

First record of *Cnidoscolus obtusifolius* Pohl (Euphorbiaceae) for Paraíba State, northeastern Brazil

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Abstract

Cnidoscolus obtusifolius Pohl (Euphorbiaceae), species so far known from Minas Gerais, Bahia, Alagoas and Pernambuco States in Brazil is reported for the first time for the State of Paraíba, in the northeastern region of the country. Specimens of this taxon were collected in a fragmented area considered a Caatinga vegetation relict, where total annual precipitation is 700 mm on average and elevation of 644 m a.s.l. The records were made in September and October 2019, when the species was in fertile stage as it bore flowers and fruits. Here we provide a description of its morphology along with taxonomic comments, data on the geographical range and detailed images of the species.

Keywords: Caatinga; diversity; floristics; Malpighiales.

Primeiro registro de *Cnidoscolus obtusifolius* Pohl (Euphorbiaceae) no estado da Paraíba, nordeste do Brasil

Resumo

Cnidoscolus obtusifolius Pohl (Euphorbiaceae) espécie até então conhecida para os Estados de Minas Gerais (Sudeste), Bahia, Alagoas e Pernambuco (Nordeste), Brasil, está sendo registrada pela primeira vez no Estado da Paraíba, nordeste do Brasil. A espécie foi coletada em uma área residual, que representa um relicto para a vegetação da Caatinga, com altitude de 644 m.s.n.m e regime pluviométrico de 700 mm anuais. Os registros foram obtidos nos meses de Setembro e Outubro de 2019, onde a espécie se encontrava florida e frutificada, a identificação foi baseada na literatura especializada. Apresentamos descrição morfológica, comentários taxonômicos, dados de distribuição geográfica e imagens detalhadas para a espécie.

Palavras-chave: Caatinga, diversidade, florística, Malpighiales.

Euphorbiaceae, a belonging family in the order Malpighiales, comprises 334 genera (Webster, 1994b) and nearly 8,000 species (Radcliffe-Smith & Esser, 2001). Representatives of this family occur in different plant formations in the Neotropics, but their distribution is mainly associated with tropical and subtropical regions, particularly in Africa and the Americas, with only a few genera and species occurring in temperate regions. The family is recognized as being one the most complex and morphologically diverse taxonomic groups within Rosidae (Cronquist & Takhtadzhian, 1981), as it exhibits all growth habits, ranging from small herbs to large size trees, in which the presence of latex is a frequent trait (Cronquist & Takhtadzhian, 1981; APG IV, 2016).

In Brazil, Euphorbiaceae is represented by 950 species distributed in 64 genera, of which four genera and 633 species

are endemic in the country. Despite having a high number of species and genera, the family's diversity is still little known (Secco *et al.*, 2012). This family has a wide geographical distribution, and is associated with all phytogeographic domains. Euphorbiaceae is considered an important group plants in the Brazilian semiarid (Alcofora do Filho *et al.* 2003, Andrade *et al.* 2004, Sátiro & Roque 2008, Lucena 2009). In the Caatinga domain, the family is represented by 228 species, distributed in 31 genera (Flora do Brasil 2020, under construction). However, it remains relatively little studied, since most works are centered only in the states of Pernambuco and Bahia (Secco *et al.*, 2012).

Studies of the flora of Pernambuco such as those of Lucena (2009) and Lucena and Alves (2010) have contributed to the family's knowledge and distribution in the

Northeast and Caatinga. Lucena and Alves (2009) added 29 occurrences to the list of Euphorbiaceae species for the Brazilian Northeast. Despite the advances provided by these studies, other work needs to be done; in order to cover the entire Northeast of Brazil to increase knowledge Euphorbiaceae diversity in the Caatinga and other northeastern ecosystems, in addition to contributing to other areas of knowledge.

Cnidoscolus Pohl is a prominent genus of Euphorbiaceae. This genus comprises 97 species exclusive of the Americas (Maya-Lastra & Steinmann, 2018), where its main diversification centers are located in Brazil, with 42 species among which 37 are endemic to the country (Flora do Brasil 2020, under construction), and Mexico, with 25 species (Maya-Lastra & Steinmann, 2019). To this date, Müller (1873) monograph remains the most comprehensive treatment on *Cnidoscolus* for Brazil, whereas Melo and Sales (2008) study has this position for the country's Northeast. With regard to the Brazilian species of this genus, 22 of them have been recorded in Caatinga vegetation, with 19 species being endemic to this floristic domain (Flora do Brasil 2020, under construction). It is worth mentioning that the genus stands out for presenting species with different therapeutic purposes and widespread in popular medicine (Moura *et al.*, 2019).

Representatives of *Cnidoscolus* are characterized by the presence of simple, alternate leaves, which are membranaceous to subcoriaceous, glabrous to velutinous-tomentose; their flowers are sessile or pedicellate, staminate ones are distal, with 10-15 free stamens organized in 2-4 whorls, while pistillate flowers are proximal; the ovary is ovoid to pyriform, glabrous to velutinous, with one ovule per locule and three styles, free or adnate at the base. The nectariferous disc is extrastaminal and annular; the presence of urticating trichomes in almost all vegetative and floral parts is particularly important as this is one of the diagnostic features of this genus (Pohl, 1827; Melo & Sales, 2008).

Among the species of this genus, *Cnidoscolus obtusifolius* Pohl was known from Minas Gerais, Bahia, Alagoas and Pernambuco States in Brazil. Now was reported for the first time for the State of Paraíba. While conducting fieldwork in the municipality of São João do Tigre, in the Brazilian semiarid, it was verified that collections of the species *Cnidoscolus obtusifolius* (Euphorbiaceae) became the first record for the state's flora, which is reported here.

Caatinga, as it is known for being the main plant formation in the Brazilian semiarid region, presents predominantly a vegetation classified as Seasonally Dry Tropical Forest, being considered the most diverse dry forest in the world (Moro *et al.*, 2015; Queiroz *et al.*, 2017). The Caatinga is marked by the influence of spatial and temporal variability of rain and landscapes, with different types of soils and a high number of endemisms (Moro *et al.* 2015; Queiroz *et al.* 2017; Silva *et al.* 2017). The results presented here were obtained in the municipality of São João do Tigre. (*município*) is located in the Cariri microrregion of Paraíba, Borborema Plateau (8°10' 27.5" S, 36° 55' 00.2" W), South extreme of Paraíba State, immersed in the Brazilian semiarid region (Mascarenhas *et al.*, 2005). This *município* is located in the portion of the Paraíba Cariri where the highest elevations are found with maxima of

around 1,200 m a.s.l. (Souza *et al.*, 2009). The regional climate is of the Bsh type, that is hot, semi-arid (Alvares *et al.*, 2013), with mean annual precipitation ranging around 700 mm, and mean annual temperature around 26 °C (Mascarenhas *et al.*, 2005; Moro *et al.*, 2015). With regard to geology, the study area is inserted in the domain of the crystalline, characterized in general by shallow, rocky and highly fertile soils. Specifically the Cariri region of Paraíba state, has a total area of approximately 11,225.736 km², the region encompasses relictual reliefs that witness the pediplanation processes developed in the area; the landscape is dominated by narrow valleys and dry slopes, in addition to multiple mountain ranges, which combined with higher levels of precipitation are responsible for the occurrence of more benign temperatures in the region (Mascarenhas *et al.*, 2005).

Fertile material of *Cnidoscolus obtusifolius* was collected during two expeditions conducted between September and October 2019. The vouchers were deposited at the Manuel de Arruda Câmara Herbarium (HACAM) of the Universidade Estadual da Paraíba (Paraíba State University), Campina Grande, Paraíba, Brazil. For the taxonomic identification, we used specialized literature (Müller Argoviensis, 1873; Melo & Sales, 2008), in addition to consultation of the electronic data bases of Re flora, the Herbário Virtual da Flora e dos Fungos (Virtual Flora and Fungal Virtual Herbarium), Jstor (<https://plants.jstor.org/>), and Tropicos (<https://www.tropicos.org/>).

Here, we present morphological description for the taxon, taxonomic and distribution notes, and illustrations (Figure 1). In the field we collected material from several individuals, and for all characteristics we analyzed three to five samples.

Cnidoscolus obtusifolius Pohl, Pl. Bras. Icon. Descr. 1: 62. 1827.

Type: BRAZIL: In deserto, Bahiensis prov., C.F.P. von Martius 2230 (Holotype: M0233240!)

Tree, 6-8 m tall. Urticating trichomes acicular (stinging), 0.5–4 mm long, covering the branches; stinging trichomes of 2–6 mm long covering in the petioles, leaf blade, inflorescence, perianth, and fruits. Stems cylindrical, grayish to reddish, glabrous to pubescent at their distal branches. Stipules 1–3 × 1–2 cm irregularly triangular, generally deciduous, sometimes persistent after the leaves are shed, margins glandulous-papillose, pubescent to puberulent. Petiole absent or, when present, up to 1.8 cm long, cylindrical, pubescent to velutinous; petiolar glands absent. Leaf blade 3–9 × 2–5.2 cm, membranaceous to chartaceous, entire, elliptic, obovate, base obtuse to subcordate, apex acuminate to rounded, margin crenate, with urticating trichomes at each border, ciliate and undulate, adaxial face pubescent with urticating trichomes on primary veins; abaxial face sparsely velutinous with urticating trichomes on primary and secondary veins in mature (senescent) leaves only; leaf venation craspedodromous and brochidodromous, main veins 3–6. Inflorescence an imperfect dichasium 2.0 × 2.5–3 cm, or with 3 dichasia arranged in 2 levels of

branching, puberulous, hispidulous-pubescent to sericeous, peduncle 0.3–0.9 (1.0 cm); bracts and bracteoles 3–4 mm, triangular, with glandulous-papillose margins at the base, pubescent. Staminate flowers sessile, located from the second level of ramification; perianth ca. 16 mm, tubular-campanulate or tubular hypocrateriform, greenish white, pubescent; tube 3–4 × 10 mm; lobes 8–9 × 7 mm, oblong-elliptic, apex rounded; stamens 18 arranged in 2–3 whorls, partially joined forming a column 2–10 mm, glabrous; filaments 3–6 mm; anthers 1 × 0.25–0.5 mm, dorsifixed, oblong; staminodes 3, filiform, ca. 5 mm; glandular disc 0.5 × 1 mm, annular, slightly lobed internally, glabrous. Pistillate flowers 3, located up to the second level of branching; pedicel ca. 2 mm; receptacle/base

persistent of inconspicuous perianth; perianth ca. 13 mm, white, externally greenish, segments free, oblong to oval, pubescent and urticating, apex rounded; ovary ovoid, sub-cylindrical in cross section, pubescent to hispidulous-sericeous; styles 3–4 mm; joined at the base, four- to many-branched, 12–32 stigmatic branches; glandular disc annular striated, glabrous. Capsule 1.5–2.2 × 1.1–1.3 cm, 1.1–1.5 × 1.1–1.2, loculicidal and septicida, sub-pyriform, cylindrical in cross section, velutinous, urticating, apex acuminate, base of the styles persistent. Seeds 1.1–1.2 × 0.4–0.5 mm, oblong, concave dorsally, convex or flat ventrally, surface brown with prominent darker spots, base retuse, apex acute; caruncle 4–5 × 3 mm.

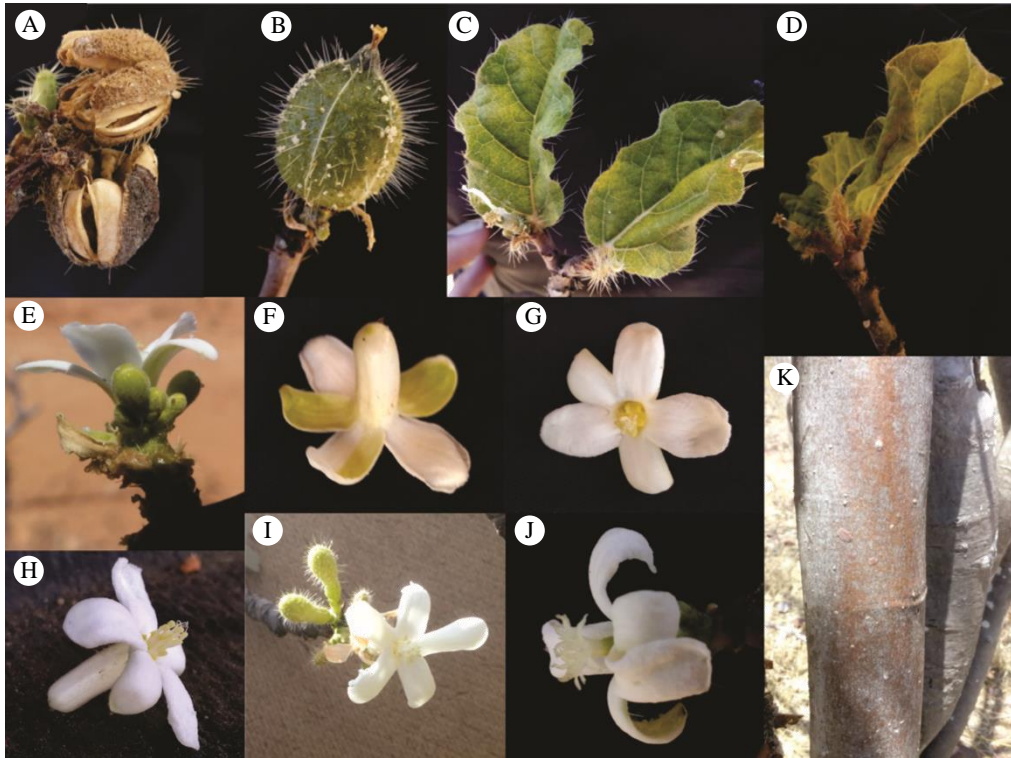


Figure 1. First record of *Cnidocolus obtusifolius* Pohl in the estate of Paraíba, Brazil. A–B, capsule; C–D, leaves; E, inflorescence; F–I, male flower; J, female flower; K, stem.

Notes: For this genus other three species have been recorded in Paraíba: *Cnidocolus infestus* Pax & K. Hoffm., *Cnidocolus quercifolius* Pohl and *Cnidocolus urens* (L.) Arthur. *Cnidocolus obtusifolius* can be easily differentiated from these congeneric species mainly by its leaves with entire, elliptical and obovate blade, with an obtuse and sub-cordate base, its irregularly triangular, pubescent to puberulous stipules with papillose-glandulose margin, and its velutinous capsule.

Geographic range and habitat: Occurring exclusively in Brazil, this species is restricted to Seasonally Dry Tropical Forest and Seasonal Deciduous Forest being registered presence so far in the states of Minas Gerais (Southeastern Region), Alagoas, Bahia and Pernambuco (Northeastern Region) (Melo & Sales, 2008; Flora do Brasil 2020, under construction). Constituting, in this work, the first record for the State of Paraíba. Collections of this species in Paraíba were in the dry season 2019, in a fragment of Caatinga vegetation with

an open physiognomy, at an elevation of 644 m a.s.l. According to World Reference Base for soil resource, soil classification prevailing soils in the study area are classified as Chromic Luvisols (IUSS Working Group WRB 2014).

The area shows signs of grazing by goats and cattle, common domestic animals and considered important drivers in the biological impoverishment of the Caatinga; which highlights the susceptibility to which *C. obtusifolius* is found. The area in which it was found is considered a fragment of shrubby Caatinga, and *C. obtusifolius* is among the five most abundant species, with random spatial distribution.

Along with *C. obtusifolius*, *Mimosa ophthalmocentra* Mart. ex Benth. (Fabaceae), *Cenostigma pyriforme* (Tul.) Gagnon & G.P. Lewis (Fabaceae), and *Aspidosperma pyriforme* Mart. & Zucc. (Apocynaceae) are most common species in the area.

Reproductive phenology: Found in flower and fruit in September and October for the observed specimens.

Examined material: BRAZIL. Paraíba: São João do Tigre municipality, (8° 10' 27.5" S, 36° 55' 00.2" W, 644 m a.s.l, 4 Oct 2019, M.B. Ramos, M.G.R. Maciel (HACAM 1978).

This new record of this specie was from in area very close to the border with Pernambuco (state where this taxon was reported before). Thus this, record underlines the importance of conducting further floristic studies in the Brazilian semiarid, since this region has a high environmental heterogeneity, which reflect the high number of endemism, species richness and variability in the plant formations and paradoxically, the knowledge about its flora is still incipient when compared to the other world plant formations.

The finding presented here refers to a Brazilian endemic species, restricted to the semiarid environment, and thus, environmental education actions about the specie and possible management plans are needed, aimed at the conservation and maintenance of high richness of Caatinga.

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