceolate, 45–65 mm. long, 20–25 mm. wide, subacuminate, rounded at base, shallowly repand to subentire (4–6 teeth per centimeter of margin), glabrous above, thinly pubescent on the veins beneath, the veinlets obscurely reticulate; peduncles ascending from the upper axils, 4 cm. long, conspicuously ridged, thinly puberulent, with two basal linear bracts 8 mm. long; hypanthium obconic, 9 mm. high, 4 mm. wide at the summit when pressed, thinly puberulent, faintly ribbed; sepals 10 mm. long, united for the basal 2 mm., the lobes oblong, erect, somewhat foliaceous, short-acuminate, many-nerved, irregularly contorted along the margin or serrulate, essentially glabrous, separated by narrow acute sinuses; corolla-tube slender, 14 mm. long, puberulent, the lobes linear-falcate, depressed, 7 mm. long; filaments glabrous, equaling the petals; anther-tube strongly depressed, short and stout, 4 mm. long, glabrous, the two lower anthers densely villous at the apex.

Type, *Pennell 10,322*, collected 7–11 Sept. 1922, along the Rio San Rafael, below Cerro Tatama, altitude 2200–2400 m., Dept. Caldas, Colombia, and deposited in the herbarium of the New York Botanical Garden.

***Centropogon Mutisianus*** (H.B.K.) n. comb. (*Lobelia Mutisiana* H.B.K.) The distinction between this and related species stated in the key above has been drawn from the type specimen in the herbarium of the Museum at Paris.

***Centropogon variabilis*** n. sp. Stem herbaceous, strongly angled, densely pubescent or subtomentose with sordid brown hairs above, becoming glabrate with age, the internodes 1–2 cm. long; petioles angled, densely pubescent, 10–25 mm. long; leaf-blades broadly elliptic, about 9 by 18 cm., thin and mem-



branous, bright green, abruptly acuminate, cuneate or acute at base, coarsely and irregularly repand, the larger teeth triangular, 2-4 mm. high and 10-20 mm. apart, the intermediate teeth much smaller, thinly pubescent along the midvein and laterals above and likewise on the surface when young, thinly pilose on the surface and densely so the veins beneath, the hairs straight, appressed, 0.4 mm. long, forming conspicuous belts along the veins; peduncles from the upper axils, 5 cm. long, thinly pubescent; hypanthium short-cylindric, 9 mm. high, 7 mm. wide when pressed, puberulent; sepals triangular, 6 mm. long, 2.5 mm. wide at the base, pubescent on both sides, with about three pairs of low callous teeth, separated by narrow rounded sinuses; corolla puberulent, the tube 25 mm. long, straight, slender, the lobes linear-oblong, falcate, depressed; filaments glabrous, included; anther-tube 8 mm. long, subtomentose on the sutures, the two lower anthers villous at the apex.

Type, *Pennell 10,734*, collected 18, 19 Sept. 1922, at Buenos Aires, north of Supia, Dept. Caldas, Colombia, altitude 2000-2200 m., and deposited in the herbarium of the New York Botanical Garden. Four other sheets are also referred here, which differ so much from the type as to suggest the specific name *variabilis*. These differences do not appear to warrant the recognition of additional species but indicate merely a considerable degree of variability. In *Pennell 3409*, Libano, Dept. Tolima, 26-29 Dec. 1917, the leaves are proportionately narrower and the serrations lower; in *Pennell 10,324*, Rio San Rafael, below Cerro Tatama, Dept. Caldas, 7-11 Sept. 1922, the leaves are smaller, thicker, and blunter; in *Pennell 10,325*, same place and date, the small leaves are almost obovate, while *Pennell 4397*, Cascada Chorrón, south of Antizales, Dept. Bolívar, 25 Feb. 1918, is a fragmentary specimen without flowers.

I have not seen the type of Karsten's *Burmeistera tomentosula*, which was imperfectly described. It may be similar to our species.

**Centropogon gravidus** n. sp. Stem herbaceous, hollow, strongly angled, densely pubescent with straight spreading hairs with black septa; petioles stout, densely pubescent, 10-13 mm. long; leaf-blades elliptic-oblong, firm, dull-green, 13-23 cm. long, 3-7 cm. wide, abruptly acuminate to long-acuminate, tapering to an acute or cuneate base, coarsely, sharply, and irregularly dentate, especially above the middle, with triangular teeth as much as 5 mm. long (about 2 teeth per centimeter of margin) to subentire, pubescent above with straight, stiff,



brown hairs about 0.5 mm. long, especially along the midvein, pubescent with similar hairs below, especially along the veins, where they form conspicuous belts of pubescence; peduncles numerous from the upper axils, ascending, 5-7 cm. long, pubescent like the stem, the bracts linear, 3 mm. long, deciduous; hypanthium short-cylindric, 9 mm. long, 7 mm. wide when pressed, sparsely pubescent; sepals erect, 8 mm. long, narrowly triangular, acute, irregularly serrate with 3 or 4 pairs of teeth, thinly hirsute, conspicuously ciliate with tufts of hairs with dark septa; corolla sparsely pubescent below, becoming densely so toward the apex of the lobes, the tube 27 mm. long, stout, the lobes broadly linear-falcate, depressed; filaments included, glabrous; anther-tube stout, somewhat curved, 8 mm. long, thinly pubescent, especially at the apex, the two lower anthers villous at the summit.

Type, *Killip & Hazen 11,122*, collected 9 Sept. 1922, at La Cumbre, Dept. El Valle, Colombia, altitude 1700-2100 m., and deposited in the herbarium of the New York Botanical Garden. Other collections are *Pennell 4398*, Cascada Chorrón, south of Antizales, Dept. Bolívar, 25 Feb. 1918, *Pennell 5723*, La Cumbre, Dept. El Valle, 14-19 May, 1922, and *Killip 5921*, La Cumbre, 21-25 May 1922.

***Centropogon breviflorus*** n. sp. Stem shrubby, climbing, angled, apparently solid, densely pubescent or subtomentose with septate hairs; petioles densely pubescent, stout, 3 mm. long; leaf-blades firm, spreading, dull-green or brown-green, elliptic, 5-8.5 cm. long, 3.5-4.5 cm. wide, obtuse, rounded at base, entire or barely repand, thinly puberulent above with short curved hairs, especially on the midvein, closely pubescent on the surface and veins beneath with short brown hairs, and hirsute on the midvein with longer, straight, spreading hairs; peduncles from the upper axils, stout, 2-3 cm. long, pubescent like the stem; hypanthium short-cylindric, 7 mm. high, 8 mm. wide when pressed, densely pubescent like the peduncle, especially at the base; sepals spreading, narrowly triangular-linear, 6 mm. long, somewhat involute, densely hirsute and ciliate with straight brown hairs; corolla 20 mm. long, densely pubescent with septate hairs, the tube 15 mm. long, the lobes linear-falcate, depressed, glabrous along the margin; filaments included, glabrous; anther-tube black, 5 mm. long, thinly and sparsely pubescent, the two lower anthers villous at the tip.

Type, *Pennell 7545*, collected 29, 30 June 1922, on Mount El Trueno, Dept. El Cauca, Colombia, altitude 2700-3000 m., and deposited in the herbarium of the New York Botanical Garden.