

Salvia caeruleobracteata (Lamiaceae), a New Species from Oaxaca, Mexico

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Abstract: During the review of the Lamiaceae of Oaxaca, specimens of the genus *Salvia* were found with morphology similar to *S. pannosa*, from the sect. *Scorodoniae*. However, the new species can be distinguished from *S. pannosa* by being branching herbs up to 0.5 m tall, with stems and upperside of the leaf hirsute, rachis, calyx and pedicel covered with non-glandular simple trichomes, and persistent bracts, blue, acuminate apex and tomentose abaxial face with simple non-glandular trichomes.

Keywords: *Salvia*, Lamiaceae, Oaxaca, México

1. Introduction

Salvia Linnaeus [11] is a cosmopolitan genus that is distinguished by having calyx and corolla bilabiate and two stamens with elongated connective, constituting an adaptation related to pollen deposition on the body of pollinators, known as lever mechanism [19]. The cohesiveness of both, elongated connectives and lever mechanism, throughout most *Salvia* had led to the assumption of conceive it as a monophyletic group. However, recent studies revealed that the lever mechanism arose independently at least three times in this lineage [19]. Walker *et al.* [18] recognized four subgenera in this group, two are found on the American continent: *Calosphace* Rafinesque [14] and *Leonia* Cervantes [2]; Walker *et al.* [20] resurrected the subgenus *Audibertia* Benth [1] of California and Baja California and in the last published proposal, Drew *et al.* [3] distinguish seven subgenres and three clades within *Salvia*, being *Calosphace* the most diverse in Mexico, with over 310 species [12] such that Mexico has been considered one of the diversification centers for this genus [10].

Within Mexico, Oaxaca is the state considered to have the highest richness in angiosperms, with over 9000 species [17]. This richness is due to the latitude at which it is located,

together with geology, physiography and a diversity of climate and soils [8]. When conducting a floristic research in this state, particularly at Santiago Yosondúa, some *Salvia* specimens were found and have a combination of characters that differs from the rest of the species in the genus, belonging to the section *Scorodoniae* and here are proposed to constitute a new species.

2. Method

Herbarium specimens, product of collections in Oaxaca, were examined in detail. The description and the diagnosis of the new species, the key and the illustration was made.

3. Results

Salvia caeruleobracteata Mart. Gord., D. Sandoval and García-Mend., *sp. nov.* (Figures 1, 2).

Salviae pannosae affinis sed habitu herbaceo, statura minore, ramosis, caulibus pubescentibus, rhachi inflorescentiae, pedicellis et calycis cum trichomatibus simplicibus, eglandulosis, bracteis caeruleis, persistentibus, acuminato apice et abaxialibus cum trichomatibus simplicibus, eglandulosis.

Type:—MEXICO. Oaxaca: Tlaxiaco District. Mpio.

Santiago Yosondúa, Cerro Kava Ndivi, southern slope, road to Yerbasantá, 16°50'37.6"N, 97°35'10.3"W, elev. 1867 m, 7 August 2012, *A. García-Mendoza* 9917, *S. Franco*, *D. Sandoval* and *J. Aragón* (holotype MEXU!, isotype SERO!).

Perennial herbs, 0.3–0.5 m tall, branched, stems densely hirsute, with short, straight, multicellular trichomes. Leaf with petiole (0.3–)0.6–1.2 cm long; blade oblong-lanceolate, 2.4–8 × (0.9–)1.3–1.8 cm, apex acute, base rounded to truncate, margin crenulate, abaxially involute, upper surface green, bullulate–rugose, with sparse multicellular trichomes, underside whitish, tomentose, with simple, dense, multicellular trichomes. Inflorescence 10–13(–17) cm long, terminal, sometimes with three branches at the base; rachis hirsute with simple, non-glandular trichomes, peduncle 1.2–3.5 cm long, lower–most proximal internode (0.8–)1.6–2.3

cm, 6–9 flowers per verticillaster. Floral bract persistent over the anthesis, ovate, 4–10 mm long, blue, apex acuminate, base cuneate, margin entire, adaxial face glabrescent, abaxial face tomentose with simple whitish trichomes, venation with 9 parallel nerves. Flower with pedicel 0.2–0.7 mm long, tomentose with simple, non-glandular trichomes. Calyx 6–7.5 mm long, 5 veins on the upper lip, pubescent with simple, non-glandular trichomes, upper lip acute. Corolla blue, tube 7–8 mm long, ventricose, papillae absent, corolla pubescent; upper lip 2–5 mm long; lower lip 6.5–7 mm long, with spherical glands, whitish. Stamen included, joined near corolla base, gubernaculum straight, abaxially with a retrorse tooth. Gynobasic gland or gynobasic horn slightly larger than the mericarps, slightly curved; style villose. Mericarp oblong, smooth, beige with brown bands.

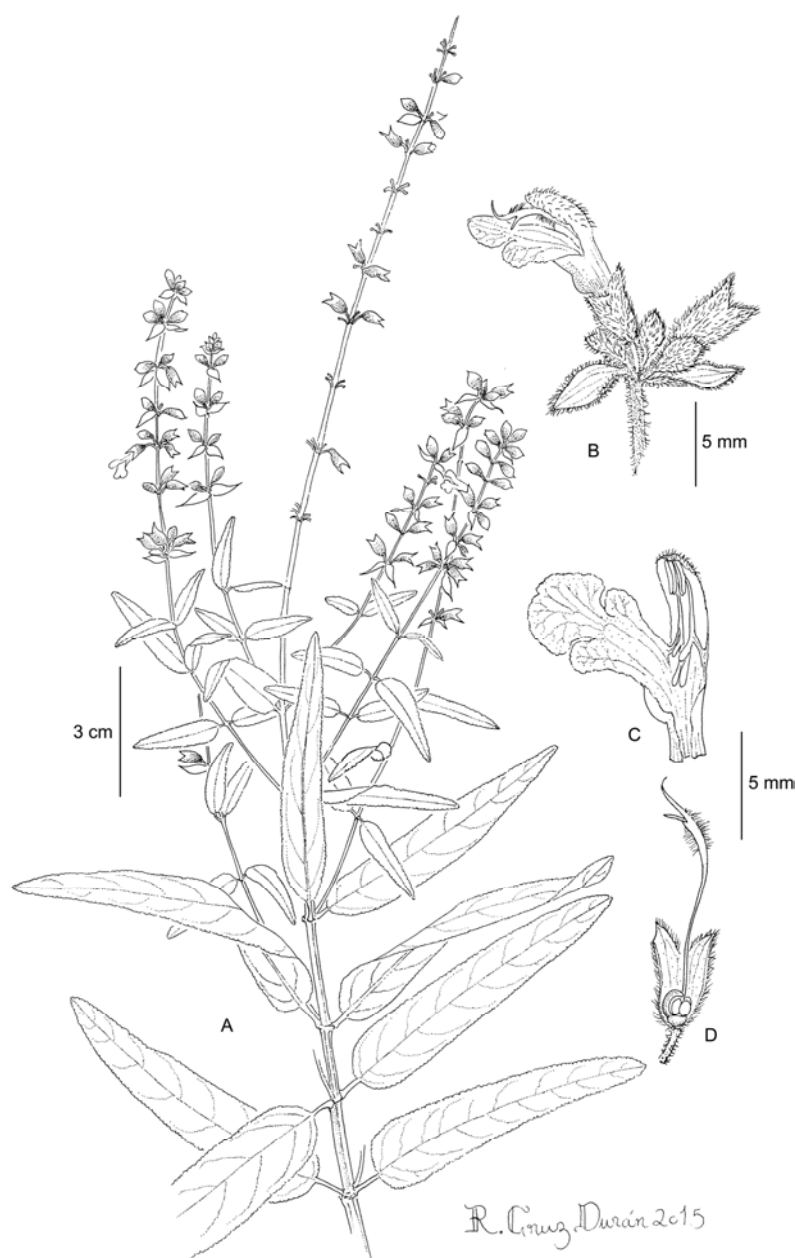


Figure 1. *Salvia caeruleobracteata*. A. Habit. B. Detail of the flower. C. Corolla. D. Dissected calyx with style, mericarps and gland of the gynobase (drawn by Ramiro Cruz Durán).



Figure 2. Scanned image from the holotype of *Salvia caeruleobracteata*.

3.1. Phenology

Flowers and fruits present in August.

3.2. Distribution and Habitat

Salvia caeruleobracteata is endemic of Oaxaca, currently known only in the municipality of Santiago Yosondúa. This species has been collected in elevations between 1850 to 2200 m, in xeric shrub with *Agave seemanniana*, *Astrolepis sinuata*, *Bocconia arborea*, *Berberis pallida*, *Cheilanthes longipila*, *Dasyllirion serratifolium*, *Mammillaria albilanata*, *Muhlenbergia gigantea* and *Selaginella lepidophylla*, and other microendemic species including *Agave kavandivi*, *Hechtia nuusaviorum*, *H. flexilifolia* and *Tillandsia rhodocephala* [4, 6, 9, 15]. The collection sites are distinguished by limestone soils and steep slopes.

3.3. Etymology

Refers to the blue bracts.

3.4. Additional Specimens Examined

MÉXICO. Oaxaca: Tlaxiaco District. Municipio: Santiago Yosondúa: Imperio Santiago Yosondúa, cerca de la carretera que va a Santiago Yosondúa, 24 August 2005, *M. Mendoza-Osorio* 97 (MEXU!); cerro Kava Ndivi, ladera sur, camino a Yerbasantá, 16°50'42"N, 97°35'11.32"W, 1870 m, 6 August 2012, *D. Sandoval-Gutiérrez et al.* 203 (MEXU!).

Salvia pannosa: MÉXICO. Puebla: Municipio Caltepec, barranca del Agua Fría, 1.5 km al W de San Luis Atolotitlán, *P. Tenorio* 6836 (IEB, MEXU!); Rincón de la Hierba, La Mesa Chica al W de Caltepec, *P. Tenorio* 7267, 7616 (MEXU!); 2 km al E de la intersección Tehuacán–Orizaba–Esperanza, *A. Salinas* 5454 (MEXU!); 7 km al E de Azumbilla, carretera a Vicente Guerrero, *P. Tenorio* 17519 (MEXU!); Nicolás Bravo, along Tehuacán–Orizaba, highway just above Azumbilla, *C. E. Smith Jr.* 3948 (MEXU!); 1 km al NW de Nicolás Bravo, *P. Tenorio* 9079 (MEXU); 2 km al N de Nicolás Bravo, *P. Tenorio* 7300 (MEXU!); municipio San Antonio Cañada, San Esteban behind cerro Colorado, between Nacoxcalco and San Antonio Cañada, *C. E. Smith Jr.* 4093 (MEXU!); municipio Tepanco de López, 7 km al NW de Teotepec, brecha a Nopala, *P. Tenorio* L. 7463 (MEXU!). Oaxaca: Municipio Tepelmeme, cañada de Carrizalillo, cerro Verde, *P. Tenorio* 6958 (MEXU!); cerro Verde, al N de Tepelmeme, *P. Tenorio* 9285 (MEXU!).

3.5. Key to the Species of *Salvia* Section *Scorodoniae* from Oaxaca, México

1. Lanceolate–elliptical leaves with decurrent base.....
S. occidua
 - Deltoid, ovate, or ovate–lanceolate leaves, with truncate, rounded or cordate base.....2
2. Persistent, blue bracts..... *S.*

caeruleobracteata

- Deciduous, brown or green bracts3
- 3. Corolla rose or magenta..... *S. variana*
 - Corolla blue, purple or white.....4
- 4. Corolla white..... *S. periconia*
 - Corolla usually blue or purple.....5
- 5. Corolla tube epapillate..... *S. pannosa*
 - Corolla tube with 2–4 papillae.....6
- 6. Leaf base cuneate..... *S. fruticulosa*
 - Leaf base truncate, redondeate or cordate.....7
- 7. Upper lip of corolla with dendritic trichomes..... *S. ramosa*
 - Upper lip of corolla with simple or glandular–capitate trichomes.....8
- 8. Upper lip of corolla with simple trichomes..... *S. gonzalezii*
 - Upper lip of corolla with glandular–capitate trichomes.....9
- 9. Calyx with dendritic trichomes..... *S. dugesii*
 - Calyx with simple and glandular–capitate trichomes..... *S. melissodora*

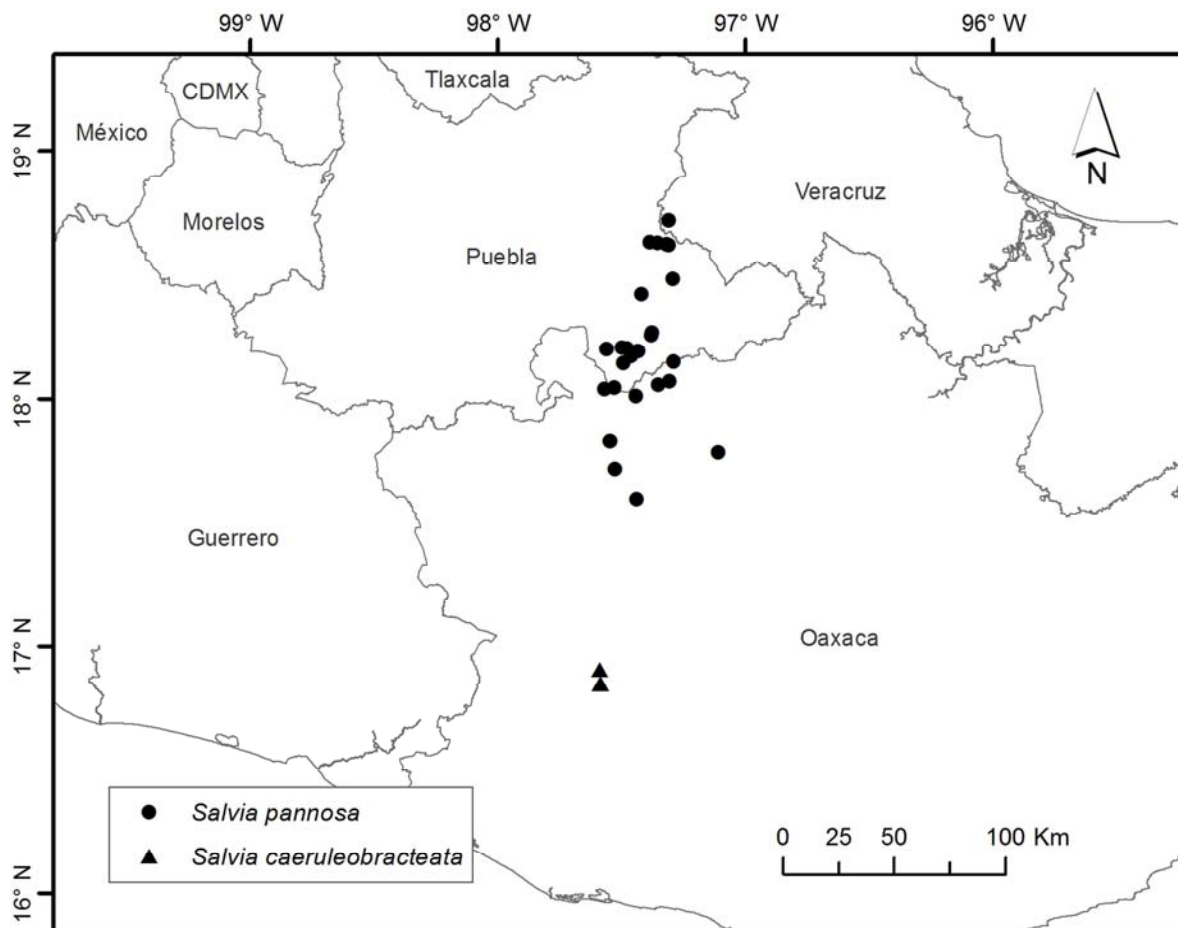
4. Discussion and Conclusion

Species of the sect. *Scorodoniae* generally present deltoid, ovate, ovate–lanceolate or lanceolate–elliptic leaves, bullate above, simple, dendritic or glandular–capitate trichomes, deciduous or rare subsistent bracts, calyx with 5–7 nerves on upper lip and hirtellous style [5, 16, 13]. They are distributed mainly in the center and western regions of Mexico and are widely represented in Oaxaca, with nine species. During the review of specimens of the Lamiaceae family in this state, a species was encountered which, according to its characteristics, belongs to sect. *Scorodoniae*, although it has persistent bracts. This is similar to *Salvia pannosa* Fernald [7] a species endemic to Puebla and Oaxaca, by the shape of the leaves, terminal inflorescence and anthers not exerted, but which presents distinctive characteristics; as such, we propose it as the new species *S. caeruleobracteata*.

Salvia caeruleobracteata is distinguished from *S. pannosa*, because of it is a branched herb (vs. unbranched subshrub), non–glandular trichomes on the rachis of the inflorescence, pedicel and calyx (vs. glandular–capitate trichomes), upper lip of the calyx with five veins (vs. seven veins), blue bracts (vs. light brown), persistent during anthesis (vs. deciduous), acuminate apex (vs. caudate) and abaxial face tomentose with simple, non–glandular trichomes (vs. abaxial face glabrescent, with glandular trichomes) (Table 1). The new species grows in the Southern Sierra Madre, whereas *S. pannosa* is distributed mainly in the Tehuacán–Cuicatlán area (Figure 3). All of the above allows us to conclude that is a different species.

Table 1. Morphological comparison between *Salvia pannosa* and *S. caeruleobracteata*.

Character	<i>Salvia pannosa</i>	<i>Salvia caeruleobracteata</i>
Habit	subshrub, unbranched	perennial herb, branched
Size (m)	0.5–1.5	0.3–0.5
Stem trichomes	short adpressed	short erect
LEAF BLADE		
Trichomes in the lower surface	adpressed	erect
INFLORESCENCE AND FLOWERS		
Rachis	glabrescent	hirsute
Trichomes on rachis	glandular–capitate	non–glandular
Bract colour	light brown	blue
Bract persistence	early deciduous	persistent
Bract apex	caudate	acuminate
Abaxial face pubescence	pubescent, trichomes glandular–capitate	tomentose, simple trichomes
Pedicle length (mm)	0.7–3.5	0.2–0.7
Pedicle pubescence	glabrescent with simple and glandular–capitate trichomes	tomentose with simple, non–glandular trichomes
Calyx upper lip apex	short–acuminate	acute
Calyx trichomes	simple and glandular–capitate trichomes	simple, non–glandular trichomes
Length of the lower corolla lip (mm)	4.3–6	6.5–7

**Figure 3.** Distribution map of *Salvia caeruleobracteata* and *S. pannosa*.

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