



FIRST RECORD OF *OLDENLANDIA CORYMBOSA* (SPERMACOCEAE-RUBIACEAE), A NEW ALIEN SPECIES FOR PARAGUAY AND ARGENTINA

PRIMER REGISTRO DE *OLDENLANDIA CORYMBOSA* (SPERMACOCEAE-RUBIACEAE), UNA NUEVA ESPECIE EXÓTICA PARA PARAGUAY Y ARGENTINA


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SUMMARY

Background and aims: During the revision of the southern South American species of *Oldenlandia*, populations of *O. corymbosa* were found in Paraguay and Argentina. The aim of this contribution is to report the presence of this adventitious species to the Paraguayan and Argentinian flora for the first time.

M&M: Living plants and herbarium material, as well as the original description of *Oldenlandia corymbosa* were analysed. Taxonomic and morphological analyses were performed. Collected materials were deposited in FCQ and CTES.

Results: A description of the morphology of the species and habitat based on herbarium specimens and field observations are provided, along with an illustration, photographs, and a map indicating the geographical position of the recorded populations in the Northeast and South Paraguay and Northeast Argentina in the Corrientes province. Complementary, an identification key of *Oldenlandia* species occurring in Argentina and Paraguay is provided.

Conclusion: With the record of *Oldenlandia corymbosa* in Paraguay and Argentina, the range of distribution of this non-native species is extended up to the Southern Cone of South America. Its status of naturalized species in Paraguay raises the possibility that it was, until now, overlooked in other regions of the Northeast Argentina.

KEY WORDS

Adventitious species, new record, *Oldenlandia*, Rubiaceae, taxonomy, weed.

RESUMEN

Introducción y objetivos: Durante la revisión de las especies del género *Oldenlandia* para el sur de Sudamérica, poblaciones de *O. corymbosa* fueron halladas en Paraguay y Argentina. El objetivo de esta contribución es reportar por primera vez la presencia de esta especie adventicia para la flora de Paraguay y Argentina.

M&M: Se estudiaron plantas vivas y material de herbario, tanto como la descripción original de *Oldenlandia corymbosa*. Se realizaron análisis taxonómicos y morfológicos. El material coleccionado fue depositado en FCQ y CTES.

Resultados: Se proporciona una descripción de la morfología y hábitat de la especie sobre la base de especímenes de herbario y observaciones de campo, junto con una ilustración, fotografías, y un mapa que indica la posición geográfica de las poblaciones registradas en el nordeste y sur de Paraguay y nordeste de Argentina en la provincia de Corrientes. Complementariamente, se proporciona una clave de identificación de las especies de *Oldenlandia* presentes en Argentina y Paraguay.

Conclusiones: Con el registro de *Oldenlandia corymbosa* en Paraguay y Argentina, se amplía el rango de distribución de esta especie alóctona hasta el Cono Sur de América del Sur. Su estatus de especie naturalizada en Paraguay plantea la posibilidad de que fuera, hasta ahora, ignorada en otras regiones del Nordeste Argentino.

PALABRAS CLAVE


Especie adventicia, maleza, nuevo registro, *Oldenlandia*, Rubiaceae, taxonomía.

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INTRODUCTION

Oldenlandia corymbosa L. is a member of the Rubiaceae family, which includes about 650 genera and more than 13,765 species worldwide (Robbrecht & Manen, 2006; Govaerts *et al.*, 2022). The genus *Oldenlandia* L. occurs throughout the tropical and warm subtropical regions of the world, with its largest diversity in Africa (Halford, 1992). It is characterized by the loculicidal capsule dehiscence and “oldenlandioid” seeds (trigonus with a reticulate or reticulate areolate testa) (Terrell, 1990). The number of species in the genus is hard to estimate (Neupane *et al.*, 2015) due to inconsistencies in genera delimitation in the tribe Spermacoceae, resulting in a taxonomic complex formed by *Oldenlandia*, *Hedyotis* L., and other smaller genera from the tropics of the Asia-Pacific region. *Oldenlandia corymbosa* is the type species for the genus and it has been extensively studied from a phytopharmacological point of view because its uses in traditional medicine in India and China (Patel *et al.*, 2014). This species is native to Africa and South Asia, and is currently naturalized in tropical and subtropical regions of the world (Terrell & Robinson, 2006; Delprete *et al.*, 2005; Sánchez Rodríguez *et al.*, 2007; Shahid & Rao, 2014).

In the Americas, *O. corymbosa* was previously recorded as naturalized and well-established in Brazil (Delprete *et al.*, 2005; Flora do Brasil, 2021), Jamaica (Adams, 1972), USA (Terrell & Robinson, 2006), and Venezuela (Taylor & Steyermark, 2004). While doing fieldwork for a revisionary study of *Oldenlandia* in South America (Nuñez Florentin, in prep.), *O. corymbosa* was collected in Paraguay, and more recently in Corrientes, Argentina. Herbaria material was analysed, but no previously existing specimens of this species from Argentina were found. Currently, *O. salzmannii* (DC.) Benth. & Hook. f. ex B.D. Jacks, which is native and widespread in South America and introduced in North America (i.e. Florida; Fosberg & Terrell, 1985), is the only species in the genus recorded for Paraguay and Argentina (IBODA, 2021).

The aim of this work is to shed light on these new records of *O. corymbosa* in Paraguay and Argentina. A detailed description and a distribution map of this species are provided, as well as, comments on its distribution and ecology. A

photographic illustration to facilitate identification of this species is also provided, with a taxonomic key to distinguish it from *O. salzmannii*.

MATERIAL AND METHODS

During floristic surveys in South Paraguay and Northeast Argentina, standard taxonomic methods have been followed for the collection, drying, and processing of herbarium specimens. The specimens have been deposited in CTES and FCQ herbaria (Thiers, 2021.) Relevant taxonomic literature (Terrell & Robinson, 2006; Delprete *et al.*, 2005), and online databases such as the Reflora Virtual Herbarium (<http://reflora.jbrj.gov.br/reflora/herbarioVirtual>), speciesLink (<http://www.splink.cria.org.br>) and TROPICOS (<https://www.tropicos.org/home>), were consulted for the identification of specimens and reference. The specimens were also compared with original descriptions (Linnaeus, 1753) of *Oldenlandia corymbosa*, and analyzed under a (SM) Leica MZ6 stereo microscope. Measurements were made using a digital caliper, and ImageJ (Rasband, 2020).

RESULTS AND DISCUSSION

The characters of specimens found in Paraguay and Argentina (Figs. 1-2) are in complete concordance with the description offered by Terrell & Robinson (2006) and Delprete *et al.* (2005), and herbaria specimens. Description presented here is based on Paraguayan and Argentinian specimens to facilitate later identifications.

***Oldenlandia corymbosa* L.**, Sp. Pl. 1: 119. 1753. *Hedyotis corymbosa* (L.) Lam., Tabl. Encycl. 1: 272. 1792. *Gerontogea corymbosa* Cham. & Schltld., Linnæa 4(2): 154. 1829. *Hedyotis biflora* var. *corymbosa* (L.) Kurz., J. Asiat. Soc. Bengal 46(2): 133. 1877. TYPE. Plumier, Nov. Pl. Amer. 42, t. 36. 1703; lectotype designated by Verdcourt, in Polhill, Fl. Trop. E. Africa, Rubiaceae 1: 308. 1976.

Herbs, erect, prostrate, or rarely decumbent, 6.5-15 cm tall. Stems tetragonal, 0.2-0.9 mm diam, glabrous or hirsute. Stipular sheaths free

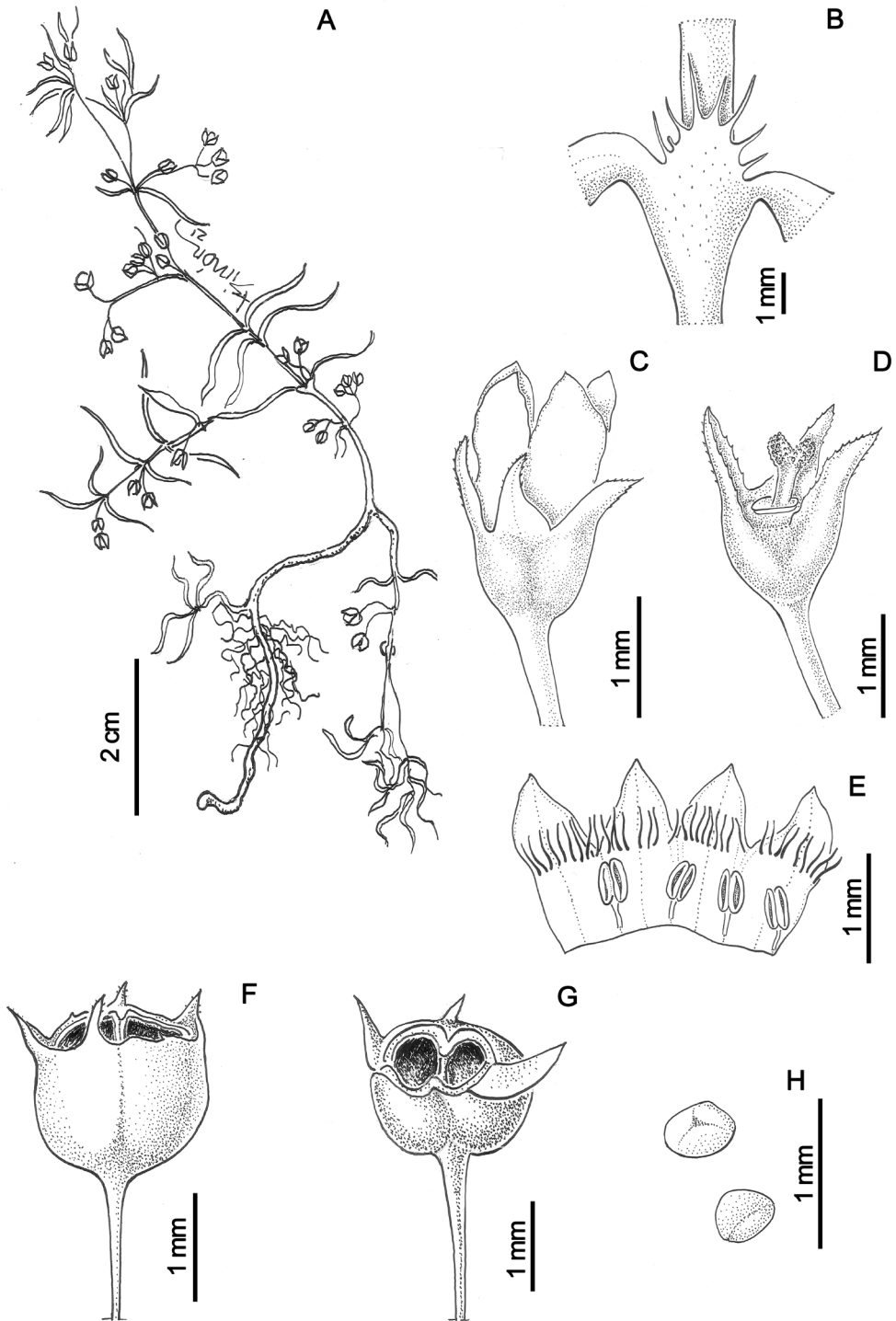


Fig. 1. *Oldenlandia corymbosa*. **A:** Habit. **B:** Stipular sheath. **C:** Flower. **D:** Hypanthium, calyx, and style. **E:** Opened corolla. **F-G:** Dehiscent fruit. **F:** Lateral view. **G:** Subapical view. **H:** Seeds. **A:** Nuñez Florentin & Florentin 144 (CTES). **B-H:** Nuñez Florentin & Salas 165 (CTES). Drawn by Laura Simón, sketches of the reproductive characters by the author.

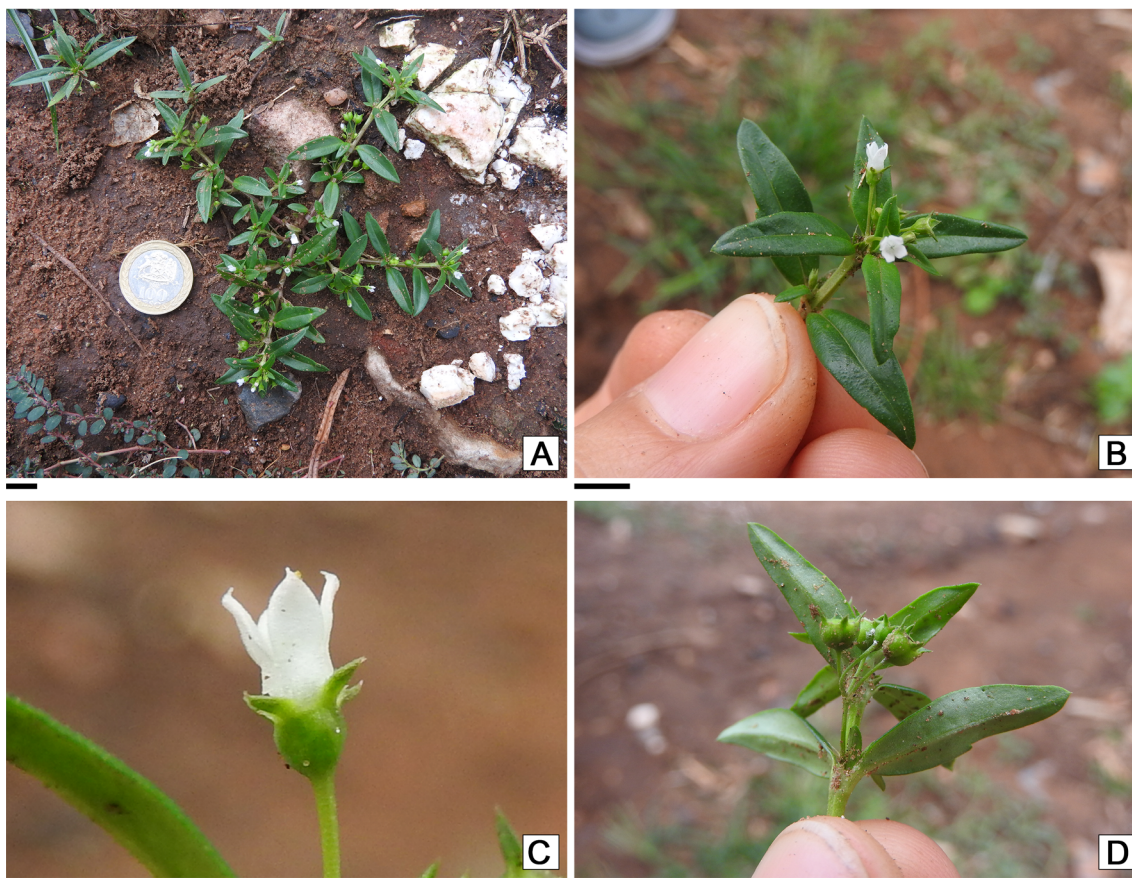


Fig. 2. *Oldenlandia corymbosa*. **A:** Habit. **B:** A flowered branch. **C:** Flower. **D:** Portion of branch with immature fruits. Scales= A: 1 cm; B, D: 5 mm; C: 1 mm. Paraguay, Dpto. Central, Lambaré.

portion subtriangular, 0.7-1.7 mm long., glabrous or hirsute, with 3-5 fimbriae, unequal, 0.5-1.5 mm long, glabrous, colleter-tipped. Leaves sessile or pseudopetiolate, blades elliptic or narrowly elliptic, linear or oblong, 6.4-15.9 × 1.2-3.3 mm, acute at apex, cuneate at base, glabrous. Inflorescences cymose, 2-5-flowered, pedunculate, axillar, with small bracts ca. 1 mm long. Flowers homostylous, pedicellate, with floral pedicels 1-4 mm long. Hypanthia obconic or globose, 0.8-1.7 mm long, glabrous. Calyces 4-lobed, 0.3-1 mm long, calyx lobes ovate-triangular, erect, with serrate margins, glabrous. Corollas infundibuliform, 1.2-2.5 mm long, white, pale pink or light lilac; corolla lobes triangular-lanceolate, externally glabrous, internally with a ring of trichomes at the height of the flower throat. Stamens included, inserted at the base of

the corolla tube; anthers oblong, 0.2-0.5 mm long. Styles included, filiform, shortly bifid, 0.1-0.3 mm long. Nectariferous disks elliptic, bipartite. Capsules subglobose, loculicidal, 1.5-1.9 × 1.9-2.3 mm, glabrous. Seeds trigonous, 0.3-0.4 mm long, numerous, with hilum apical, punctiform, with exotesta reticulate-foveate, castaneous to brown (Fig. 1-2).

Phenology. It is flowered and fruited all year.

Distribution and habitat. *Oldenlandia corymbosa* is native in the African Continent (e.g. Nigeria, Uganda, and Kenya) and India (Lewis, 1964; Halford, 1992), but currently presenting a pantropical distribution, being naturalized in The Americas and in other parts of the world. For

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example, in the past decade it has been cited as an alien species for the European flora in Spain (Sánchez Rodríguez *et al.*, 2007); and in the United Arab Emirates flora, specifically in three different areas of Dubai (Shahid & Rao, 2014), in which the species is reported as a weed but with minor impact, probably not representing a big threat to the environment.

Oldenlandia corymbosa grows in open areas on sandy soils, open banks along streams, savannas, waste ground and disturbed areas, or usually on man-made environments, on rocky outcrops or between cracks on the sidewalks. Its presence in the Southern Cone of South America is reported here for the first time, growing in Paraguay and Argentina (Fig. 3). In the latter, it was only recorded in the Corrientes province, where it was observed and collected in urban and anthropized areas, growing spontaneously. It is likely that other populations

of *O. corymbosa* could be found in similar areas to the northeast of Argentina (probably Formosa and Chaco provinces). This species could be considered as “casual alien plant” according to Pyšek *et al.* (2004), based on its subspontaneous growing and single record. However, in Paraguay, because all individuals analysed are from the last two decades, I can consider *O. corymbosa* as naturalized in Paraguay (Pyšek *et al.*, 2004).

Specimens examined: ARGENTINA. Prov. Corrientes: *Dpto Capital*, 10-X-2021, Nuñez Florentin & Salas 165 (CTES). PARAGUAY. Dpto Amambay: *Bella Vista*, 22° 6' 50" S, 56° 31' 4" W, 11-III-2018, De Madrignac Bonzi & Florentín 776 (CTES). Dpto. Central: *Areguá*, Lago Ypacaraí, 25° 19' 32" S, 57° 23' 55" W, 4-III-2018, De Madrignac Bonzi & Florentín 624 (CTES); *Asunción*, 25° 17' 32" S, 57° 37' 44" W, X-2014, Mereles 10122

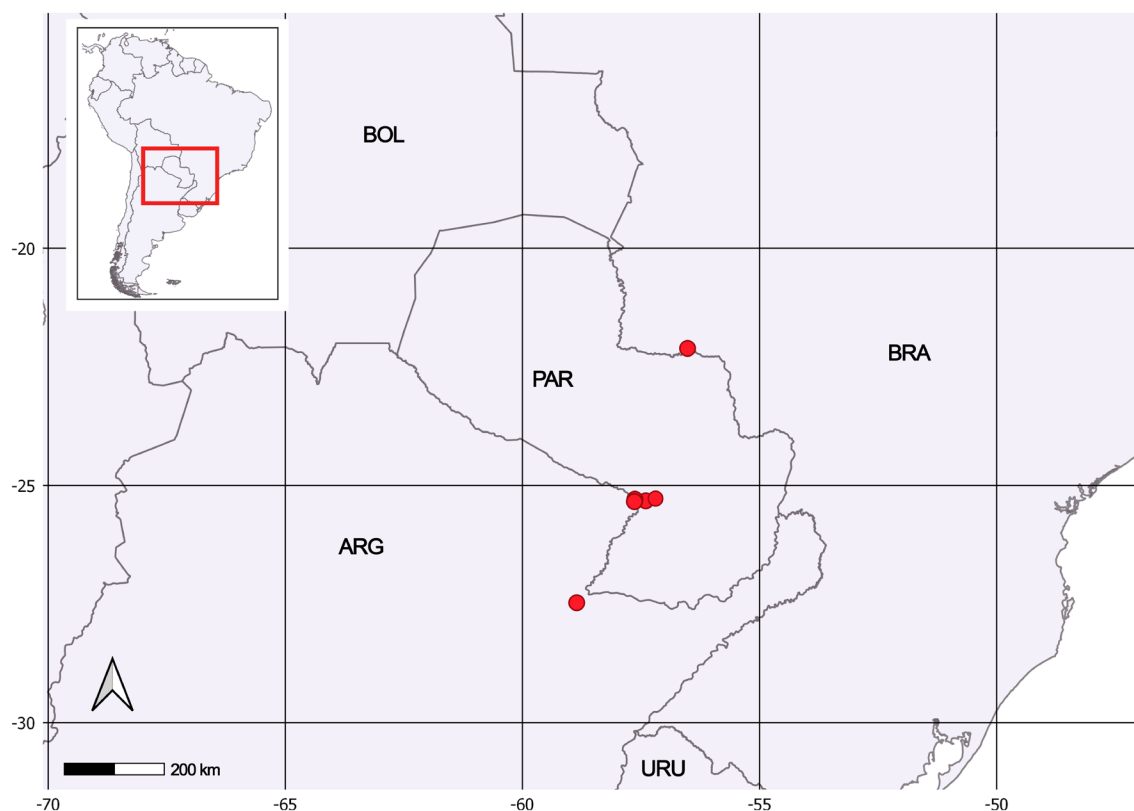


Fig. 3. *Oldenlandia corymbosa*. Geographic record of collected specimens in Paraguay and Argentina (red circles). Abbreviations= Arg: Argentina; Bol: Bolivia; Bra: Brazil; Par: Paraguay; Uru: Uruguay.

(FCQ); idem, X-2014, Mereles 10120 (FCQ); Lambaré, Cerro Lambaré, 5-VIII-2015, Nuñez Florentin & Florentín 144 (CTES); San Lorenzo, 25-XI-2016, Martínez *et al.* 193 (CTES, FCQ).

Key to species of *Oldenlandia* in Argentina and Paraguay

1. Herbs erect or prostrate. Inflorescences cymose, 2-5-flowered, axillary. Flowers homostylous with corollas 1.2-2.5 mm long, internally with a ring of trichomes at the height of the flower throat.
O. corymbosa
- 1'. Herbs creeping, radicanat at the nodes. Inflorescences cymose, 1-3-flowered, terminal and pseudoaxillary. Flowers heterostylous with corollas 4-8 mm long, internally with a fringe of trichomes on the tube or a ring of trichomes at the throat.
O. salzmannii

CONCLUSIONS

With the addition of *O. corymbosa*, the genus *Oldenlandia* is now represented by two species in Paraguay and Argentina. *Oldenlandia corymbosa* can be differentiated from *O. salzmannii* on the basis of general habit and floral characters, such as floral biology, corolla length, and internal indumentum.

I agree with previous authors that this species does not present a potentially invasive behavior. However, its occurrence should be reported for Paraguay and Argentina as a means to complement these countries floras. Its naturalized status in Northeast and South Paraguay raises the possibility that it was, until now, overlooked in places like the Formosa and Chaco Provinces (Northeast Argentina), or even in other regions of Paraguay.

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