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NOTES ON GEOGRAPHIC DISTRIBUTION

First record of *Croton rottlerifolius* Baill. (Euphorbiaceae) in Pernambuco state, Brazil—a warning for the protection of threatened Brejos de Altitude of the Caatinga domain

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Abstract. The occurrence of *Croton rottlerifolius* Baill. in the state of Pernambuco, Brazil, is recorded here for the first time. Individuals of this species were collected in the municipality of Triunfo in a Brejo de Altitude, a type of humid forest found in some mountain ranges and plateaus of the Brazilian semi-arid region. This new record is essential for a better understanding of the geographical distribution and conservation of *C. rottlerifolius* in Brazil.

Key words. Conservation, new occurrence, Northeast Brazil, semi-arid

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INTRODUCTION

Croton L., with around 1,200 species, is the second largest genus of Euphorbiaceae (Berry et al. 2005) and is distributed mainly in the tropical regions (Berry et al. 2005). The genus is represented by one subgenus in the Old World (*Croton*) and three subgenera in the Neotropical region (*Adenophylli* (Griseb.) Riina, B.W.van Ee & P.E.Berry, *Geiseleria* A.Gray, and *Quadrilobi* (Müll. Arg.) Pax), where 31 sections and 10 subsections are recognized (Van Ee et al. 2011).

Croton subgen. *Geiseleria* sect. *Cleodora* (Klotzsch) Baill. is characterized by its woody habit, clear or reddish latex, a pair of nectaries at the apex of the petiole or at the base of the leaf blade, bisexual inflorescences, 15–25 stamens, pistillate flowers with imbricate sepals, united styles, commonly forming a conspicuous crown-like structure when dry, with a disjunct distribution across Mexico and Central America, northern and northwestern South America, and eastern Brazil (Van Ee et al. 2011; Caruzo and Cordeiro 2013). The section was revised by Caruzo and Cordeiro (2013), admitting 18 species in two subsections (*Sphaerogyni* Caruzo and *Spruceani* Caruzo) distinguished by the aestivation of pistillate flowers (imbricate in *Sphaerogyni* vs. quincuncial in *Spruceani*) and fruit shape (subglobose, usually trigonal in *Sphaerogyni* vs. globose or ellipsoid fruits, never trigonal in *Spruceani*). *Croton rottlerifolius* Baillon (1864), described from a specimen collected in Minas Gerais, Brazil in 1838 (Claussen n. 788), was placed in subsection *Spruceani* together with *C. billbergianus* Müll. Arg., *C. fragrans* Kunth, *C. fragrantulus* Croizat, *C. hoffmannii* Müll.Arg., *C. orinocensis* Müll.Arg., *C. pseudofragrans* Croizat, *C. sexmetralis* Croizat, and *C. spruceanus* Benth.

In subsequent studies, 10 species were added to *Croton* sect. *Cleodora*: Riina et al. (2018) assigned *C. amazonicus* Müll.Arg., *C. javarisensis* Secco, *C. loretensis* Riina & Caruzo, *C. nirguensis* Riina & W. Meier, *C. orinocensis* Müll.Arg., *C. perstipulatus* G.L. Webster ex Caruzo & Secco, and *C. santaritensis* Huft. to subsection *Spruceani*, and *C. gigantifolius* P.E. Berry & Secco and *C. viroleoides* P.E. Berry & Secco were included in subsection *Sphaerogyni*; *C. cantoensis* R.F. Santos & Caruzo was assigned to subsection *Sphaerogyni* by Santos et al. (2024).

A synopsis of *Croton* species occurring in Pernambuco was published by Silva et al. (2010), in which 35 species were recorded, but *C. rottlerifolius* was not mentioned, nor was the occurrence of this species verified in any subsequent survey on Euphorbiaceae or in general floristic lists in the state (Pereira et al. 2010; Pinto et al. 2012; Athiê-Souza et al. 2018). Caruzo and Cordeiro (2013) and Flora e Funga do Brasil (2025)

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considered *C. rottlerifolius* to be endemic to Brazil, occurring in the states of Bahia, Mato Grosso do Sul, Minas Gerais, Rio de Janeiro, and São Paulo. This is the first record of *C. rottlerifolius* in Pernambuco, highlighting the importance of field collections and increased sampling efforts for the conservation of endemic species.

METHODS

Specimens of *C. rottlerifolius* were collected in Sítio Retiro (07°50′42.96″S, 038°04′59.12″W) in the municipality of Triunfo, Pernambuco, Brazil, in April 2025. Around 20 individuals were found in Brejo de Altitude vegetation, a humid, predominantly forested physiognomy surrounded by shrubby xerophytic vegetation known as Caatinga, which is prevalent in the Brazilian semi-arid region in areas of considerable elevation (500–1,200 m). Annual temperatures in Triunfo vary between 23° and 27° C, and annual rainfall between 640 and 1250 mm (MDA 2011). The fragment where the species was found covers around 10 ha and is privately owned. The vegetation of the site is predominantly arboreal, with canopy trees between 8 and 15 m high and some emergent trees over 20–25 m high. The forest is mainly made up of *Picrasma crenata* (Vell.) Engl. (Simaroubaceae), *Ocotea prolifera* (Nees & Mart.) Mez (Lauraceae), *Cupania impressinervia* Acev.-Rodr. (Sapindaceae), *Casearia luetzelburgii* Sleumer (Salicaceae), *Coccoloba mollis* Casar. (Polygonaceae), *Guettarda sericea* Müll. Arg. (Rubiaceae), and *Tocoyena formosa* (Cham. & Schltdl.) K.Schum. (Rubiaceae). In the understory, *C. jacobinensis* Baill. and *C. pulegiodorus* Baill. are found, among others. On the edge of the fragment, *C. urticifolius* Lam., *C. heliotropiifolius* Kunth, and *C. hirtus* L'Her. are also common. The soil has a clay–humus appearance and is rich in litter. Rock outcrops are also frequent.

Fertile samples of *C. rottlerifolius* were collected and herborized following the usual methods in plant taxonomy of Mori et al. (1989) and identified based on specialized bibliography (Caruzo and Cordeiro 2013), as well as by analysis of type images deposited at A, G, and P on the JSTOR platform (2025). Additional specimens were examined from CEN, COR, HUEFS, SP, and SPF (all acronyms are according to Thiers et al. 2025 using images available on the Reflora-Virtual Herbarium (2025) and SpeciesLink (2025) platforms. The specimens collected in the field were deposited in the Herbário do Semiárido brasileiro (HESBRA) at the Unidade Acadêmica de Serra Talhada (UFRPE-UAST).

QGIS v. 3.34 (QGIS 2023) was used to create the species' distribution maps, utilizing occurrence records from SpeciesLink and the literature.

RESULTS

***Croton rottlerifolius* Baill.**, Adansonia 4: 327. 1864.
Figures 1, 2

New record. BRAZIL — Pernambuco • Triunfo, Sítio Retiro; 07°50′42.96″S, 038°04′59.12″W; 11 June 2025; fl., fr.; *A. Laurênio et al. 4312* (HESBRA 7442).

Additional examined materials. BRAZIL — Bahia • Rui Barbosa, Serra do Orobó; 12°23′01″S, 040°31′45″W; 574 m a.s.l.; 20 Dec. 2020; L.P. Queiroz, T.A.B. Costa, D. Cardoso, E. Miranda, F.H. Nascimento 10005 leg.; HUEFS 91323 — Mato Grosso do Sul • Corumbá, Morro Bocaina; 19°02′08″S, 057°38′11″W; 260 m a.s.l.; 04 Sept. 1998; K.C.R. Proença, L.L. Teixeira, M.B. Santos, S.C. Sodré, K.X. Ayala 36 leg.; COR 5681 — Minas Gerais • Triângulo Mineiro, Mata do Vasco; 05 Jan. 1993; A.L.P. Mota 1513 leg.; VIC 13988 • Santana do Riacho, APA Morro da Pedreira; 19°18′20″S, 043°36′58″W; 910 m a.s.l.; 18 Dec. 2014; G.M. Antar, I.S. Seto, I. Akemi-Borges, C. Farhat 593 leg.; CEN 92664 • Santana do Riacho, Serra do cipó; 19°18′20″S, 043°36′58″W; 920 m a.s.l.; 17 Jan. 2007; J.R. Pirani, M.F.A. Calió, B.P.F. Loeuille, E.G. Martins 5559 leg.; SPF 179025; — São Paulo • Ribeirão Preto, Morro do Piripau; 21°07′49.98″S, 047°40′16.93″W; 4 Jan. 2002; O. Kotchetkoff-Henriques & A. Furlan 400 leg.; SP 366834 • Campinas, Mata da fazenda Santa Elisa; 22°53′34.68″S, 047°03′58.09″W; 653 m a.s.l.; 26.Jan.2015; OLM Silva, FS Petrongari, UG Fernandes 209 leg.; SP 472179 — Rio de Janeiro • Cantagalo; 08 Dec. 1979; LEM Filho 5301 leg.; SP 441749.

Identification. The species was identified by the adpressed-stellate trichomes; a pair of acropetiolar nectaries; plate-shaped, oval or broadly oval leaf blade; campanulate staminate calyx, with lobes united up to half their length, imbricate in prefloration; and globose-ellipsoid fruits. According to Caruzo and Cordeiro (2013), *C. rottlerifolius* can be further differentiated from other species of *C.* sect. *Cleodora* by its cylindrical, slightly grooved branches, and they recognized *C. fragantulus* and *C. hoffmannii* as the most morphologically similar to *C. rottlerifolius*. However, besides the differences mentioned above, *C. fragrantulus* is distributed in the Andes of Bolivia and Peru, while *C. hoffmannii* occurs in Costa Rica, French Guiana, Suriname, and Roraima state in Brazil.

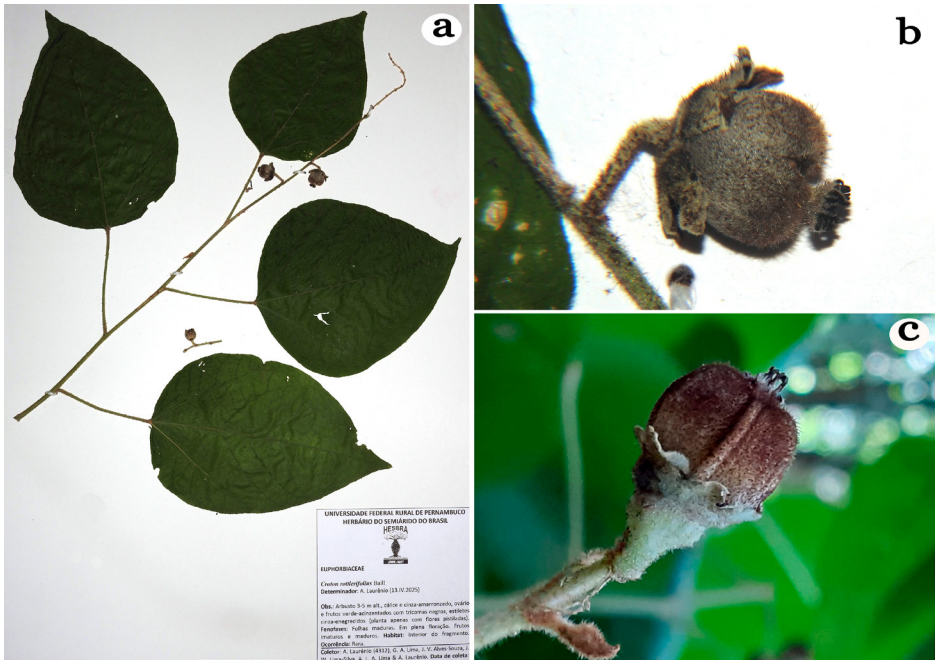

Figure 1. *Croton rottlerifolius* Baill. **A**. Specimen deposited in the HESBRA herbarium (HESBRA 7442). **B**. Detail of fruit in herborized specimen. **C.** Field image of the fruit.

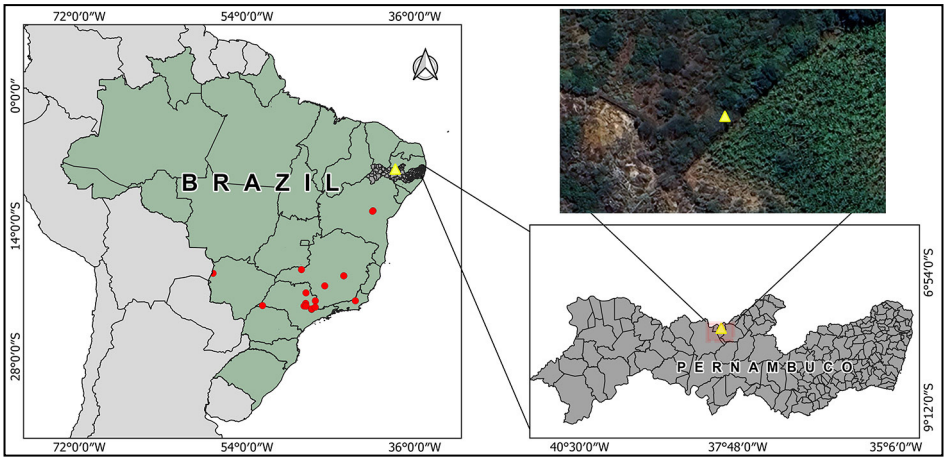

Figure 2. Geographical distribution of *Croton rottlerifolius* in Pernambuco, Brazil. Yellow triangle = new record; red circle = previous records.

DISCUSSION

Croton rottlerifolius was known to occur mainly in the Central-West and Southeast regions of Brazil, with a single record in the Northeast from the state of Bahia. This species is found at altitudes of between 260 and 920 m, in habitats such as the Atlantic Forest, transitional areas with the Cerrado, rupestrian fields, and high-altitude fields, which suggests a preference for mountain environments.

This preference for high-altitude habitats is compatible with the physiognomy of its new occurrence in Pernambuco, a Brejo de Altitude. Currently, the species is known to have a large area of occurrence, over 100,000 km^2 (Figure 3); however, the number of records in Brazilian herbaria is still few.

The population found in Pernambuco occurs in a fragment of Brejo de Altitude covering an area of only 10 ha. This habitat is under serious threat, such as deforestation caused by the urban expansion of Triunfo, the selective extraction of wood for fences and firewood, and the rearing of cattle loose in the forest, which trample and damage the seedlings. The combination of these factors increases the risk of the species disappearing locally. Thus, this discovery emphasizes the importance of the collection efforts to expand knowledge of the Brazilian flora, update the geographical distribution of endemic species, and assess their level of threat. This information is essential for proposing appropriate conservation measures.

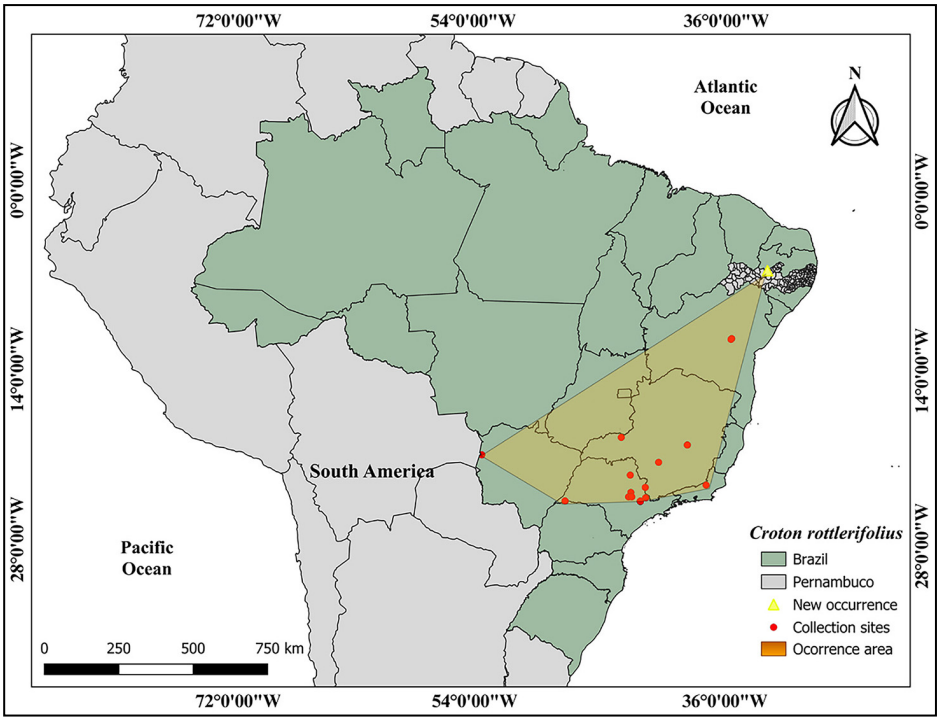

Figure 3. Area of occupancy (AOO) of *Croton rottlerifolius* from Brazil.

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ADDITIONAL INFORMATION

Conflict of interest

The authors declare that no competing interests exist.

Ethical statement

No ethical statement is reported.

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Author contributions

Conceptualization: ALM. Data curation: ALM, WJG, JVAS. Investigation: WJG, MGPS, JVAS, ALM. Supervision: ALM. Visualization: WJG. Writing – original manuscript: ALM, MGPS, WJG, JVAS, RAPS. Writing – review and editing: APSG, ALM, RAPS.

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Data availability

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

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