

## ***SOBRALIA ARYAEELIZABETHIANA* (ORCHIDACEAE), A SMALL AND UNUSUAL NEW SPECIES FROM NORTHWESTERN PERU**

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**ABSTRACT.** A new species of *Sobralia* from the Andes of northern Peru is described and illustrated. *Sobralia aryaelizabethiana* can be easily recognized by its short stems with axillary racemose inflorescences. The species is most similar to *S. rigidissima* but differs in having smaller leaves (up to 8 cm *vs.* 15 cm), oblanceolate sepals up to 29 mm long (*vs.* linear-oblong, up to 13 mm), and an unlobed, ovate lip (*vs.* trilobed, cuneate-flabellate). Additionally, it has longer petals, widely ovate floral bracts with a triangular apex, and lavender flowers with purplish lip stains (*vs.* rose-colored with a white lip). *Sobralia aryaelizabethiana* is found only in a small area near Abra de Porcuya in the Piura department, on northwestern Peru. It thrives in semiarid soils that are partially covered with herbaceous or shrubby vegetation. This species is adapted to an environment characterized by intense sunlight and the constant air currents that bring in dense fog. The species diversity of *Sobralia* in Peru remains incompletely understood and a comprehensive taxonomic revision is required to clarify its richness.

**RESUMEN.** Se describe e ilustra una nueva especie de *Sobralia* de los Andes del norte de Perú. *Sobralia aryaelizabethiana* se puede reconocer fácilmente por sus tallos cortos con inflorescencias racemosas axilares. La especie es más similar a *S. rigidissima* pero se diferencia por tener hojas más pequeñas (hasta 8 cm *vs.* 15 cm), sépalos oblanceolados de hasta 29 mm de largo (*vs.* linear-oblongos, hasta 13 mm) y un labelo entero, ovado (*vs.* trilobulado, cuneado-flabelado). Además, tiene pétalos más largos, brácteas florales ampliamente ovadas con un ápice triangular y flores de color lavanda con manchas violáceas en el labelo (*vs.* rosa con labelo blanco). *Sobralia aryaelizabethiana* está restringida a una pequeña zona cerca del Abra de Porcuya en el departamento de Piura, en el noroeste de Perú. Crece en suelos semiáridos, parcialmente cubiertos de vegetación herbácea o arbustiva, expuestos a la intensa luz solar y a la densa niebla transportada por las constantes corrientes de aire en la zona. La diversidad de *Sobralia* en Perú es aún poco comprendida y se requiere de una revisión taxonómica para establecer su riqueza.

**KEYWORDS/PALABRAS CLAVE:** especie nueva, Huarmaca, new species, Piura, Porcuya, Sobralieae, taxonomía, taxonomy

**Introduction.** *Sobralia* Ruiz & Pav. is a polyphyletic genus comprising approximately 172 recognized species (Baranow, Dudek & Szlachetko, 2017; Neubig *et al.*, 2011; POWO, 2025). Plants of the genus typically exhibit caespitose growth and can be epiphytic, lithophytic, or terrestrial (Serracín, Samudio & Bogarín, 2022). Their growth form is variable, featuring cylindrical, erect, or arching stems that are usually unbranched, though they can be rarely branched. The stems are covered by tubular, appressed leaf sheaths.

The leaves are sessile and plicate, arranged either along the entire stem or only in the apical half. Inflorescences may be terminal or axillary, simple or branched, elongated or short and compact, often strongly condensed to form conical clusters of floral bracts (Baranow, 2015; Baranow & Dudek, 2018; Pridgeon *et al.*, 2005), occasionally with a new growth arising from old inflorescences (Dressler, 2012). The flowers are generally showy, gregarious, or synchronous, usually ephemeral, and vary in size. The lip can

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be entire or trilobed, typically infundibuliform (Seracín *et al.*, 2022) and often adorned with two ridges along the length of the lip base (Neubig, 2015). The gynostemium is usually claviform, erect, sigmoid, or curved in various ways. The anther bends forward, and the pollinia are soft and mealy, consisting of four or eight distinctly curved bands that are joined together (Szlachetko *et al.*, 2009).

Members of *Sobralia* inhabit a variety of environments, ranging from humid and shady tropical forests to sunny and dry savannas, and they thrive from sea level to over 3,000 meters of elevation (Baranow *et al.*, 2014; Pridgeon *et al.*, 2005). This genus is distributed across the tropical regions of Central and South America, specifically from Mexico to Peru, Bolivia, and southeastern Brazil (Garay, 1978; Dressler, Acuña & Pupulin, 2016; Pridgeon *et al.*, 2005).

Peru is recognized for its rich diversity of orchid species (Ulloa Ulloa *et al.*, 2017), with dozens of new species described annually (Martel, 2020). However, some genera remain poorly understood, and *Sobralia* is a prime example. Despite ongoing efforts to improve our understanding of its diversity (Arias-Sapa *et al.*, 2023; Bennett & Christenson, 1995, 1998, 1999, 2001; Bennett *et al.*, 1996; Christenson, 1996, 2002, 2003; Christenson & Moretz, 2003; Rodríguez Arzubialde, 1999; Schweinfurth, 1958, 1970; Szlachetko *et al.*, 2009), it remains to be one of the least studied orchid genera in the country. Its classification remains outdated compared to other orchid groups (Dressler, 2005), largely due to the lack of sampling in most clades of *Sobralia* (I, II, III, IV, V) (Neubig, 2012; Neubig *et al.*, 2011). Moreover, the fragile and short-lived flowers of *Sobralia* pose challenges for classifying the genus (Dressler, 2011; Dressler & Pupulin, 2010). Primarily because preserving floral characteristics, three-dimensional structure, and color patterns in herbarium specimens is particularly challenging (Neubig, 2012). As a result, identifying pressed specimens becomes notably difficult (Dressler, 2011).

To contribute to the knowledge of this genus, a new species of *Sobralia* from northwestern Peru is here described and illustrated. This new species is characterized by its unusual short stems (< 60 cm) for this clade within the genus and racemose axillary inflorescences. It is restricted to a small area near Abra

de Porcuya, where it grows in semi-arid soils, partially covered by grasses or shrubs. This species is adapted to sunlight exposure and dense fog that is transported by the constant air currents in the region.

**Materials and methods.** In November 2017, the first author discovered a small species of *Sobralia* during field exploration near Abra de Porcuya, located in the Huarmaca district of the Huancabamba province in the Piura department. A specimen was collected and deposited in the HUT Herbarium at the Universidad Nacional de Trujillo. In 2024, the author returned to the area to gather more information about the *Sobralia* specimen and its habitat, preparing two herbarium specimens that were deposited in the PRG Herbarium of the Pedro Ruiz Gallo National University.

We examined *Sobralia* specimens with similar vegetative and floral characteristics that were deposited in the Peruvian herbaria CUZ, HOXA, HUT, PRG, and USM. Additionally, we reviewed high-resolution digital images of specimens housed in foreign herbaria, including AAU, AMES, BR, F, K, MO, NY, P, and W, which were accessible through various virtual platforms. Original descriptions and relevant literature on the genus were consulted.

The description was based on fresh flowers preserved in liquid. Vegetative and floral structures were photographed using a Canon® Rebel 80D camera equipped with a Canon EF 100 mm f/2.8L Macro IS USM lens, and the images were processed with Adobe Photoshop 24.0.1 (Adobe Inc., 2022). The conservation status was suggested according to the categories and criteria of the International Union for Conservation of Nature Red List (IUCN, 2019). Maps were created using QGIS Desktop 3.22.0 (QGIS, 2021) and further edited in Adobe Photoshop. Botanical terminology followed Beentje (2016) and Stearn (2004).

#### TAXONOMIC TREATMENT

*Sobralia arielizabethiana* Ocupa, *sp. nov.* (Fig. 1–2).

TYPE: PERU. Piura: Prov. Huancabamba, Distrito de Huarmaca, Cerro Porcuya, carretera hacia Tallacas, 2689 m, 15 November 2023, *L. Ocupa* 322 (holotype: PRG!, isotype: PRG!).

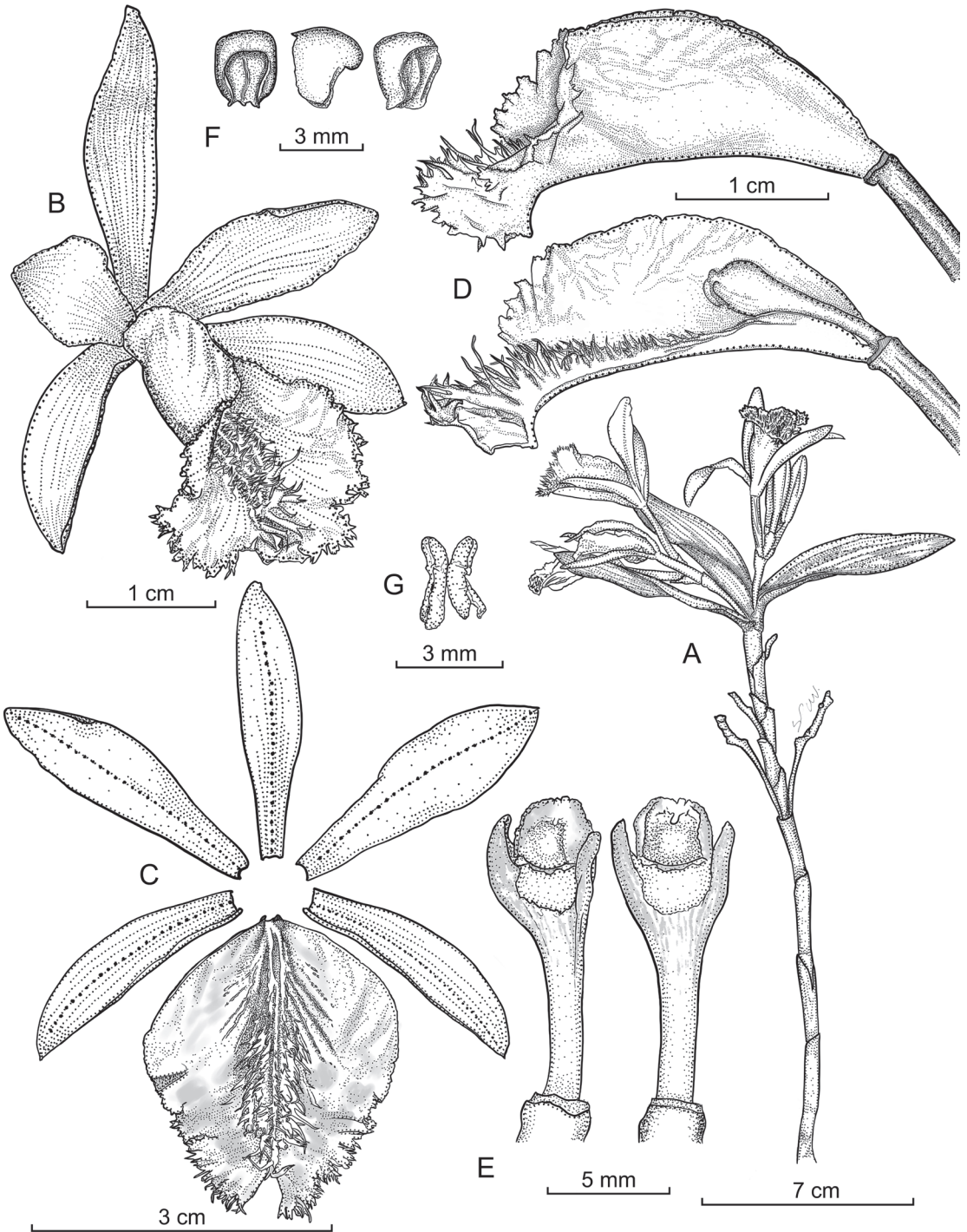


FIGURE 1. *Sobralia aryaelizabethiana*. A. Habit. B. Flower. C. Dissected perianth. D. Column, lip and ovary, lateral view (above), and with the lip longitudinally sectioned (below). E. Column (without anther) three-quarters and ventral views. F. Anther cap, ventral, lateral, and three-quarters views. G. Pollinarium, ventral view. Drawing by S. Vieira-Uribe from the plant that served as type.

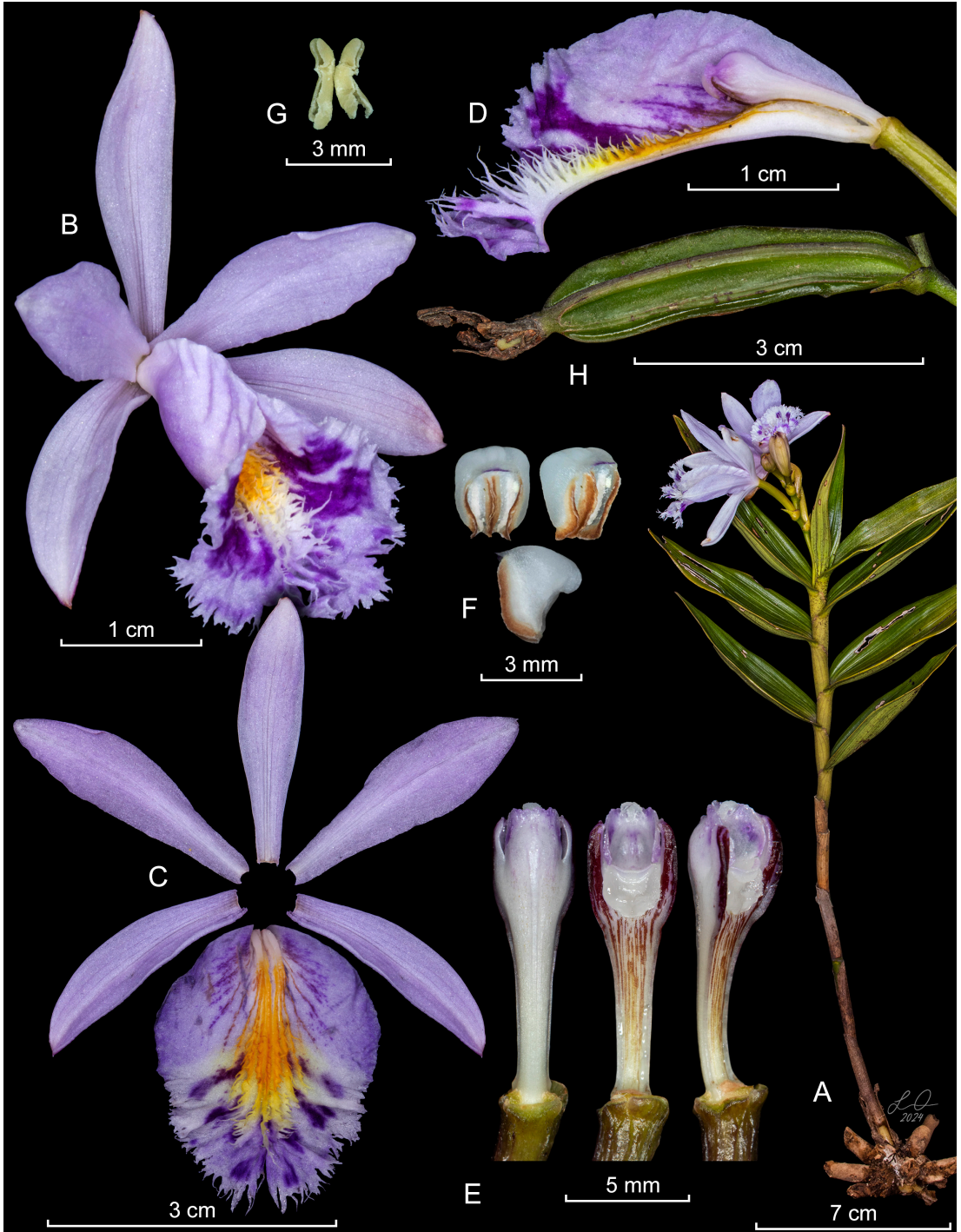


FIGURE 2. Composite plate of *Sobralia aryaelizabethiana*. A. Habit. B. Flower. C. Dissected perianth. D. Column, lip and ovary, lateral view (the lip longitudinally sectioned). E. Column (without anther), dorsal, ventral and, three-quarters views. F. Anther cap, ventral, three-quarters, and lateral views. G. Pollinarium, ventral view. H. Fruit. Prepared by L. Ocupa-Horna.

DIAGNOSIS: *Sobralia aryaelizabethiana* is most similar to *S. rigidissima* Linden ex Rchb.f., but differs in the shorter leaves which are up to 8 cm long (vs. up to 15 cm long), widely ovate floral bracts with a triangular apex (vs. triangular-ovate and obtuse), the oblanceolate sepals, up to 29 mm long (vs. linear-oblong, up to 13 mm long), the narrowly obovate petals, up to 29 mm long (vs. obovate-oblanceolate, up to 13 mm long), and the unlobed, ovate lip, 29–30 mm long (vs. trilobed, cuneate-flabellate, 15 mm long).

*Plant* terrestrial, caespitose, up to 60 cm tall. *Roots* coarse, fleshy, white to pale brown, finely pubescent, 4–6 mm in diameter. *Stem* cane-like, erect, cylindrical, rigid, 21–45 cm long, 3–6 mm in diameter, with leaves distributed in the upper third, covered by adpressed, coriaceous, pale green leaf sheaths, with folded margins, 28 mm long, with age they become chartaceous, brown and with black spots. *Leaves* sessile, alternate, strongly plicate, coriaceous, elliptic-lanceolate to lanceolate, acute, 30–80 × 16–36 mm. *Inflorescences* axillar, suberect, congested racemes, arising from the apical internodes, with 1–3 simultaneous inflorescences per stem, up to 9 cm long including the peduncle, with 3–7 flowers per inflorescence, 2–3 opening at the same time, peduncle somewhat flexuous, laterally compressed, ca. 30–40 mm long, rachis fractiflex, cylindrical, 10–18 mm long. *Floral bracts* coriaceous, slightly oblique, widely ovate, triangular at the apex, dorsally low-keeled, 4–6 × 4–7 mm. *Ovary* pedicellate, straight to arched, cylindrical, green or reddish brown colored, 17–23 mm long, 6-furrowed; ovary and pedicel shorter in apical flowers. *Flowers* white, light pink, lavender or purple-colored, with pale purple to violet or pale magenta lip spots, column white with pale brown spots along the ventral side, column wings basally colored from brown or dark purplish red, clinandrium purple to pale purple. *Sepals* concave, distinctly conduplicate at the base, subsimilar, oblanceolate, acute, abruptly apiculate-carinate, 25–29 × 6.0–7.5 mm; *dorsal sepal* slightly recurved towards the apex; *lateral sepals* spreading to recurved, basally connate 1.0 mm. *Petals* slightly recurved or arched forward, narrowly obovate, briefly sinuated, irregularly erose, obtuse, 29–30 × 8–10 mm. *Lip* unlobed, surrounding the column, ovate when expanded, 29–30 × 24–26 mm, deeply incised; basal margins entire to irregularly erose, somewhat un-

dulate; apical margins reflexed, fimbriate-lacerate; the base of the lip with two, linear, high, parallel, white, ca. 5 mm long calli, and 7 slightly diverging, orange, fimbriate-laciniate keels, these becoming higher and more ornate distally, located from 1/3 of the base of the lip to the apex. *Column* claviform, winged, slightly arched at the base, ventrally flattened, 1-keeled dorsally, the apex with two falcate, upcurved wings, 11–12 mm long, 4 mm wide distally; rostellum semi-circular; anther and stigma ventral; *anther cap* cucullate, rounded, white, stained yellow at the apex, 2-celled, 3 × 2 mm. *Pollinia* 4, crescent-shaped, flattened, soft, mealy, pale yellow, in two symmetrical pairs of different size, without defined caudicles, each hemipollinarium ca. 2.6 mm long. *Fruit* fusiform, trilocular, pale green, up to 4 cm long.

EPONYMY: This species is named in honor of Arya Elizabeth, daughter of the first author.

DISTRIBUTION AND ECOLOGY: The known population of *S. aryaelizabethiana* is found exclusively along Cerro Porcuya, at elevations ranging from 2689 to 2740 meters. This region is situated near the Abra de Porcuya, a mountain pass in the Western Cordillera of the Andes, in the Piura department, northwestern Peru (Fig. 3). It is regarded as the lowest point of the Huancabamba Depression, which is at 2145 meters of elevation. The area is part of the Andean scrubland ecosystem, characterized by predominately sclerophyllous vegetation that includes herbaceous plants, shrub thickets, and small trees (MINAM, 2018). This ecosystem experiences dense fog, driven by air currents, and features moderate environmental humidity. Additionally, its ecological processes are distinctly seasonal, with a wet season marked by heavy rainfall.

*Sobralia aryaelizabethiana* grows in sympatry with other orchid species such as *Epidendrum rauhii* Hágsater, *Masdevallia bonplandii* Rchb.f., *M. civilis* Rchb.f. & Warsz., and *Oncidium cajamarcae* Schltr. Like some other terrestrial *Sobralia*, individuals of this new species can be found scattered on soils and slopes made up of sedimentary layers of clay, silt, sand, and boulder gravel. These areas are typically partially covered by herbaceous plants, subshrubs, and shrubs, and they are fully exposed to solar radiation and dense fog. Competition for light availabil-

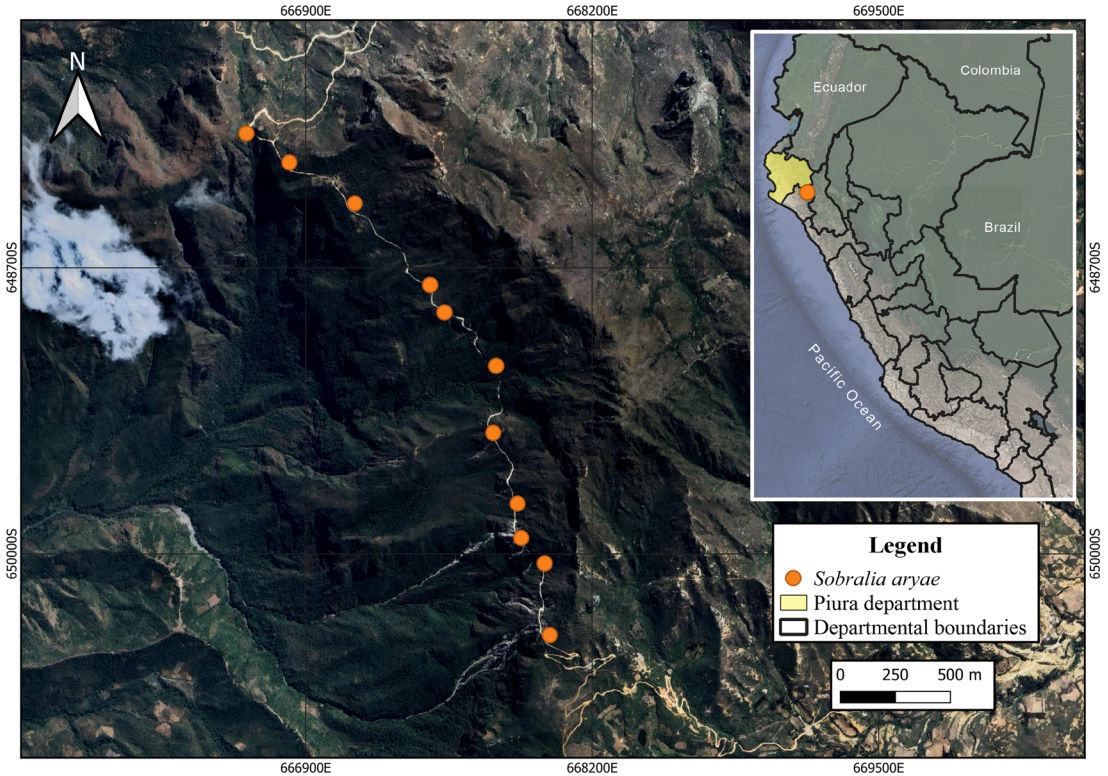


FIGURE 3. Location map of the population of *Sobralia aryaelizabethiana* in Piura Department, Peru. Prepared by L. Ocupa-Horna.

ity significantly influences the growth of *S. aryaelizabethiana* plants. In regions where the vegetation consists mainly of grasses and scattered subshrubs, these plants can reach heights of up to 45 cm high. On the other hand, *S. aryaelizabethiana* individuals that grow in denser shrub areas can also reach approximately 60 cm (Fig. 4B–C).

The longest-lived individuals of *S. aryaelizabethiana* can develop up to three bifurcate and functional inflorescences simultaneously, which can produce around 36 flowers per plant (Fig. 5). Additionally, some individuals of this new species exhibit variations in flower color and the size of the perianth segments, particularly in the petals and sepals. Some plants may produce flowers in white, light pink, lavender, or purple, with lip spots that range in color from pale purple to violet or pale magenta (Fig. 6). These variations in flower coloration are not always documented in other *Sobralia* species.

**PHENOLOGY:** The flowering of *S. aryaelizabethiana* occurs between November and December, during

the end of the dry season. Individuals flower at least once a year.

**CONSERVATION STATUS:** *Sobralia aryaelizabethiana* is only known from its type locality, which is located on Cerro Porcuya and along the slopes of the road to Tayacas. Currently, the habitat of *S. aryaelizabethiana* faces potential threats due to the maintenance of the road that passes through this ecosystem and the frequent landslides caused by erosion and heavy rainfall. Local populations use this ecosystem as grazing land for goats and sheep, resulting in the persistent practice of burning pastures (Fig. 7). Until a more thorough assessment is conducted, the species should be classified as “Data Deficient” (DD) according to IUCN criteria (IUCN, 2019).

**PARATYPE:** PERU. Piura: Prov. Huancabamba, ruta Abra Porculla – Tallacas, 2640 m, 14 November 2017, L. Ocupa 241 (HUT-65426!).

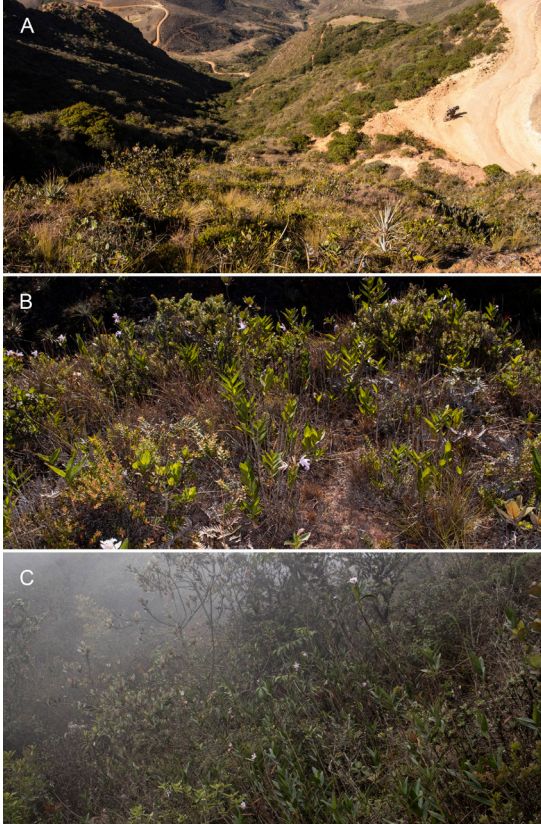


FIGURE 4. Habitat of *Sobralia aryaelizabethiana*. **A.** View of the road from Cerro Porcuya to Tallacas. **B.** Individuals growing in eroded soils, partially covered by grasses and subshrubs. **C.** Individuals growing among the shrubs. Photographs by L. Ocupa-Horna.

SPECIMENS EXAMINED OF *S. RIGIDISSIMA*: COLOMBIA. Norte de Santander: Ocaña, 1846–1852, *L. J. Schlim* 36 (lectotype: W-0070331; isolectotypes: BR-06589516, BR-06589189, BR-06590499; F-0360849; K-000364488; P-00441742; photo of the type: AMES). ECUADOR. Zamora-Chinchi: Road Loja–Zamora, km 24–25, steep rocky slopes, covered with scrub, alt. 1950–2100 m, 15 April 1973, *L. Holm-Nielsen*, *S. Jeppesen*, *B. Löjtmant* & *B. Ollgaard* 3455 (AMES-02161502; AUU [photo seen]).

**Discussion.** Morphological characteristics such as axillary and racemose inflorescences (Fig. 8A), along with prominent internodes and floral bracts that are shorter than the pedicel and ovary (Fig. 8B), suggest that *S. aryaelizabethiana* belongs to one of the *Sobralia* clades related to *Elleanthus* C.Presl. and *Sertifera*



FIGURE 5. Individuals of *S. aryaelizabethiana* with many pollinated flowers. Photograph by L. Ocupa-Horna.

Lindl. ex Rchb.f., rather than being part of *Sobralia s.s.* (Neubig, 2012; Neubig *et al.*, 2011). These polyphyletic clades were previously classified under *Brasolia* (Rchb.f.) Baranow, Dudek & Szlach. (Baranow *et al.*, 2017), which is currently not accepted (Govaerts *et al.*, 2021; POWO, 2025). Consequently, the new species is described under *Sobralia* in a broad sense until new phylogenetic evidence clarifies the taxonomic framework of the genus.

Species in its clade exhibit racemose, axillary, and elongated inflorescences with prominent internodes and floral bracts that are shorter than the pedicel and ovary. Additionally, their stems persist for several years, with older inflorescences remaining attached. One species in this clade is *Sobralia ciliata* C.Schweinf. ex Foldats, which has a strong resemblance to *S. rigidissima* (Neubig, 2012), but is easily differentiated from *S. aryaelizabethiana* by the bright rose-purple flowers (*vs.* white, light pink, lavender or purple flowers with purplish to violet stains on the lip), 3-lobed lip, *ca.* 23 × 15 mm (*vs.* unlobed, ovate lip, 29–30 × 24–26 mm). Other species within these clades include *S. altissima* D.E.Benn. & Christenson, *S. boliviensis* Schltr., *S. caloglossa* Schltr., *S. dichotoma* Ruiz & Pav., *S. scopulorum* Rchb.f., and *S. weberbaueriana* Kraenzl. (Neubig, 2012; Neubig *et al.*, 2011). A comparison between *S. aryaelizabethiana* and the Peruvian species in this clade is presented in Table 1.

Several features distinguish *S. aryaelizabethiana* from *S. rigidissima*. The leaves of *S. aryaelizabethiana* are elliptic-lanceolate to lanceolate and acute (*vs.* lanceolate to ovate-lanceolate, acuminate), and the flowers are white, light pink, lavender or purple with purplish



FIGURE 6. Variation in the coloration of flowers of *Sobralia aryaelizabethiana*. Photographs by L. Ocupa-Horna.

to violet stains on the lip (compared to rose-colored with a white lip as noted by Reichenbach (1854) and Garay (1978). Additionally, the lateral sepals are acute and abruptly apiculate-carinate (instead of obtuse), and the lip is unlobed with a fimbriate-laciniate apical margin (vs. three-lobed and lacerate-denticulate).

The diversity of *Sobralia* in Peru is not yet fully understood. Therefore, further efforts, including additional explorations and a comprehensive taxonomic revision, are necessary to better identify and understand the richness of this genus in the country.

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FIGURE 7. Habitat type *S. aryaelizabethiana* affected by the traditional practice of pasture burning. Photograph by L. Ocupa-Horna.

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**AUTHOR CONTRIBUTION.** LO-H: Conceptualization, Methodology, Investigation, Writing - Original Draft, Writing - Review & Editing, Visualization. JV-D: Investigation, Writing - Review & Editing, Visualization. **FUNDING.** This study was carried out with funding from the authors. **CONFLICT OF INTEREST.** The authors declare that no competing interests exist.

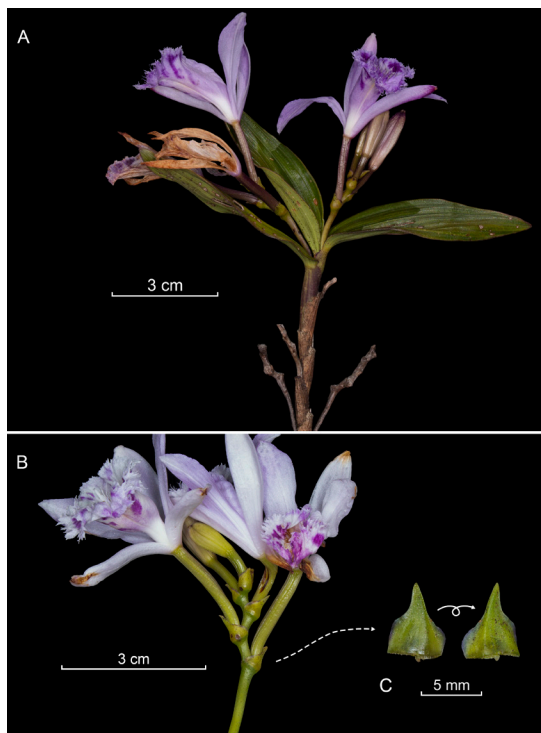


FIGURE 8. Inflorescence of *Sobralia aryaelizabethiana*. **A.** Apical portion with axillary inflorescences, including fresh inflorescences (above) and traces of old inflorescences (below). **B.** Detailed view of the rachis, bracts, pedicels, and ovaries. **C.** Close-up of the floral bracts. Photographs by L. Ocupa-Horna.

TABLE 1. Comparison of *S. aryaelizabethiana* with other species of *Sobralia* sect. *Sobralia*.

	<i>S. aryaelizabethiana</i>	<i>S. caloglossa</i>	<i>S. ciliata</i>	<i>S. dichotoma</i>	<i>S. scopulorum</i>	<i>S. weberbaueriana</i>
<b>Plant size</b>	Up to 60 cm tall	Up to about 6 m tall	More than 2 meters tall	Up to about 6 m tall	Up to about 1.2 m tall	Up to 5 m tall
<b>Flower color</b>	White, light pink, lavender or purple with purplish to violet stains on the lip	Brown, rarely violet-purplish, lip of lavender	Bright rose-purple	Ruby red to red-vinaceous, or magenta or purple	Apparently purple (Schweinfurth, 1958)	Purple (Schweinfurth, 1958)
<b>Lip</b>	Unlobed, ovate, 29–30 × 24–26 mm	Pandurate with a bilobed apex, or obscurely tri-lobed a, ca. 40–50 × 32–34 cm	3-lobed, lateral lobes rounded, mid-lobe suborbicular, ca. 23 × 15 mm	Ovate-subquadrate or rarely broadly obovate, or obscurely tri-lobed, ca. 4.7 × 4	Unlobed, ob-ovate, ca. 28–30 × 18 mm	Unlobed, very broadly ovate, ca. 35 × 40 mm
<b>Lip keels</b>	7 fimbriate-laciniate keels	5 irregularly laciniate keels	7 denticulate keels, thickened and almost to the apex of the median lobe	5-7 laciniate keels that elongate and densify towards the apex, forming a pubescent mass	5 keels dentate or serrulate towards the apex	5 denticulated keels

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