

Hidden in the Andes: new insights into the distribution of *Magnolia guatapensis* (Lozano) Govaerts (Magnoliaceae) and *Cyathea antioquensis* A. Rojas (Cyatheaceae)

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Abstract. *Magnolia guatapensis* (Lozano) Govaerts (Magnoliaceae) and *Cyathea antioquensis* A. Rojas (Cyatheaceae) are endangered species endemic to Antioquia region (Colombia). This study reports new populations of *M. guatapensis* and *C. antioquensis* from the Santo Domingo Canyon, extending their ranges by 45 km and 11 km, respectively, from previously known locations. These findings highlight Santo Domingo Canyon as a vital refuge for endemic flora and underscore the importance of ongoing botanical exploration in poorly studied areas. Such records are critical for refining conservation priorities and protecting threatened habitats in the Central Cordillera.

Key words. Endemism, magnoliids, Neotropics, scaly tree ferns

Montoya-López A (2025) Hidden in the Andes: new insights into the distribution of *Magnolia guatapensis* (Lozano) Govaerts (Magnoliaceae) and *Cyathea antioquensis* A. Rojas (Cyatheaceae). Check List 21 (4): 658–665. <https://doi.org/10.15560/21.4.658>

INTRODUCTION

The Regional Protective Forest Reserve of the Canyons of the Melcocho and Santo Domingo Rivers (MS Reserve) in Antioquia, Colombia, is a biodiversity hotspot of critical ecological, scientific, recreation, education, and conservation importance. Located in the Central Cordillera of the northern Andes, this reserve encompasses diverse ecological zones, from Montane Pluvial Forest to Tropical Very Humid Forest supporting a wide range of endemic and endangered species while providing vital ecosystem services (CORNARE 2016).

Among the unique flora of the MS Reserve, *Magnolia guatapensis* (Lozano) Govaerts and *Cyathea antioquensis* A. Rojas stand out as species of high conservation concern. *Magnolia guatapensis* is an endangered tree species endemic to Antioquia, restricted to fragmented sub-Andean humid cloud forests at elevations of 1,800–2,300 m. With an extent of occurrence estimated at 2,800 km², this species faces significant threats from habitat conversion due to agriculture, urbanization, and hydrological projects (Calderón et al. 2007, 2016; Toro-Murillo 2010). Despite its ecological and economic potential—including applications in carpentry, construction, and landscaping—*Magnolia guatapensis* is not currently propagated in commercial nurseries within the region. Restrepo-Cossio et al. (2024) demonstrated that the early life stages of *M. guatapensis* are critical for individual survival, as indicated by low seed viability and weak seedling vigor. Moreover, seedlings showed limited tolerance to adverse environmental conditions, particularly those associated with pathogen attack.

Similarly, *Cyathea antioquensis*, a rare endangered non-arborescent fern, is one of the few epiphytic species of the genus *Cyathea* Sm. in the Neotropics. Known only from a single collection by R. Callejas in 1991, it inhabits lower montane humid forests, thriving on rocky escarpments and roadside slopes. Evidence of habitat transformation at its type locality highlights the urgent need for conservation actions (Rodríguez et al. 2019).

Understanding the geographic distribution and ecological requirements of such species is essential for guiding conservation priorities, particularly in regions experiencing rapid land-use changes. This study reports new records of *M. guatapensis* and *C. antioquensis* within the MS Reserve, significantly expanding their known ranges. These findings underscore the importance of botanical exploration in identifying conservation priorities and safeguarding the unique flora in this region of northern Andes.



Academic editor: Felipe Gonzatti

Received: 24 January 2025

Accepted: 11 July 2025

Published: 16 July 2025

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METHODS

Survey design. Four free-search surveys were conducted in the Regional Protective Forest Reserve of the Canyons of the Melcocho and Santo Domingo Rivers (MS Reserve) during December 2024 and January 2025. Surveys were conducted in the eastern section of the MS Reserve, along roads and hiking trails spanning an elevation gradient of 1,800–2,300 m above sea level within the La Sirena and Bocachica zones. The survey routes were selected to cover a range of habitat types, including sub-Andean humid cloud forests and disturbed roadside vegetation. Each survey involved two observers and lasted approximately 6–8 h per day, covering an average distance of 5–10 km per day.

Species identification. The scaly fern and magnolias encountered during the surveys were identified and georeferenced using a handheld GPS receiver with an accuracy of ± 5 m. *In situ* photographs were taken of diagnostic features, including leaves, reproductive structures, and bark, to facilitate accurate identification and subsequent verification.

The identification of *Cyathea antioquiensis* was conducted using established taxonomic keys and references (Lehnert 2009; Rojas-Alvarado and Tejedor 2016). *Magnolia guatapensis* was identified based on the key and original descriptions provided by Lozano-Contreras (1994), Velasquez and Serna (2005) and the identification table from Montoya-López and Bota-Sierra (2023). To verify identifications, specimens were cross-referenced with herbarium records available in the Global Plants Jstor (2025) online collection. Distribution maps were generated using QGIS v. 3.34.11-Prizren (QGIS Development Team 2023). The acronym HUA refers to the Herbario Universidad de Antioquia, Medellín, Colombia, while the acronym JAUM refers to the Herbario Jardín Botánico Joaquín Antonio Uribe, Medellín, Colombia (acronyms according to Thiers 2025). The Extent of Occurrence (EOO) and Area of Occupancy (AOO) were calculated using the online Geospatial Conservation Assessment Tool (IUCN 2025). The AOO was estimated using the IUCN-recommended 2 km² grid cells. Two sets of values were calculated: one based solely on historical localities, and another incorporating the new record reported in the present study.

RESULTS

Order Magnoliales

Family Magnoliaceae Juss.

Magnolia guatapensis (Lozano) Govaerts

Figures 1, 2

New record. COLOMBIA — ANTIOQUIA · El Carmen de Viboral, Vereda La Honda along road from Finca La Mascota to Finca Bocachica; 05°55'0.3"N, 075°15'4"W; 1865 m a.s.l.; 20 Dec. 2024; Andrés Montoya; HUA 240643 and HUA 240644.

Identification. Tree (Figure 1A). Branchlets semi-terete, with prominent nodes, hairy; internodes glabrous, striated, with scattered, prominent, oval lenticels. Terminal buds protected by stipules free from the petiole, externally woolly, covered with a white caducous indumentum. Leaves alternate, petiolate; petioles adaxially flat with a longitudinal groove, abaxially convex with longitudinal ribs and thickened at the base, covered with caducous white hairs on young branchlets (Figure 1B, C). Leaf blade obovate, with evident prefoliation lines, abaxially fully covered by a very short appressed white cream-colored indumentum; apex emarginate, base truncate.

This species is easily distinguished from other species of *Magnolia* present in Antioquia by its obovate leaves, covered with a short appressed white cream-colored indumentum, and its typically emarginate leaf apex and white woolly stipules.

Comparative material. *Magnolia guatapensis* COLOMBIA — ANTIOQUIA · Guatapé, vereda Santa Rita, finca Montepinar; 06°18'29"N, 075°08'57"W; 1850 m a.s.l.; 27 Feb. 1986; Albert, Uribe, Vallejo, Roldán, 6302; HUA 0000506. Isotype. Available on Global Plants Jstor (2025). During a visit to this locality in 2023, I confirmed the continued presence of large individuals of *Magnolia guatapensis*.

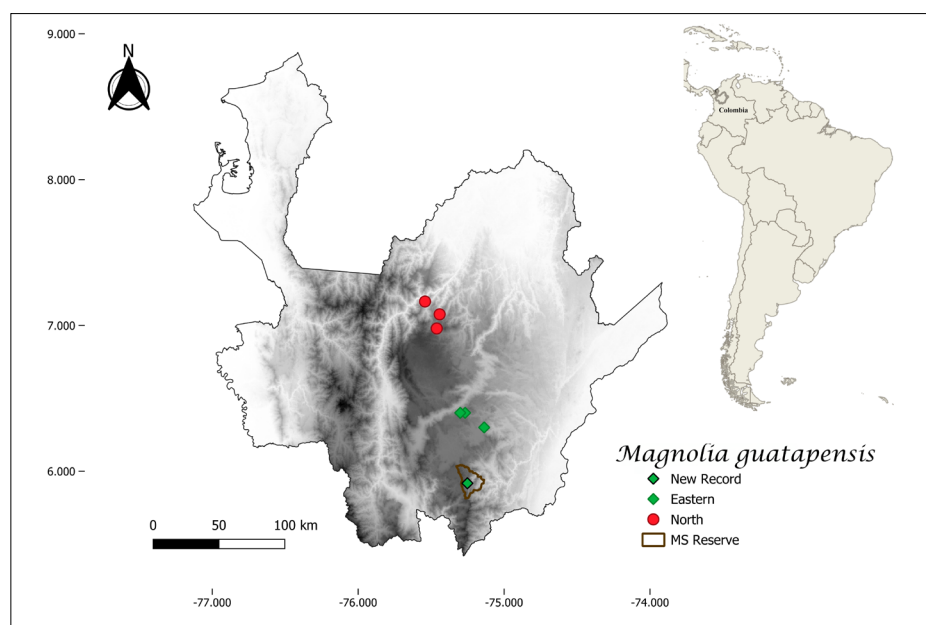
Previous distribution. *Magnolia guatapensis* is an endemic tree species from Antioquia region in Colombia.

COLOMBIA — ANTIOQUIA · Yarumal, vereda Corcovado, finca Villa Nueva, km 3 vía Ventanas-El Cedro; 07°04'33"N, 075°26'29"W; 2500 m a.s.l.; Feb. 2002, Velásquez 3380; JAUM · Yarumal, la Cueva; 06°58'43"N, 075°27'40"W; 2100 m a.s.l.; 22 Nov. 1978, Lozano 3091; COL 188709 · Concepción, vereda Fátima; 06°24'N, 075°16'W, 1740–1780 m a.s.l.; Jun. 1997, Uribe 191; JAUM · Concepción, vereda San Pedro, 06°24'N, 075°16'W, 2200 m a.s.l.; Jul. 1997, Uribe 149; JAUM (Velasquez and Serna 2005; Calderón et al. 2007) · Briceño, Vereda Santa Ana de los Chorillos, sobre la vía a Briceño, 3–6 km NW de la vía Yarumal Caucasia; 07°09'49"N, 075°32'30"W; 1750–1880 m a.s.l.; 29 Apr. 2005, Callejas, Patiño, Tuberquia; HUA 166164.



Figure 1. *Magnolia guatapensis*. **A.** Adult. **B.** Leaf. **C.** Stipule. **D.** Flower bud.

Figure 2. Distribution of *Magnolia guatapensis*.



Remarks. Individuals from the northern Antioquia populations lack the characteristic white woolly indumentum on the stipules (e.g. Restrepo-Cossio et al. 2024: figure 2A) and on the petioles of young leaves, which are present in individuals from the type locality and Carmen de Viboral in eastern Antioquia (Figure 1B–D). Further research is required to conduct a detailed comparison of floral and vegetative structures to determine whether these populations represent distinct populations or potentially constitute different species.

Order Cyatheales

Family Cyatheaceae Kaulf.

***Cyathea antioquensis* A. Rojas**

Figures 3, 4

New record. COLOMBIA — ANTIOQUIA · El Carmen de Viboral, Vereda La Honda, along the road from finca La Quinta to finca La Sirena; 05°55'49"N, 075°15'19"W; 2,230 m a.s.l.; 10 Jan. 2025; Andrés Montoya; HUA 240645.

Identification. Along road cuts and escarpments. Trunkless (see Remarks below); rhizome approximately 1 cm in diameter, creeping to suberect (Figure 3A, B); rhizome scales 2.0–3.0 × 1.0–1.5 mm, ovate, black with a yellowish-brown margin approximately 0.1 mm wide, appressed, imbricate (Figure 3C). Petiole smooth or with slight nodules at the scale junctions, black, opaque, scaly, and with scurf; scales like those of the rhizome, dense at the base and sparse towards the middle; scurf appressed, less than 0.5 mm long, moderately

Figure 3. *Cyathea antioquensis*. **A.** Habit. **B.** Rhizome apex **C.** Petiole scale and scurf. **D.** Sori.



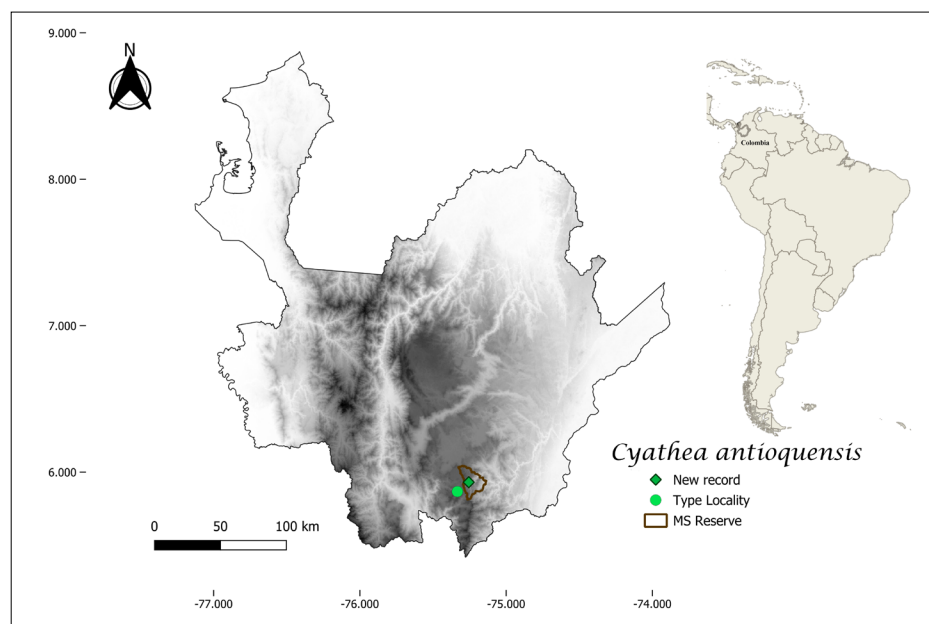


Figure 4. Distribution of *Cyathea antioquensis*.

dense. Laminae 1-pinnate-pinnatifid to 2-pinnate basally, base truncate to slightly reduced, apex gradually attenuate and pinnatifid. Rachis black at the base and middle, becoming brown distally, smooth, with scales ventrally and hairs dorsally; hairs 1.0–1.5 mm long, brown, crisped, and arching towards the apex. Basal and medial pinnae linear-lanceolate to linear-oblong, falcate, sessile basally, attenuate distally. Costae yellowish brown to brown, with basal nodules, hairy dorsally; hairs like those on the rachis, sparsely scaly ventrally; scales yellowish brown, bicolored with a darker center, margin erose to ciliate. Pinnules or segments sessile, falcate, obtuse distally. Veins 5–7 pairs per segment, free or rarely once-forked to pinnate, glabrous dorsally, with scattered yellowish scales. Laminar tissue between veins glabrous on both surfaces. Sori inframedial; without paraphyses; indusium globose, yellowish brown, almost completely enclosing the receptacle (Figure 3D).

This species differs from *Cyathea latevagans* (Baker) Domin by its rhizome scales with a narrower pale margin, stipe and rachis with scurf, and sessile, linear-oblong, falcate pinnae.

Comparative material. *Cyathea antioquensis* COLOMBIA — ANTIOQUIA • El Carmen de Viboral, vereda La Viborita, 6 km SE del Mpio. de La Unión, en la vía de la troncal Sonsón-La Unión a la vereda Viborita, cabeceras del Río Buey; 05°52'N, 075°20'W; 2100–2600 m a.s.l., 20 Jun. 1991, Callejas et al.; 10196 HUA. Holotype as shown in Rodríguez et al. (2019).

Previous distribution. Previously only known from type locality.

Remarks. This little-known species was originally described as a trunkless, scaly tree fern. However, in the newly identified locality near fertile *Cyathea antioquensis* individuals in Vereda La Honda, Carmen de Viboral, I observed a truly slender, arborescent fern—approximately 1.5 m in height—growing beside a waterfall and displaying morphological characteristics similar to those of *C. antioquensis*. Notably, the individual was sterile (Figure 5). It is important to verify whether *C. antioquensis* can develop a true tree-like habit, or if the slender arborescent form represents a different species.

DISCUSSION

The findings of this study expand the known geographic ranges of *Magnolia guatapensis* and *Cyathea antioquensis*, providing new insights into the distribution and habitat requirements of these poorly documented species. The identification of populations within the MS Reserve underscores its importance as a key refuge for endemic and endangered species in the Central Cordillera. These results build upon previous studies by Montoya-López and Bota-Sierra (2023), which recorded *Magnolia unicarmensis* A.F. Montoya-López & C. Bota-Sierra in the upper portion of the reserve, and Montoya-López and Lehnert (2024), which highlighted significant richness of Cyatheales in a small section of the reserve.

The discovery of *M. guatapensis* approximately 45 km south of its previously known populations in Carmen de Viboral emphasizes the fragmented nature of its distribution. The historical EOO was estimated at 935 km², and the historical AOO at 24 km². With the inclusion of the new record, the EOO increased to 1881 km² and the AOO to 28 km² (Figure 6). This range extension suggests that small remnant populations may



Figure 5. Slender tree fern possibly *Cyathea antioquiensis*.

persist in forest fragments across the Central Cordillera, despite the extensive habitat transformation caused by agriculture and urban expansion. These findings highlight the urgent need for propagation programs and habitat restoration initiatives to mitigate the species' risk of local extinction.

The type locality of *Magnolia guatapensis* is Vereda Santa Rita, Guatapé, Antioquia (Lozano, 1994). This site lies at the transition zone between premontane and montane tropical forest, at an elevation of 1,850 m above sea level. The vegetation is characterized by a well-developed canopy comprising species from genera such as *Albizia* Durazz., *Croton* L., *Meriania* Sw., and *Palicourea* Aubl., along with *Podocarpus oleifolius* D. Don, *Quercus humboldtii* Bonpl., and a dominant presence of *Wettinia* Poepp. and *Dictyocaryum lamarckianum* (Mart.) H. Wendl. (Uribe et al., 1987). The new locality reported in this study—Vereda La Honda, Carmen de Viboral, at 1,865 m above sea level—is ecologically similar to the type locality. This likeness is attributed to the steep altitudinal gradient, which results in a rapid transition from montane to premontane tropical forest, and to the presence of comparable canopy species, including the dominance of *Dictyocaryum lamarckianum* (Figure 7).

For *Cyathea antioquiensis*, the newly recorded population, located 11 km northeast of the type locality, confirms the species' extreme rarity and highlights the importance of undisturbed montane humid forests in eastern Antioquia. The historical AOO was estimated at 4 km², whereas the current AOO is estimated at 8 km².

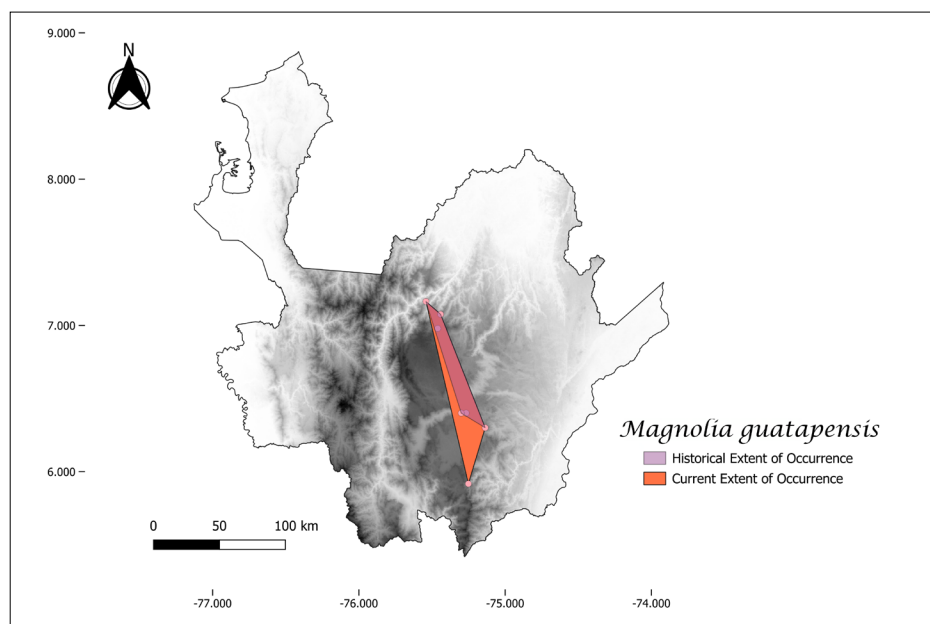
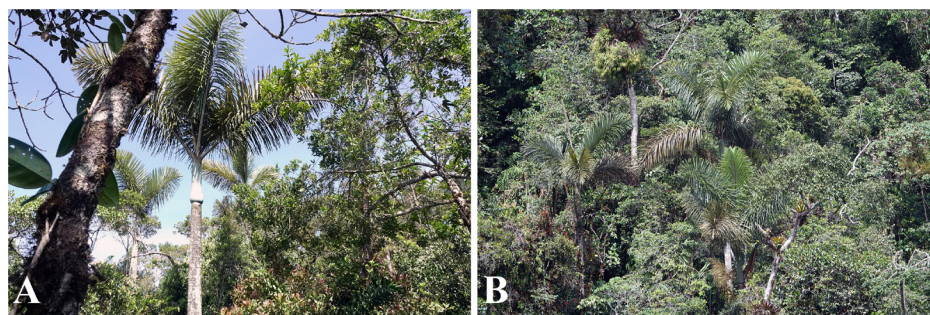


Figure 6. Historical and current Extent of Occurrence of *Magnolia guatapensis*.

Figure 7. Comparison between (A) the type locality and (B) the new locality of *Magnolia guatapensis*, vereda la Honda Carmen de Viboral. Note the dominant presence of *Dictyocaryum lamarckianum* in both sites.



Current knowledge of the distribution of *Magnolia guatapensis* and *Cyathea antioquiensis* within the MS Reserve remains limited. Several areas within the reserve have yet to be surveyed and may represent potentially suitable habitats for these species. Conducting more detailed studies—such as demographic assessments at the scale of the entire reserve—would be essential to enhance our understanding of the spatial distribution and ecological requirements of these endangered plant species.

This study expands the known geographic ranges of *Magnolia guatapensis* and *Cyathea antioquiensis* in the Central Cordillera of the northern Andes. The identification of populations within the MS Reserve highlights its critical role as a refuge for endemic and endangered species amidst ongoing habitat transformation in the region. These findings reinforce the ecological importance of this protected area and provide valuable data for refining conservation strategies.

ACKNOWLEDGEMENTS

I wish to express sincere gratitude to Yoshi Orozco and Luis Guillermo Sierra Cadavid for their invaluable support in the field. Special thanks are extended to Rosita Clementina for her thoughtful provision of cake and cookies, which brought warmth and comfort during the fieldwork. I also acknowledge Dr. Felipe Gonzatti for his guidance throughout the editorial process and his insightful reviews and constructive suggestions, which greatly contributed to improving the quality of this manuscript.

ADDITIONAL INFORMATION

Conflict of interest

The author declares that no competing interests exist.

Ethical statement

No ethical statement is reported.

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Data availability

All data that supports the findings of this study are available in the main text

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