VALIDATION OF SELAGINELLA PSITTACORRHYNCHA (SELAGINELLACEAE), A NEW SPECIES FROM THE GUIANA HIGHLANDS OF VENEZUELA AND BRAZIL

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ABSTRACT

Selaginella psittacorrhyncha Valdespino is validated as a new species from the Guiana Highlands of Venezuela and Brazil by providing a description, illustrations, and discussion on taxonomic affinity, as well as information on conservation status. Its centipede-like habit, ascending to erect stems with anisotomously branching pattern, and strobili born almost laterally on the main stems resemble that of the Panamanian S. taylorii Valdespino and S. chrysoleuca Spring and S. euclimax Alston ex Crabbe & Jermy, both found also in Panama and western South America. Selaginella psittacorrhyncha differs from them by its lateral rhizophores, coriaceous leaves, acute and parrot’s beak-like median leaf apices, and orange megaspores. Selaginella psittacorrhyncha is morphologically closer to S. vernicosa Baker of Venezuela and Brazil, from which it is set aside by its ascending to suberect stems, ascending branches, coriaceous leaves, median leaves with the outer bases glabrous or infrequently puberulent only with 1 or 2 short hairs and parrot’s beak-like apices.

RESUMEN

Selaginella psittacorrhyncha Valdespino es validada como una especie nueva del Escudo guayanes de Venezuela y Brasil mediante una description, ilustraciones y discusion de sus afinidades taxonómicas, asi como informacion sobre su estado de conservacion. Su habito centipediforme, tallos ascendentes a suberectos con un patron de ramification anisotomo y estróbilos que se originan casi lateralmente en el tallo principal la asemejan a S. taylorii Valdespino de Panamá y a S. chrysoleuca Spring y S. euclimax Alston ex Crabbe & Jermy, las cuales se encuentran tambien en dicho pais y en el Oeste de Sudamérica. Selaginella psittacorrhyncha se diferencia de dichas especies por sus rizóforos laterales, hojas coriáceas y hojas mediales con los apices agudos, parecidos al pico de un loro y megasporas anaranjadas. Selaginella psittacorrhyncha es mucho mas cercana morfologicamente a S. vernicosa Baker de Venezuela y Brasil, de la que se distingue por sus tallos ascendentes a suberectos, ramas ascendentes y hojas coriáceas, las mediales con los apices parecidos al pico de un loro.

Selaginella psittacorrhyncha Valdespino was first noticed as an undescribed taxon from the Guiana Highlands in Venezuela and Brazil and included in my previous paper describing some new species from the latter country (Valdespino 2015) as “S. sp. A.,” with the intended specific epithet “psittacorrhyncha.” At that time, however, the species could not be formally described because additional studies, including Scanning Electron Microscopy (SEM) of leaves and spores to ascertain morphological features as per Valdespino (2015, 2016, 2017) were underway. Now that such studies are concluded, allowing for a better understanding and documentation of morphological features of the new species as well as an improved assessment of morphologically similar taxa, I formally validate it in accordance with the current ICN (McNeill et al. 2012). Furthermore, this confirms the number of native Selaginella species so far found in Brazil to be 80 and the estimated number in Venezuela to be 100, as indicated in Valdespino (2015).

Selaginella psittacorrhyncha somewhat resembles other centipede-like species, including the Panamanian S. taylorii Valdespino and S. chrysoleuca Spring and S. euclimax Alston ex Crabbe &
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Jermy, both from Panama and western South America, but it seems morphologically closer to *S. vernicosa* Baker from Mount Roraima, in the state of Bolivar, Venezuela and the state of Roraima, Brazil, in the Guiana Highlands. This region is known for the high diversity and number of endemic *Selaginella* species (Smith 1990; Valdespino 1992; Smith 1995; Valdespino 2016), thus, it is not surprising that new taxa are uncovered as careful specimen examination proceeds.

The description that follows, including measurements data and terminology used to describe leaves and spores, as well as specimens citation and determination of conservation status, was prepared according to Valdespino (2015, 2016, 2017, and references therein). Herbaria acronyms follow Thiers (2017).

**Selaginella psittacorrhyncha** Valdespino, sp. nov. Type: VENEZUELA. Amazonas.


*S. psittacorrhyncha* is morphologically very similar to *S. vernicosa* Baker by its leaf shape but differs noticeably in its ascending to suberect (vs. creeping) habit with the branches ascending (vs. mostly perpendicular to the stem or only slightly ascending), coriaceous (vs. chartaceous) leaves, the lateral leaves on main stem with glabrous (vs. often tufted with 2–6 cilia) basiscopic bases and entire (vs. short-ciliate along proximal ¼–½) basiscopic margins, the median leaves with glabrous or infrequently puberulent only with 1 or 2 short hairs (vs. tufted with 3–5 cilia) outer bases, and distinctly beaked (vs. flat) apices in profile.

**Plants** terrestrial or epipetric. **Stems** ascending to suberect, stramineous, 6–15 cm long, 0.5–0.7 mm diam., non-articulate, not flagelliform or stoloniferous, 1- or occasionally 2-branched. **Rhizophores** lateral, curving downward as to appear dorsal, borne on proximal ½ to ¼ of stems, filiform and stout, 0.1–0.3 mm diam. **Leaves** heteromorphic throughout, coriaceous, strongly imbricate, upper and lower surfaces shiny to waxy and olive colored or on older parts of stems and branches, tawny. **Lateral leaves** imbricate and slightly ascending, ovate-deltate or ovate, 1.8–2.4 × 0.9–1.5 mm; bases truncate, acroscopic bases strongly overlapping stems, basiscopic bases free from stems; acroscopic margins greenish, 1–3 cells wide with the cells elongate, slightly sinuate-walled and glabrous, parallel to margins, shortly-ciliate along proximal ¼ to ½, otherwise entire distally; basiscopic margins greenish, comprising quadrangular, sinuate-walled and glabrous cells, entire or infrequently sparsely and minutely ciliate-venticillate; apices obtuse and entire or infrequently tipped by 1 or 3 teeth; upper surfaces comprising quadrangular, slightly sinuate-walled cells (often difficult to distinguish because of waxy deposits), those along the submarginal to marginal side of basiscopic half and on distal ½ of the leaves covered by 1 or 2 papillae, without idioblasts or stomata or with some stomata along basiscopic margin, lower surfaces comprising elongate, sinuate-walled cells, with many of those along distal % of the leaves covered by 1 or 2 papillae, without idioblast, with 6–8 rows of stomata along midrib. **Median leaves** ascending, broadly deltate-ovate, 0.9–1.4 × 0.6–1.2 mm; bases truncate, the outer base glabrous or infrequently puberulent with 1 or 2 short hairs, without auricles; margins greenish, 1–3 cells wide with the cells elongate, slightly sinuate-walled and glabrous, parallel to margins, shortly-ciliate along proximal ¼, otherwise entire distally; apices acute, prominent and beaked, tipped by an often caducous short cillum or teeth-like projection; both surfaces without conspicuous idioblasts, upper surfaces comprising quadrangular, slightly sinuate-walled cells (often difficult to distinguish because of waxy deposits), those along the submarginal to marginal side of basiscopic half and on distal ½ of the leaves covered by 1 or 2 papillae, without idioblasts, with stomata in 3–5 rows along distal ½ of the midribs, lower surfaces comprising elongate, sinuate-walled cells, without stomata. **Axillary leaves** ovate to ovate-oblong or similar to lateral leaves, 1.8–2.0 × 1.0–1.3 mm; the bases, margins, apices, and surfaces as in lateral leaves. **Sporophylls** monomorphic, without a laminar flap.
Figure 1. Selaginella psittacorrhyncha, sp. nov. (Maguire et al. 37298, holotype, NY).
Valdespino: *Selaginella psittacorrhyncha*, sp. nov.

Figure 2. *Selaginella psittacorrhyncha* sp. nov. **A–B** (Maguire et al. 27823, paratype, NY); **C–E** (Maguire et al. 37298, holotype, NY). **A–B.** Habit. **C.** Strobili. **D.** Close-up of lower surface of stem section showing lateral leaves. **E.** Close-up of upper surface of stem section showing median leaves. Illustration made by Rubén Lozano.
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Figure 3. SEM micrographs of branch sections and leaves of *Selaginella psittacorhyncha* sp. nov. (Maguire et al. 37298, holotype, NY). A. Section of upper surface of stem. B. Upper surface of median leaf. C. Section of lower surface of stem. D. Lower surface of lateral leaf. E. Detail section, acroscopic margin of lateral leaf lower surface. F. Close-up of lower surface of lateral leaf; note papilla.

each with a strongly developed and seemingly glabrous keel along midribs often ending in a single short cillum or teeth-like projection, broadly ovate to ovate-deltate, 1.5–1.8 × 0.9–1.5 mm; bases rounded to truncate; margins as in median leaves; apices acute to obtuse, often beaked, tipped by 1–3 short cilia or teeth-like projections; *dorsal sporophylls* with upper and lower surfaces as in vegetative leaves; *ventral sporophylls* with both surfaces of the same color as the vegetative leaves, comprising elongate, sinuate-walled cells on both surfaces. *Megasporangia* in 2 ventral rows and often on distal ½ of 2 dorsal rows; *megasporas* deep orange, rugulate-reticulate on proximal faces with verrucate and perforate microstructure, rugulate-reticulate on distal faces with reticula formed by very low muri and granulate and perforate microstructure (Figure 4C & D), 355–375 μm. *Microsporangia* in 2 dorsal rows or only on proximal ½ of 2 dorsal rows; *microspores* deep orange, gemmate on proximal and distal faces with psilate microstructure (Figure 4E & F), 50–58 μm.
Habitat and Distribution. *Selaginella psittacorrhyncha* grows in or around rocky cliffs in montane highland savannas, on wet ledges of cliffs in scrub forests, sandstone outcrops above swampy savanna or on bare earth at base of grass tussocks at 1600-2343 meters; it is documented here in Cerro Sipapo, Venezuela, and Cerro de la Neblina in both Venezuela and Brazil.

Etymology. The specific epithet derives from the Latin “psittacus,” meaning parrot, and “rhynchus,” nose; together these allude to the median leaf apices resembling a parrot’s beak.

Conservation status. *Selaginella psittacorrhyncha* is here documented in two distinctly isolated tepuis at high elevations in the Amazon basin of Venezuela and Brazil. These areas are difficult to reach by humans and, therefore, the species may not face imminent anthropomorphic-based threats. Accordingly, I tentatively consider it of Least Concern (LC) according to IUCN categories and criteria (2012).
Additional specimens examined (paratypes): VENEZUELA. Amazonas. Cerro Sipapo (Paráque), west Peak, 1600 m, 20 Dec 1948, Maguire & Politi 27823 (NY); [Depto. Río Negro], Cerro de la Neblina, Río Yatua, Cañón Grande basin, 1200–2200 m, 15 Dec 1957, Maguire et al. 42417 (NY, PMA), Venezuelan-Brazilian Frontier, Neblina Massif, Camp 12, 1950 m, 26–27 Feb 1985, Boom et al. 6013 (NY, PMA), Cerro de la Neblina, Planicie de Zuluaga, Río Titirico, 2300 m, 10–15 Oct 1970, Steyermark 103899 (NY), vicinity of Camp VI, on a ridge on Venezuelan-Brazilian border [Cerro de la Neblina], 3.5 km W of Pico Zuloaga, 00°53'N, 65°56'W, 2000 m, 13–15 Apr 1984, Thomas & Plowman 3145 (NY).


Selaginella psittacorrhyncha is characterized by its centipede-like habit, ascending to erect stems that branch anisotomously once or twice. The secondary branches ascending and striplike or ribbon-shaped, rhizophores borne laterally on stems (a feature that to my knowledge has not been reported before in the genus) that curve downward as to appear dorsal in position, coriaceous leaves, strongly beaked median leaf apices, and orange megaspores. Its overall habit, branching pattern, and strobili position are reminiscent of those found in S. chrysoleuca, S. euclimax, and S. taylorii. Nevertheless, S. psittacorrhyncha differs from those species by its lateral rhizophores, coriaceous leaves, acute and parrot’s beak-like median leaf apices, and orange megaspores. As previously mentioned, a closer morphological allied species of S. psittacorrhyncha is S. vernicosa but the former is most distinct by the characters discussed under the diagnosis. In addition, S. psittacorrhyncha is known from the tepuis of Cerro de la Neblina and Cerro Sipapo, whereas S. vernicosa is only known from Mount Roraima in Venezuela and Brazil.

ACKNOWLEDGEMENTS

I deeply appreciate the courtesies provided to me by the curators and staff of multiple herbaria, in particular those of NY and PMA, by allowing study of their Selaginella collections over an extended period of time at the facilities of the Smithsonian Tropical Research Institute (STRI) and the University of Panama, both in Panama. My studies on Selaginella, a fascinating genus, have been greatly advanced by my tenures at the California Academy of Sciences, the New York Botanical Garden, and STRI, as well as by the support of the offices of the dean of the Faculty of Natural and Exact Sciences and Technology and the Vice-President for Research and Graduate Programs of the University of Panama. In addition, support from Alan R. Smith (UC) and Robbin Moran (NY), as well as assistance of my students Christian López and José Palacios at the University of Panama and Pedro Argudo of NovoArt, is deeply appreciated. Thanks are also due to Rubén Lozano for the line drawing and Jorge Ceballos (STRI) for his help with the SEM work. Christopher Gioia has always lent encouragement and additionally, kindly read and checked the English on a draft of the manuscript. Finally, I am most grateful to Guy Nesom for helpful comments on the manuscript and facilitating its publication.

LITERATURE CITED


Valdespino: *Selaginella psittacorrhyncha*, sp. nov.


