



<https://doi.org/10.11646/phytotaxa.650.1.6>

## A new species of *Ceratostema* (Ericaceae: Vaccinieae) from the province of Morona-Santiago, Ecuador

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### Abstract

A new species of *Ceratostema* from the southern Ecuadorian province of Morona-Santiago is described and illustrated. The taxonomy and morphological similarities of *C. agettiorum* with its closely related species are discussed and information about its distribution, habitat, and conservation status is provided.

**Key words:** *Andes, new species, rainforest, taxonomy*

### Introduction

In the Neotropics, the family Ericaceae Jussieu (1789: 159) is composed of approximately 46 genera and 800 species (Luteyn 2002). The center of diversity for this family is located within the Tropical Andes, with Colombia and Ecuador being the most diverse countries. In Ecuador, there are approximately 230 species belonging to 21 genera. The most representative genera of which, in descending order, are *Ceratostema* Jussieu (1789: 163) (32 spp.), *Psammisia* Klotzsch (1851: 42) (27 spp.), *Macleania* Hooker (1837: 109) (22 spp.), *Cavendishia* Lindley (1836: sub plate 1791) (21 spp.) and *Disterigma* (Klotzsch) Niedenzu (1851: 57) (23 spp.) (Luteyn 2021).

The name *Ceratostema* from the Greek *keras*, *keratos* (“horn”) and *stema* (“stamen”), refers to the “hornlike”, long tubular anthers of the stamens (Luteyn 1986, Quattrocchi 2000). Across its distribution, this genus is composed of about 36 described species (Luteyn, 2005, Jørgensen & León-Yáñez 1999, Jiménez *et al.* 2021) distributed from Venezuela and Guyana throughout Peru in northern South America, and into Bolivia; having its peak diversity within Ecuador (Luteyn 1996, 2005, Jiménez *et al.* 2021). There are 32 *Ceratostema* species present within Ecuador alone, making it the largest and best representative genus of the family found within the Ecuadorian Andes (Luteyn 2021). Of these, 27 species are endemic to the eastern Andean slopes (Luteyn 1996, Jørgensen & León-Yáñez 1999, Jiménez *et al.* 2021), and new species continue to be added to the list (Jiménez *et al.* 2021). *Ceratostema* species are commonly epiphytic or terrestrial shrubs found from 450 to 3950 m, in habits ranging from rainforests, montane forests, inter-Andean valleys up to Paramo areas (Luteyn 1996).

In the eastern mountain range of Ecuador, the Ericaceae family is one of the most diverse families (León-Yáñez *et al.* 2011). Even though southeastern Ecuador is a highly endemic area, it has been poorly studied compared to the country’s Central or Western Andes (Neill 2005). For this reason, multiple publications regarding new species and even genera are published annually for the eastern regions (e.g. Ulloa & Neill 2006, Clark *et al.* 2010, Hågsater &

Santiago 2020, Jiménez *et al.* 2021, Clark & Garzón-Suárez 2022, Pérez *et al.* 2023). Here, we provide a description for *Ceratostema agettiorum*, a new species of the family Ericaceae from the province of Morona-Santiago in southeastern Ecuador. We also include relevant ecological information, a Lankester composite digital plate (LCDP), photos taken *in situ* and a map displaying its distribution.

## Materials and methods

*Ceratostema agettiorum* was found during an expedition by the authors (MJ & HG) in January 2023. It was found in the montane forests of southern Morona-Santiago province, under the project “Estudio de Diversidad Taxonómica y Genética de Plantas y Hongos del Ecuador”. Over the following months, subsequent field visits were undertaken to register the coordinates, altitude, ripening period of the fruits, and habitat structure for this species.

Collections were made under environmental research permit No. MAATE-DBI-CM-2022-0248 and were stored in the herbarium of the Universidad Técnica Particular de Loja (HUTPL) (Herbarium acronyms follow Thiers, 2024). Vegetative and fertile parts were pressed, dried and prepared for making the herbarium specimens. Fertile parts were preserved in 70% ethanol and 1% glycerol. Measurements for description were taken from these plants collected *in situ*, and further supplemented from the field photographs.

Specimens were photographed *in situ* with a Nikon D3100 camera with AF-S DX Micro NIKKOR 40mm f/2.8G lens, and *ex situ* with a Nikon D3500 camera with AF-S VR Micro-Nikkor 105mm f/2.8G IF-ED lens and Raynox DCR-250 Super Macro lens. The dissected material was photographed with a scale to have a record of their size. The species illustration was drawn from the field photos. The illustration, the figures and the Lankester Composite Digital Plate (LCDP) were prepared with Adobe Photoshop CS6. The distribution map was prepared using ArcGIS Desktop 10.3.

Fertile material and photographs of the new species were compared with all known representative species within the genus. To determine the taxonomic revision related to Ericaceae—*Ceratostema* from Ecuador (Luteyn 1996), and the original descriptions from related species were reviewed and compared. Specimens of *Ceratostema megabracteatum* Luteyn (1979: 158) stored at herbaria E, NL, NY and US were examined online through GBIF (<https://www.gbif.org>), to be compared with the new species.

The Extent of Occurrence (EOO) and the Area of Occupancy (AOO) were estimated using GeoCat, and the conservation status follows the IUCN criteria (Bachman *et al.* 2011, IUCN 2022).

## Taxonomy

*Ceratostema agettiorum* M.M.Jiménez & H.Garzón, *sp. nov.* Figs. 1–2,4.

**Type:**—ECUADOR. Morona-Santiago: Limón Indanza, (coordinates omitted for conservation reasons; detailed data on the type specimen), 30 January 2023, *H. Garzón 176* (holotype: HUTPL!).

**Diagnosis:**—This species is most similar to *Ceratostema megabracteatum* Luteyn but differs in the leaves not embracing the stem at the base, strongly plinerved (*vs.* amplexicaul, pinnately nerved, or weakly plinerved), with the midrib and lateral nerves thickened and impressed adaxially (*vs.* all veins impressed, including the reticulate veinlets), the inflorescence predominantly terminal (*vs.* axillary), the floral parts pink with the base green excluding the corolla (*vs.* pale yellowish-green, sometimes with a red base), the obconic hypanthium (*vs.* cylindrical) with long-triangular lobes (*vs.* lanceolate), the corolla dark scarlet and black towards the apex (*vs.* pinkish-red) with the lobes long-triangular (*vs.* lanceolate), the pink filaments (*vs.* golden-yellow), and the much shorter thecae (5–6 *vs.* 15–16 mm long).

*Plant* erect pendent *shrubs*; axonomorphous (provided with a main pivotal root) roots with well-developed lignotubers, lignotubers subspherical 14.0–19.5 × 14.9–21.6 cm. *Stems* terete to subterete, glabrous, slightly arching, to 82.5 cm long arising from the lignotuber, covered by leaves from the basal third, the bark dark brown, cracking longitudinally and exfoliating, twigs terete to complanate, minutely pubescent, striate after exfoliation, dark brown, to 44.7 cm long, new twigs pale green; axillary buds emerging above the leaf node, compressed; axillary bud bracts 2–3, long-triangular to subulate, 8.1–2.8 × 1.3 mm, apex acuminate. *Leaves* alternate, descending in natural position; petioles pale green with long-pubescent white hairs, terete, 6.3–8.4 × 2.8–3.6 mm; blades thickly-coriaceous, broadly ovate to ovate, 7.1–15.3 × 4.0–8.4 cm, dark green adaxially, paler abaxially, slightly polished adaxially, centrally

channeled, revolute, finely wrinkled, base cordate to subcordate, apex attenuate to acuminate, covered with white puberulent and caducous indumentum abaxially, strongly 7–11 plinerved from near the base, midrib and lateral nerves thickened and impressed adaxially, conspicuous raised abaxially, lateral nerves reticulate, plane adaxially and plane to weakly impressed abaxially, veinlets slightly raised, anastomosed adaxially. *Inflorescence* terminal or rarely axillary, racemose, up to 15 flowers per raceme, usually branching from the base, short-pedunculate; peduncle subterete, pubescent, pale green, to 3.1–3.5 cm long, covered by persistent bracts; bracts 5.8–34.0 × 3.7–18.4 mm; rachis ribbed, 6.5–13.2 cm long, 4.8–7.3 mm thick, pubescent; floral bracts large, elliptic, caudate, lanate adaxially, glabrous abaxially, reticulate veined, pink and green to the base, 46.9–49.4 × 20.3–21.5 mm; pedicel pink, pubescent, obconic, lanate, 1.0 cm long, 3.7–4.3 mm thick, articulate with the calyx; bracteoles 2, large, opposite, narrowly ovate, lanate abaxially, glabrous adaxially, 41.3–41.6 × 7.6–7.8 mm, apex acuminate. *Flowers* 5-merous, pendent; calyx 23.6–28.0 × 8.1–9.1 mm; hypanthium obconic, truncate, 10-ribbed, 5.3–6.1 × 3.6–5.2 mm, green; limb open, erect, 20.2–22.6 × 8.1 mm, magenta with white lanate hairs; lobes 5, narrowly-lanceolate 17.8–19.2 × 3.7–3.9 mm, erect, the sinuses acute. *Corolla* thick-carnose, bistratose, tubular but slightly narrowing distally, terete in cross-section, 4.7–5.0 cm long, 8 mm in diameter at base and 6 mm in diameter at throat, dark scarlet with white, tomentose hairs, glabrous on the covered part; lobes 5, half-spreading, linear-lanceolate, acute, 18.4–25.0 × 3.0 mm, with white pubescence, dark scarlet and black at both extremes externally, blackish internally, polished, channeled and subverrucose internally. *Stamens* 10, nearly equaling the corolla in overall length, each pair unequal with each other, 4.1–4.5 cm long; filaments connate forming a staminal tube, pink with the base white, glabrous and polished on both sides, 9.9 mm long; anthers 3.7–4.0 cm long overall, thecae 5–6 mm long, conspicuously papillose, tubules distinct, but seemingly connate in proximal 1/3, glabrous, 3.2–3.4 cm long, dehiscent by terminal pores 1.7 × 0.3 mm; style not exerted, shorter than the stamens and hidden by them, 4.7–4.9 cm long, glabrous, turning dark scarlet with the black tip above the upper half; stigma truncated. *Fruits* a pearl white berry when ripe, globose, sparsely pubescent, 2.7 × 1.5 cm, seeds greenish yellow.

**Eponymy:**—Named after Nancy Agett and twin brothers Jack and James (Jaime) Agett. The latter being a Peace Corps volunteer contributed to the establishment in 1966 of the first concrete school in San Juan Bosco, Morona Santiago.

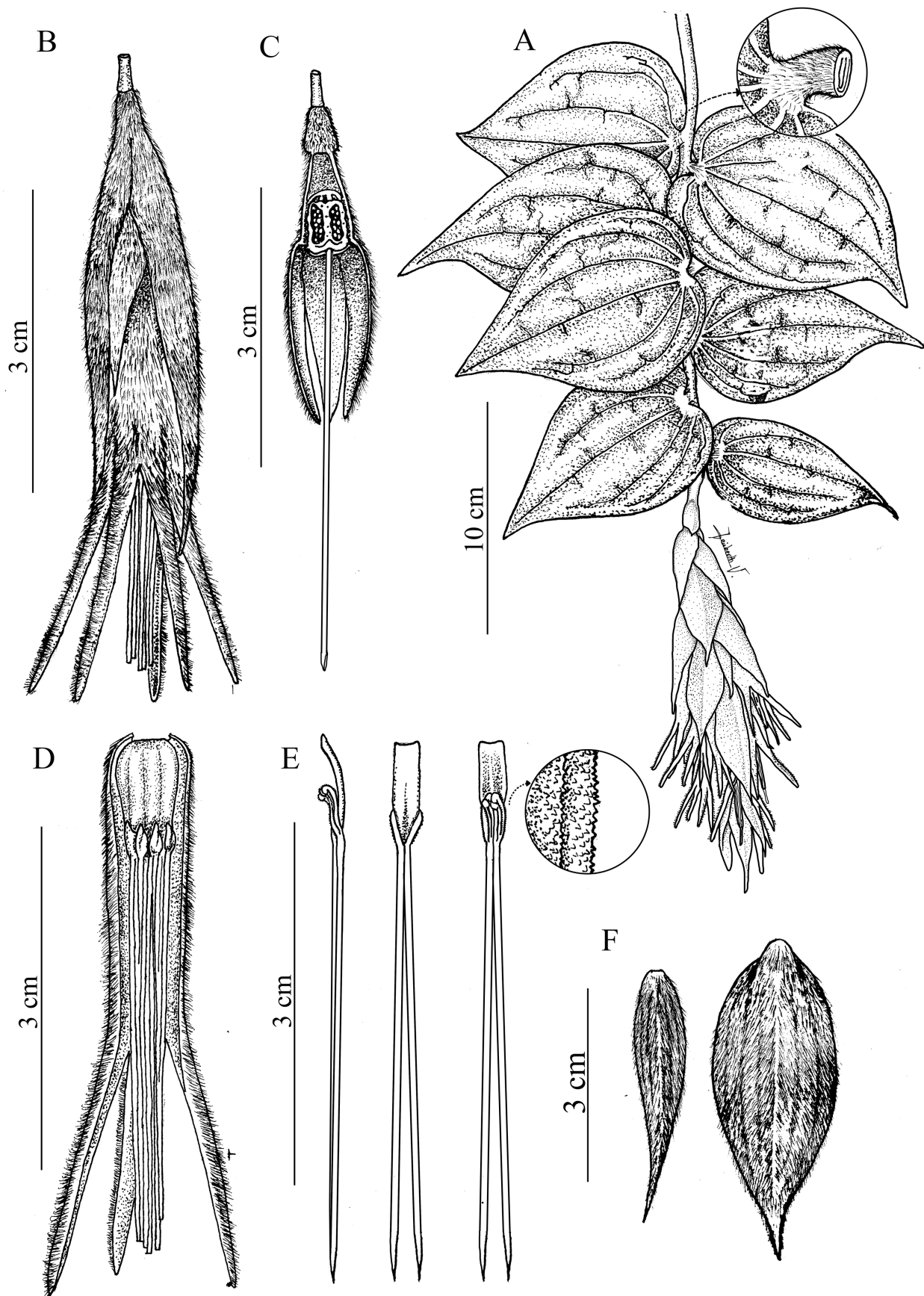
**Distribution and habitat:**—*Ceratostema agettiorum* has been reported in the canton of Limon Indanza, province of Morona Santiago, which is here allocated as the type locality. In addition, the species has also been observed in the canton of San Juan Bosco, 9 km south of its type locality. This is a pendant epiphytic species known from the eastern Andean foothills, where it grows at elevations between 1600 and 1900 m above sea level in both primary forests and disturbed primary and secondary areas. Within primary forests, it has been seen growing on tree branches near the canopy, while in pastures it grows on relict trees, mainly on high branches of *Piptocoma discolor* (Kunth 1818: 35) Pruski (1996: 97) (Asteraceae).

**Conservation status:**—The two localities of *Ceratostema agettiorum* are located within the buffer zones of the municipal and conservation areas of Tinajillas–Río Gualaceño (Limón Indanza) and Siete Iglesias (San Juan Bosco). These municipal reserves provide a legal framework to establish areas dedicated to conservation, as well as the responsibility of the municipalities to protect nature in these areas. Unfortunately, the sad reality is local farmers continue to destroy primary forests for wood harvesting and pasture planting for cattle production. Moreover, another important threat is the construction of new roads which facilitates easy access and intervention of people to previously inaccessible sites. As current farming methods are non-sustainable, habitat loss and land degradation remain a serious threat to the preservation of these areas. The extent of occurrence (EOO) calculated for *C. agettiorum* resulted in an area of 4.41 km<sup>2</sup> and an area of occupancy (AOO) of 16 km<sup>2</sup>; therefore, we recommend classifying *C. agettiorum* as Endangered (EN) according to the criteria B2ab (i, ii) (IUCN 2022).

**Notes:**—*Ceratostema agettiorum* belongs to a group of species where the leaves are basally cordate or amplexicaul; the inflorescence is pubescent with eglandular hairs: having a very conspicuous calyx limb; the calyx lobes 9 mm long or more; a calyx hypanthium with 10-costate and bracteoles of 15–35 mm long or more located at or below the middle of the pedicel (Luteyn 1996). From this group, the new species is most similar to *C. megabracteatum* by the large floral bracts covering much of the flowers during anthesis, and the bracteoles reaching the throat of the corolla (Fig. 3). However, the species is noticeably different by the strongly 7–11 plinerved leaves (*vs.* with 3–5 lateral nerves); the shorter, 46.9–49.4 mm long, elliptic-caudate floral bracts (*vs.* 60–70 mm long, lanceolate); the shorter calyx (up to 28 *vs.* 35 mm long); the corolla being slightly narrowing towards the apex; glabrous in the covered part (*vs.* slightly swollen basally, mostly pubescent overall); the longer filaments (10 *vs.* 7–8 mm long); and the longer tubules (32–34 mm *vs.* 22 mm long). *C. agettiorum* is also similar to *C. nodosum* Luteyn (1986: 489) having large, persistent bracts that cover much of the flowers, the latter is differentiated by the extremely reduced lobes around the calyx.



**FIGURE 1.** Lankester composite digital plate (LCDP) of *Ceratostema agettiorum*. **A.** Habit. **B.** Terminal branch and inflorescence with close-up of the basal nerves of the adaxial side and trichomes of the abaxial side of the leaf. **C.** Flower with floral bracts and bracteoles in adaxial and abaxial views. **D.** Flower without floral bracts and a close-up of the longitudinal section of the calyx and ovary. **E.** The entire corolla and its longitudinal section. **F.** Stamens with a close-up of the thecae and pores of the tubule. **G.** Immature (left) and mature (right) fruit. Elaborated by Henry X. Garzón-Suárez based on photographs of the type.



**FIGURE 2.** Illustration of *Ceratostema agettiorum*. **A.** Habit. **B.** Flower. **C.** Longitudinal section of the calyx showing ovary and pistil. **D.** Longitudinal section of the corolla showing stamens. **E.** Stamens, lateral (left), dorsal (middle) and ventral (right) views. **F.** Bracteole and floral bract, adaxial view. Drawing by Leisberth Vélez-Abarca based on the type.



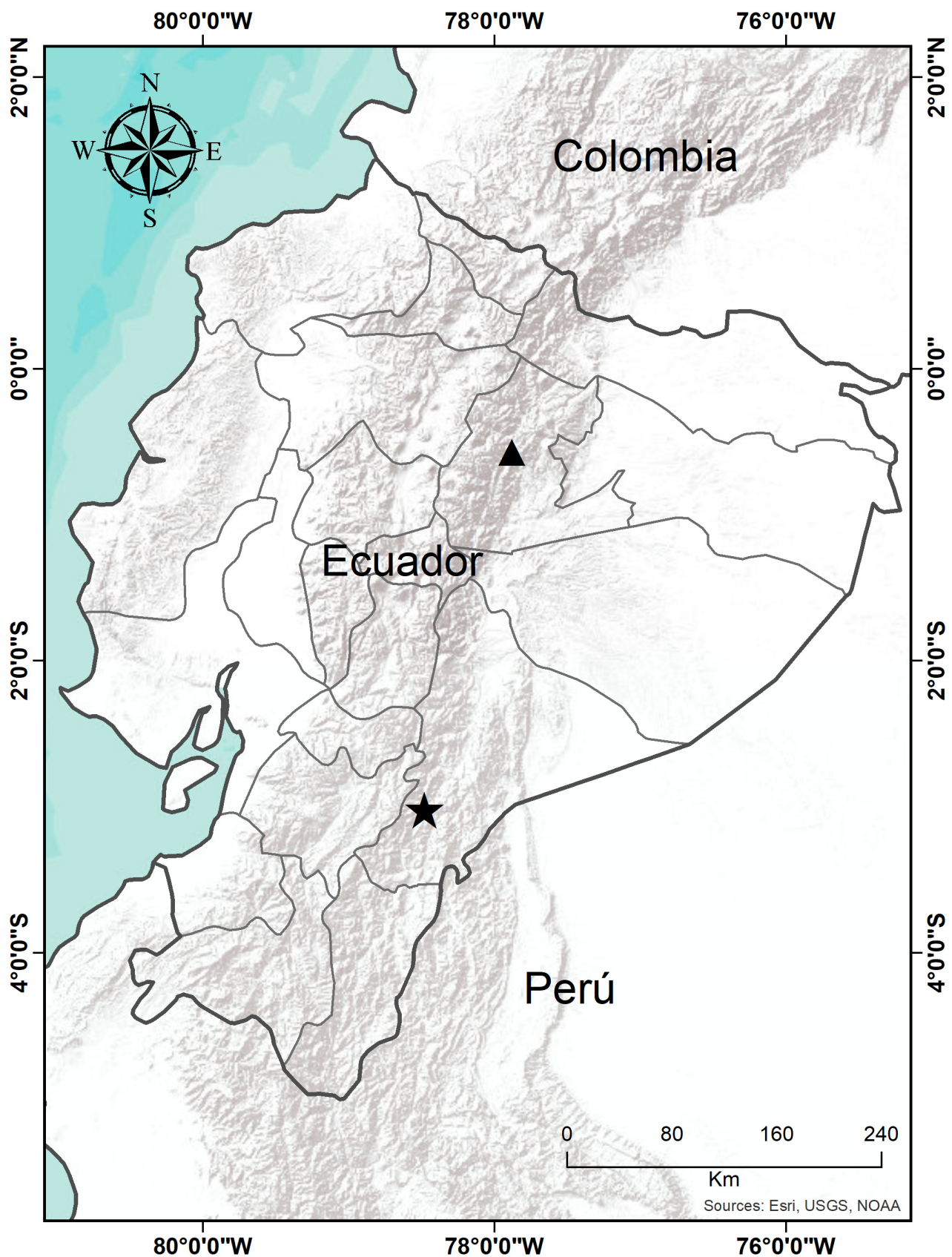
FIGURE 3. *Ceratostema megabracteatum* in situ with the detail of the inflorescences. Elaborated by Henry X. Garzón-Suárez from photos by Paul Maas (uppermost) and James L. Luteyn.

The geographic distribution of the species also provides additional evidence to segregate the new taxon. *Ceratostema agettiorum* grows at lower elevations from 1600 to 1900 m and is restricted to the evergreen lower montane at the southeastern Cordillera of the Andes (BSBN02) in the southeast region of Morona-Santiago province in Ecuador. Unlike the lower montane forests of the eastern slopes of northern Ecuador, this ecosystem has minimum

influence from the Amazonian flora and most of the trees belong to taxa of Andean origin (Baéz *et al.* 2013). According to Luteyn (1996), *C. megabracteatum* is distributed around Cosanga at higher altitudes from 1850 to 2240 m in cloud forests of the province of Napo, northeastern Ecuador (Fig. 5). Santiana *et al.* (2013a: 112, 2013b: 114), mentioned that the type of forest of this area is classified as evergreen montane and lower montane forest in the northern part of the Eastern Cordillera (BsMN01 & BsBN01).



**FIGURE 4.** *Ceratostema agettiorum* in situ. Photos by Henry X. Garzón-Suárez.



**FIGURE 5.** Distribution map of *Ceratostema agettiorum* (star) and *Ceratostema megabracteatum* (triangle) prepared using collection locality data in ArcGIS. Elaborated by Henry X. Garzón-Suárez.

The new taxon has been found sympatrically with *Ceratostema glans* Luteyn (1996: 228) and *C. pendens* Luteyn (2005: 1272). *C. glans* can be distinguished by the presence of glands in most of its vegetative and floral anatomy, the



turbinate hypanthium with abruptly short-acuminate lobes of the calyx, and the slightly ventricose corolla. *C. pendens* is characterized by having pinnately veined leaves with cordate blades that are involute at the base thus concealing the 1–2 flowers, and the relatively inconspicuous floral bracts, bracteoles and calyx lobes (Luteyn 1996, 2005).

## Acknowledgments

A special thanks to David R. Goucher of Jungles Dave's Science Foundation for funding botanical research in the Morona Santiago province of Ecuador. Also, Yero R. Kuethe and David R. Goucher are acknowledged for reviewing the English of this manuscript. MMJ and GAI thank Universidad de Las Américas (UDLA) for funding orchid research in Ecuador, grant No. AGR.LBR.22.03. We would like to thank the Universidad Técnica Particular de Loja herbarium (HUTPL) for their support in the development of this research. To the Ministerio del Ambiente, Agua y Transición Ecológica (MAATE) of Ecuador for granting the research permit No. MAATE-DBI-CM-2022-0248. Paul Maas and James L. Luteyn for allowing the use of their photos. The authors also acknowledge Xavier Cornejo and an anonymous reviewer for helping us improve this manuscript with their revisions.

## References

- Bachman, S., Moat, J., Hill, A.W., De la Torre, J. & Scott, B. (2011) Supporting Red List threat assessments with GeoCAT: geospatial conservation assessment tool. *ZooKeys* 150: 117–126.  
<https://doi.org/10.3897/zookeys.150.2109>
- Báez, S., Santiana, J. & Guevara, J. (2013) BsBn02. Bosque siempreverde montano bajo del Sur de la Cordillera Oriental de los Andes. *In*: Ministerio del Ambiente del Ecuador. Sistema de Clasificación de los Ecosistemas del Ecuador Continental de los Andes. Ministerio del Ambiente del Ecuador, Quito, pp. 126–128.
- Clark, J.L. & Garzón-Suárez, H.X. (2022) *Pearcea lutea*, a new species of Gesneriaceae from southeastern Ecuador. *Brittonia* 74: 398–402.  
<https://doi.org/10.1007/s12228-022-09721-z>
- Clark, J.L., Neill, D.A., Weber, A., Gruhn, J.A. & Katan, T. (2010) *Shuaria* (Gesneriaceae), an Arborescent New Genus from the Cordillera del Cóndor and Amazonian Ecuador. *Systematic Botany* 35: 662–674.  
<https://doi.org/10.1600/036364410792495917>
- Hágsater, E. & Santiago, E. (2020) The Genus Epidendrum. Part 13. “Species New & Old in *Epidendrum*”. *Icones Orchidacearum (Mexico)* 17: 1757–1800. México: Instituto Chinoín, A. C.
- Hooker, W.J. (1837) *Icones Plantarum* 2 (3). Longman, Rees *et al.*, London, pp. 101–150.
- IUCN. (2022) *Guidelines for Using the IUCN Red List Categories and Criteria*. Version 15.1. Prepared by the Standards and Petitions Committee. Retrieved from: <https://www.iucnredlist.org/documents/RedListGuidelines.pdf>. (Accessed 11 January 2023).
- Jiménez, M.M., Vélez-Abarca, L., Horna, L.O., Jaramillo, N. & Baquero, L.E. (2021) A new species of *Ceratostema* (Ericaceae: Vaccinieae) from Ecuador. *Phytotaxa* 520: 265–272.  
<https://doi.org/10.11646/phytotaxa.520.3.5>
- Jørgensen, P.M. & León-Yáñez, S. (Eds.) (1999) Catalogue of Vascular Plants of Ecuador. *Monographs in Systematic Botany from the Missouri Botanical Garden* 75: 1–1181.
- León-Yáñez, S., Valencia, R., Pitman, N., Endara, L., Ulloa Ulloa, C. & Navarrete, H. (2011) *Libro Rojo de Plantas Endémicas del Ecuador*. Publicaciones del Herbario QCA, Pontificia Universidad Católica del Ecuador, Quito, 957 pp.
- Klotzsch, J.F. (1851) Studien über die natürliche klasse Bicornes Linné. *Linnaea* 24: 1–88.
- Kunth, C.S. (1820) *Nova Genera et Species Plantarum* (folio ed.), vol. 4. N. Maze, Paris, pp. 301–412.
- Lindley, J. (1836) *Edward's Botanical Register* 21. James Ridgway and sons, London, pp. 1742–1828.
- Luteyn, J.L. (1979) Notes on neotropical Vaccinieae (Ericaceae) VII. Novelties from Ecuador. *Brittonia* 31: 156–163.  
<https://doi.org/10.2307/2996763>
- Luteyn, J.L. (1996) Ericaceae: *Ceratostema*. *In*: Harling, G. & Andersson, L. (Eds.) *Flora of Ecuador*. Volume 54. Part 147. Göteborg University, Stockholm, pp. 210–253.
- Luteyn, J.L. (2002) Diversity, Adaptation, and Endemism in Neotropical Ericaceae: Biogeographical Patterns in the Vaccinieae. *The Botanical Review* 68: 55–87.

[https://doi.org/10.1663/0006-8101\(2002\)068\[0055:DAAEIN\]2.0.CO;2](https://doi.org/10.1663/0006-8101(2002)068[0055:DAAEIN]2.0.CO;2)

- Luteyn, J.L. (2005) Four new species of Ericaceae (Vaccinieae) from Ecuador. *SIDA, Contributions to Botany* 21: 1269–1282.
- Luteyn, J.L. (2021) The plant family Ericaceae (“Blueberries”) in Ecuador: Ecology, diversity, economic importance, and conservation. *Revista Ecuatoriana de Medicina y Ciencias Biológicas* 42: 1–32.  
<https://doi.org/10.26807/remcb.v42i2.911>
- Neill, D.A. (2005) Cordillera del Cóndor: Botanical treasures between the Andes and the Amazon. *Plant Talk* 41: 17–21.
- Pérez, Á.J., Tobar, F., Burgess, K.S. & Henning, T. (2023) Contributions to Ecuadorian butterworts (Lentibulariaceae, *Pinguicula*): Two new species and a re-evaluation of *Pinguicula calyptrata*. *PhytoKeys* 222: 153–171.  
<https://doi.org/10.3897/phytokeys.222.98139>
- Pruski, J.F. (1996) Compositae of the Guayana Highland–X. Reduction of *Pollalesta* to *Piptocoma* (Vernonieae: Piptocarphinae) and consequent nomenclatural adjustments. *Novon: A Journal for Botanical Nomenclature* 6: 96–102.  
<https://doi.org/10.2307/3392220>
- Quattrocchi, U. (2000) *CRC World Dictionary of Plant Names: Common Names, Scientific Names, Eponyms, Synonyms, and Etymology*. Volume I A–C. CRC Press, Boca Raton, Florida, 714 pp.
- Santiana, J., Báez, S. & Guevara, J. (2013a) BsBn01. Bosque siempreverde montano bajo del Norte de la Cordillera Oriental de los Andes. In: Ministerio del Ambiente del Ecuador. *Sistema de Clasificación de los Ecosistemas del Ecuador Continental de los Andes*. Ministerio del Ambiente del Ecuador, Quito, pp. 112–114.
- Santiana, J., Báez, S. & Guevara, J. (2013b) BsMn01. Bosque siempreverde montano del Norte de la Cordillera Oriental de los Andes. In: Ministerio del Ambiente del Ecuador. *Sistema de Clasificación de los Ecosistemas del Ecuador Continental de los Andes*. Ministerio del Ambiente del Ecuador, Quito, pp. 114–116.
- Thiers, B. (2024) [continuously updated] Index Herbariorum. Part I: The herbaria of the world. New York Botanical Garden. Available from: <http://sweetgum.nybg.org/science/ih/> (Accessed 15 January 2024).
- Ulloa, C.U. & Neill, D.A. (2006) *Phainantha shuariorum* (Melastomataceae), una Especie Nueva de la Cordillera del Cóndor, Ecuador, Disyunta de un Género Guayanés. *Novon: A Journal for Botanical Nomenclature* 16: 281–285.  
[https://doi.org/10.3417/1055-3177\(2006\)16\[281:PSMUEN\]2.0.CO;2](https://doi.org/10.3417/1055-3177(2006)16[281:PSMUEN]2.0.CO;2)