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A new *Sobralia* (Orchidaceae: Sobralieae) from Panama

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Abstract

In Panama, the Orchidaceae comprise 187 genera, of which one of the most conspicuous is *Sobralia*. The flowers of *Sobralia* are mostly ephemeral but colorful, often fragrant, and of variable sizes. Despite being a prominent group, its taxonomy is still underdeveloped in most neotropical countries. To continue with taxonomic studies in the Orchidaceae of Panama, we investigated a species of *Sobralia*, which differs from any recorded species of the genus. We documented the species with digital images and compared it with morphologically similar taxa. This paper describes and illustrates a new *Sobralia* from the Bosque Protector Palo Seco in the Fortuna area, Panama. *Sobralia rinconiana* differs from all other species recorded in Panama by the combination of a large plant size that reaches up to 120 cm high and the larger and broader, elliptical-lanceolate leaves (30–35 × 14–16 cm). *Sobralia rinconiana* is most similar to *S. carazoi* but differs in the spreading flowers with reflexed petals and the infundibuliform, cream-yellow lip, the wider, longer sepals and petals, and the longer, suberect column. The accurate estimate of the number of *Sobralia* species in Panama is still uncertain. Its diversity may increase as new areas are explored or species complexes are resolved.

Keywords: Bosque Protector Palo Seco, Fortuna, Flora of Panama, *Sobralia rinconiana*, taxonomy, tropical biodiversity

Introduction

Sobralia Ruiz & Pavón (1794: 120) comprises more than 170 exclusively Neotropical species distributed from Mexico to Peru, Bolivia, and southeastern Brazil but absent from the Antilles (Dressler *et al.* 2016, Baranow & Dudek 2018). The diversity of the genus in Panama is remarkable, with some 39 species, of which 16 are endemic (Bogarín *et al.* 2014). Plants of *Sobralia* differ from other orchids by their cylindrical, elongated culm-like stems, distal, plicate leaves, congested inflorescences developing from a cone of imbricate bracts, and showy but ephemeral flowers with an infundibuliform lip. In Panama, plants grow from low to medium elevations, rarely up to ca. 2800 m [i.e. *Sobralia amabilis* (Reichenbach 1852: 712) L.O. Williams (1946: 30)]. They grow as epiphytes, lithophytes, or terrestrials among organic matter. Some species are easy to find on rocky roadside slopes, where they form large populations among grasses in exposed areas. In contrast, other species do not conform to large populations and comprise a few scattered individuals (Dressler 2002).

In *Sobralia*, some species apparently show gregarious flowering or floral synchrony, a poorly understood phenomenon involving the simultaneous flowering of several individuals mediated by weather conditions such as heavy rains or sudden temperature changes. This phenomenon might follow a pattern similar to *Dendrobium crumenatum* Swartz (1799: 237) (Coster 1926). In this species, the flower buds reach a particular stage of development, and their growth stops until an environmental factor stimulates the growth of the buds to their anthesis. In Panama, some common species that likely show flower synchrony are *S. chrysostoma* Dressler (2001: 750), *S. citrea* Dressler (2005: 937), and *S. mariannae* Dressler (2002: 13).

Also, most *Sobralia* show ephemeral flowers, as they rarely remain open for more than a day. Instead, they open in the morning and close in the late afternoon. In addition, the flowers comprise very soft tissues that break or oxidize

quickly. These anatomical characteristics complicate the taxonomy of *Sobralia* because some floral traits (such as the keels of the lip) are lost in herbarium specimens or even in flowers preserved in liquid (Dressler 2002, 2011). For this reason, Dressler *et al.* (2016) suggested that the best method for studying *Sobralia* is by establishing a living collection of plants or by looking at individuals in the field. Using this method, R.L. Dressler described 40% of the species in Panama and showed the need to continue with exploration in the country, mainly in poorly sampled areas.

One of these little-explored areas in Orchidaceae is the Bosque Protector Palo Seco (BPPS) that borders the Reserva Forestal Fortuna (RFF) in Chiriquí and Bocas del Toro in western Panama. The BPPS lies in the premontane rainforest life zone characterized by high cloudiness, rainfall of up to 4,000 mm/year, and average temperatures of 16–17 °C. Environmental conditions favor a fascinating biological richness and many species of restricted geographical distribution (Dalling & Turner 2021). Since 1976, various studies have focused on accounting for the diversity in the area, yielding an estimate of 252 orchid species in the RFF (Silvera 2021). However, specifically in Orchidaceae, the precise estimate of the number of species in BPPS is still uncertain because orchid sampling has been scarce (Dalling & Turner 2021).

After the works on systematics and taxonomy of *Sobralia* in Panama, mainly by Dressler (2002, 2005, 2011) and Dressler & Bogarín (2007, 2009), the genus has not been studied recently. After the most updated checklist of Orchidaceae of Panama (Bogarín *et al.* 2014), only one new species of *Sobralia* was described for the country (Kolanowska 2014). In addition, some areas remain little explored in Panama, or it has been difficult to determine species diversity with certainty. For example, recent explorations in BPPS continue revealing new records in the genus, such as *Sobralia purpurella* Dressler & Bogarín (2011: 309) (Ortiz *et al.* 2019).

To continue with the project towards an illustrated flora of the Orchidaceae of Panama, we investigated a species of *Sobralia* in the BPPS, which is morphologically different from any species of the genus. We documented the species with digital images and compared it with morphologically similar taxa. Therefore, here, we describe and illustrate a new species of *Sobralia* from Panama.

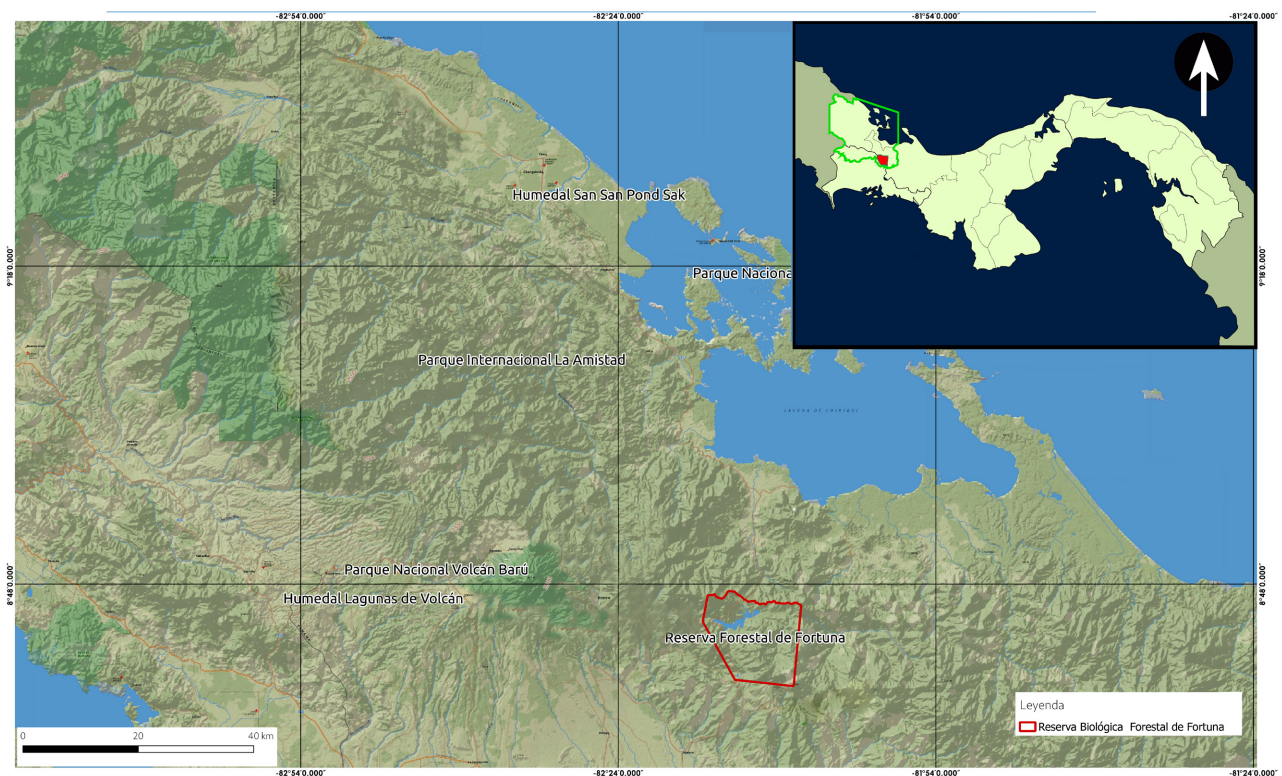


FIGURE 1. Fortuna Forest Reserve and Bosque Protector Palo Seco, Panama. Inset map showing the study area in red. Map by Zabyd Samudio and Jonathan González-Quiel.

Materials and Methods

We explored the BPPS between Chiriquí and Bocas del Toro, Panama (Figure 1), to study and collect living specimens during the flowering season of the species around August from 2014 to 2020. Plants were cultivated in the greenhouses

of the Herbario UCH of the Universidad Autónoma de Chiriquí, David, Panama. We photographed plants and flowers with a Nikon® D7100 digital camera with an AF-S VR Micro-NIKKOR 105mm f/2.8G IF-ED lens in the field and the photography laboratory at UCH. In addition, descriptions were prepared of living specimens following Dressler (2002, 2005, 2011), Dressler & Bogarín (2007, 2009) and Dressler *et al.* (2016). Locality data was obtained with a Garmin GPS 64S and visualized in Google Earth 6.1.0 ©, and herbarium specimens were deposited at UCH and PMA.

Taxonomic treatment

Sobralia rinconiana Serracín, Samudio & Bogarín, *sp. nov.* (Figures 2–3)

Type:—PANAMA. Chiriquí-Bocas del Toro: Bosque Protector Palo Seco, 8°47'30.4"N 82°12'29.8"W, 1141 m, bosque pluvial premontano, terrestres en bosque secundario a orillas del camino, 3 agosto 2014, Z. Serracín, R. Rincón & D. Bogarín 831 (holotype: UCH!, isotype: PMA!).

Among the *Sobralia* species, *S. rinconiana* is characterized by the combination of a large plant size that reaches up to 120 cm high with the chartaceous, larger, and wider leaves (27–35 × 14–16 cm), elliptical-lanceolate, acute to acuminate. Among the species of the genus, *S. rinconiana* is most similar to *S. carazoi* but differs (apart from its larger size of plants and leaves), in its grayish, papyraceous sheaths (rather than warty and dark) erect conical, acicular, papyraceous flower bracts without spots (instead of erect, narrow, acute, strongly lepidote), the spreading flowers with reflexed petals and the infundibuliform, cream-yellow lip (vs. campanulate, white flowers with an opened lip of *S. carazoi*) in its grayish, papyraceous sheaths, erect conical, acicular, papyraceous flower bracts without spots, the longer and wider sepals 4.0–4.4 × 0.8–1.0 cm (vs. 2.0 × 0.8 cm) and petals 4.2 × 0.9 cm (vs. 1.70 × 0.45 cm), the cream-yellow lip 3.8 × 2.8 cm (vs. white, 1.3 × 1.6 cm), and the longer, suberect column 2.5 cm long (vs. 1.2 cm).

Description:—Erect, terrestrial, large herb 120 cm tall. **Roots** coarse, fleshy, finely pubescent, 3–5 mm in diameter, and 5–10 cm long. **Stem** cylindrical, round in section, simple, fleshy, erect; up to 85 cm long, 4–5 mm in diameter; bracts, tubular papyraceous, not lepidote, foliate in the upper third, covered by adpressed, green, sparsely subscarios sheaths, becoming papyraceous with age. **Leaves** plicate, sessile, on a clasping vaginate base, chartaceous, elliptic-lanceolate, acute, 3–5 per stem, 27–35 × 14–16 cm, with 9–11 veins; the uppermost leaf smaller, petiolate, subtending the inflorescence, 7.5–9.0 × 4–5 cm. **Inflorescence** terminal, developed from a conical cluster of imbricating bracts, successively several-flowered, with a single flower, opened at once, floral bracts acuminate, papyraceous, 1.5–2.0 cm. **Floral bracts** conical, 2 cm long, acicular, papyraceous. **Flowers** ephemeral, white, with a cream-yellow lip throat, the lip base reddish tinged, the apex white, membranaceous, to 8.2 cm in diameter. **Dorsal sepal** elliptic-lanceolate, suberect, conduplicate, dorsally uncarinate, mucronate, entire, 4.0–4.4 × 0.8–1.0 cm. **Lateral sepals** elliptic to oblong, spreading, conduplicate, dorsally uncarinate, mucronate, entire, 4.0–4.2 × 0.8–0.9 cm. **Petals** white, elliptic-lanceolate, reflexed, spreading, acute, 4.2 × 0.9 cm. **Lip** infundibuliform, obscurely 3-lobed, oblong, retuse, erect, the base encircling the column, the distal margins spreading, crispate, 3.8 × 2.8 cm, the base of the lamina with two divergent calli. **Column** hemiterete-subclavate, slightly arched, 2.5 × 0.4 cm, the apex with two acute arms, with two prominent keels at the middle. **Anther and stigma** ventral. Anther cap cucullate, translucent, rounded, 2-celled, 2 mm in diameter. **Pollinia** 4, soft, mealy, in two symmetrical pairs of different size, not sharply distinct from the caudicles, each hemipollinarium 1 × 2 mm.

Distribution and Ecology:—Only known from Bosque Protector de Palo Seco, Fortuna along the Cordillera de Talamanca in western Panama. It grows as terrestrial on the roadside secondary forest at 1141 m of elevation (Figure 4). Plants were recorded in flower in August.

Etymology:—Dedicated to Prof. Rafael Rincón, Director of the Herbarium UCH of Universidad Autónoma de Chiriquí (UNACHI), Panama, in recognition of his contributions to the flora of Panama and who encouraged us to study this *Sobralia*.

Conservation status:—It has not been formally assessed, however, it should be considered data deficient (DD) because more data on population and distribution is needed for a proper assessment.

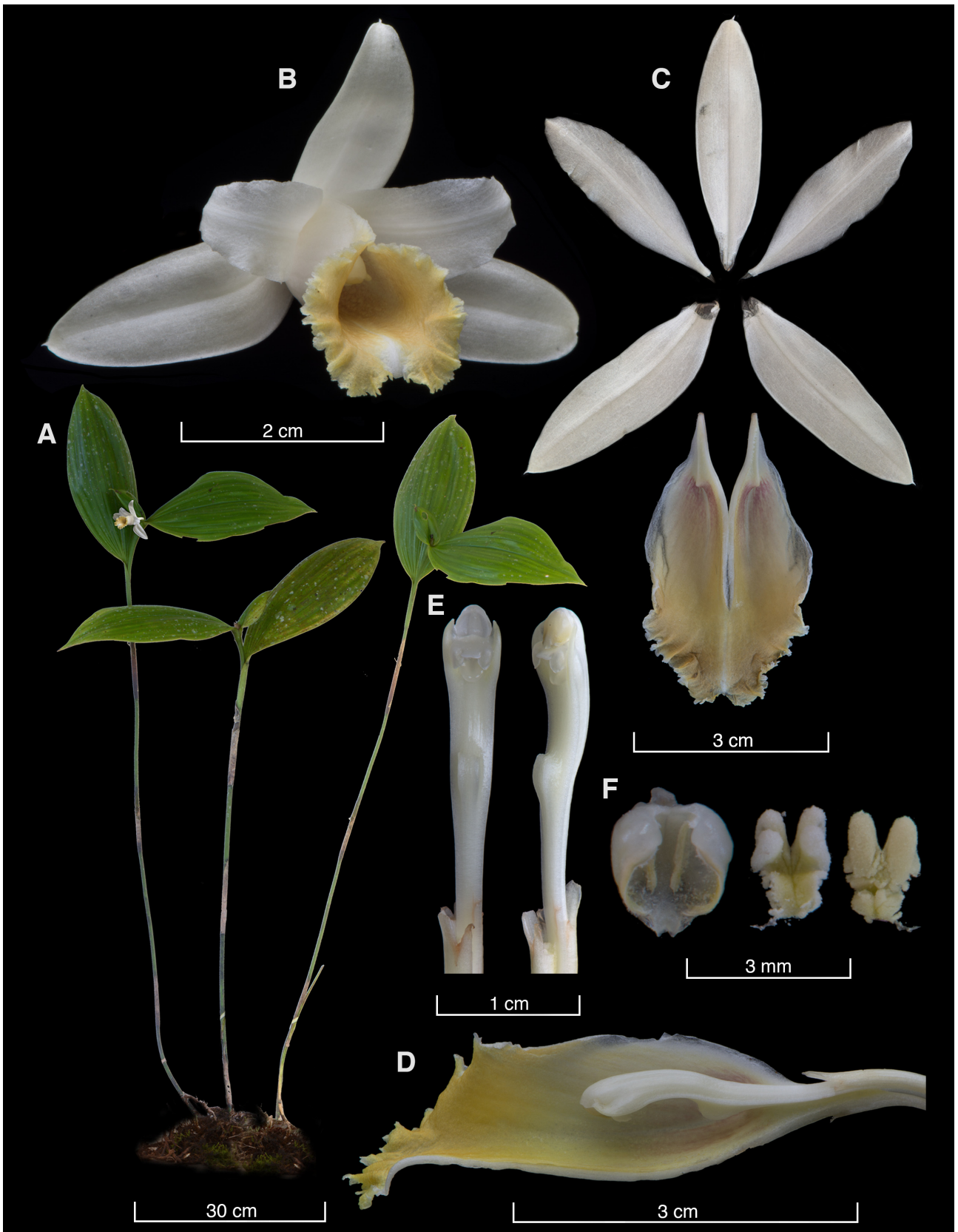


FIGURE 2. *Sobralia rinconiana* Serracín, Samudio & Bogarín: **A.** habit, **B.** flower, **C.** dissected perianth, **D.** column and section of the lip, lateral view, **E.** column, ventral and $\frac{3}{4}$ lateral views, **F.** anther cap and pollinarium (LCDP from the plant that served as the holotype) by the authors.



FIGURE 3. A-B. Morphology of two flowers of the plant that served as the holotype. Pictures by D. Bogarín.



FIGURE 4. Right and left, study site and natural habitat of *S. rinconiana* along Bosque Protector Palo Seco, Panama. Pictures by D. Bogarín.

Taxonomic Discussion:—the most conspicuous characteristic of *S. rinconiana* is the plant size that reaches up to 120 cm high and its large elliptical-lanceolate, chartaceous, acute to acuminate leaves $30\text{--}35 \times 14\text{--}16$ cm. *Sobralia rinconiana* is similar to *S. carazoi* C.H.Lankester & Ames (1924: 34) but vegetatively differs (apart from its larger size of plants and leaves) in its grayish, papyraceous sheaths (rather than warty and dark) erect conical, acicular, papyraceous flower bracts without spots (instead of erect, narrow, acute, strongly lepidote), the longer and wider sepals $4.0\text{--}4.4 \times 0.8\text{--}1.0$ cm (vs. 2.0×0.8 cm) and petals 4.2×0.9 cm (vs. 1.70×0.45 cm), the cream-yellow lip 3.8×2.8 cm (vs. white, 1.3×1.6 cm), and the longer, suberect column 2.5 cm long (vs. 1.2 cm). The habit of *S. rinconiana* is

similar to other species such as *S. chrysostoma* Dressler, *S. leucoxantha* Reichenbach.f. (1866: 86), *S. undatocarinata* C.Schweinfurth (1938: 197), *S. violacea* Linden ex Lindley (1846: 133), and *S. warszewiczii* Reichenbach (1852: 714) characterized by stems over 100 cm tall, with conspicuous floral bracts forming an imbricating cone; however, the leaf of the new species is larger than the rest of the *Sobralia* currently registered in Panama. The leaf size of the species similar in plant habit to *S. rinconiana* is up to 23 cm long and 8 cm wide, contrasting with the leaf of *S. rinconiana*, which is greater than 30 long and 14 cm wide.

Two peculiar characteristics of *S. rinconiana* are the small flower size in proportion to the plant height and leaf width. These two morphological features are present at least in *S. carazoi*, *S. doremiliae* Dressler (1995: 142), and *S. valida* Rolfe (1909: 65). However, the new species shows spreading flowers with reflexed petals from the middle to the apex. In addition, the infundibuliform, cream-yellow lip contrasts to the campanulate, white flowers with an opened lip of *S. carazoi* and *S. doremiliae*. Another similar species, *Sobralia valida*, shows smaller and narrower leaves (12–20 × 6.0–8.5 cm) and the lip with crested veins and a yellow band becoming deep orange in front (Rolfe 1909). These characters contrast to the two basal keels not extending along the cream-yellow lip of *S. rinconiana*.

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