



## A new species of *Croton* section *Cleodora* (Euphorbiaceae s.s.) from Minas Gerais, Brazil

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### Abstract

*Croton stellatoferrugineus*, a new species from Brazil, is here described and illustrated. This new species is endemic to dry forests at the base of “Pico do Itambé”, the highest point of the Espinhaço range, in Minas Gerais State, occurring at 700–900 m elevation. *Croton stellatoferrugineus* presents morphological features consistent with its inclusion in *Croton* section *Cleodora*, due to its shrubby habit, petiolar basilaminar glands, 15 stamens, pistillate flowers with quincuncial aestivation, and multifid styles connate at the base.

### Resumo

*Croton stellatoferrugineus*, uma nova espécie do Brasil, é aqui descrita e ilustrada. Esta nova espécie é endêmica das florestas secas na base do “Pico do Itambé”, o ponto mais alto da cadeia do Espinhaço, no Estado de Minas Gerais, ocorrendo de 700–900 m de altitude. *Croton stellatoferrugineus* possui características morfológicas que permitem incluí-lo em *Croton* seção *Cleodora*, tais sejam seu hábito arbustivo, glândulas do pecíolo basilaminares, 15 estames, flores pistiladas de prefloração quincuncial e estiletos multifídeos conados na base.

**Key words:** *Croton stellatoferrugineus*, *Croton* section *Cleodora*, Espinhaço Range, Minas Gerais, Brazil

### Introduction

*Croton* Linnaeus (1753: 1004) is ranked as the 11<sup>th</sup> biggest flowering plant genus according to Frodin (2004), with an estimated 1223 species (Govaerts *et al.*, 2000). The genus occurs mostly in tropical regions worldwide, but also with some representatives in subtropical and northern temperate areas, and most of its species are important elements of secondary vegetation, which make many species useful for reforestation of degraded forests. Its main centers of diversity in the Neotropics are Brazil, the West Indies, and Mexico (Burger & Huft, 1995). Even with a large number of species already known for the genus, many species have been described for the Neotropical region in the last decade (Secco *et al.* 2001; Secco 2004; Gordillo & Luna 2005; Secco *et al.* 2005; Smith 2006; Riina *et al.* 2007; Caruzo *et al.* 2008; Cordeiro *et al.* 2008; Lima & Pirani 2008; van Ee & Berry 2009; Secco 2009; Caruzo *et al.* in press; Carneiro-Torres *et al.* in press). Brazil has approximately 350 species of *Croton*, including herbs, shrubs, trees and rarely lianas, occupying all kind of habitats, with the greatest number of species concentrated in the eastern part of the country. A new species of *Croton* sect. *Cleodora* (Klotzsch 1841: 196) Baillon (1858: 369) is described here. *Croton stellatoferrugineus* Caruzo & Cordeiro is known only from the “Pico do Itambé”, the highest point of the Espinhaço range in central Minas Gerais state, southeastern Brazil, where it grows in dry forests.

## Taxonomic treatment

### *Croton stellatoferrugineus* Caruzo & Cordeiro, *sp. nov.* (Figs. 1A–E, 2A–H)

*Crotoni sphaerogyno* Baill. affinis sed indumento ferrugineo, bracteis foliaceis, floribus femineis campanulatis, stylis multifidis ca. 24-partitis differt.

Type:—BRAZIL: Minas Gerais: Santo Antônio do Itambé, estrada para as cachoeiras e para a ponte de pedra, próximo à ponte, 18°27'16,2''S e 43°18'29,4''W, 750 m, fl., fr., 25 June 2008, M.B.R. Caruzo, L.R. Lima, S.E. Martins & A.L. Santos 120 (holotype SP, isotypes K, MICH, MO, NY, SPF).

Shrub 1–3 m tall, monoecious, indument ferrugineous; branchlets flattened, covered by stellate and multiradiate trichomes. Leaves alternate; lamina 3–11.5 x 1–4.5 cm, narrowly ovate to ovate-elliptic, slightly discolorous, apex narrowly acute, base slightly cordate, margin entire, upper surface pubescent, covered by stellate trichomes, with less than 10 radii, usually with a long central erect ray, lower surface densely pubescent, covered by multiradiate trichomes, with more than 10 radii, venation pinnate, brochidodromous, secondary veins abruptly upturned towards the next ones, tertiary veins sinuous; petiole 0.5–2 cm long, with a pair of sessile basilaminar chestnut-brown glands; stipules ca. 5 mm long, linear. Inflorescence 5–20 cm long, terminal; inflorescence axis flat, striate, pubescent; proximal cymules pistillate, with a single pistillate flower, distal cymules staminate, with 1–2 staminate flowers, bracts from 0.4 cm long in terminal and youngest cymules, up to 2 cm long in the basal and oldest ones, foliaceous, prophylls 1–3 mm long, linear. Staminate flowers 5 mm long, campanulate; pedicels 2 mm long; calyx 2 mm long, pubescent externally, covered by stellate and multiradiate trichomes, glabrate internally; sepals 5, valvate, united up to half their length, then free for 1 mm long, entire, equal, ovate, apex acute; petals 5, 2 mm long, ovate to ovate-lanceolate, apex acute to rounded, reflexed; disk 5-segmented; stamens 15, filaments subulate, glabrate; receptacle villose with simple trichomes. Pistillate flowers 5 mm long, campanulate; sessile; calyx 4 mm long, pubescent externally, covered by stellate and multiradiate trichomes, glabrate internally; sepals 5, quincuncial, united up to half of their length, then free for the terminal 3 mm, equal, ovate-lanceolate, slightly fleshy, covered by ferrugineous trichomes, pale trichomes extending up to the central part of the sepals, margins villose; petals absent; disk 5-segmented; ovary globose, pubescent; styles 3, multifid, connate into a short column at the base, then branching into 24–30 terminal arms about 1/3 the way up the style. Capsules 0.7–1 cm long, globose, pubescent, calyx slightly accrescent, not inflated; seeds 4–5 mm long, subglobose, smooth; caruncle small, reniform.

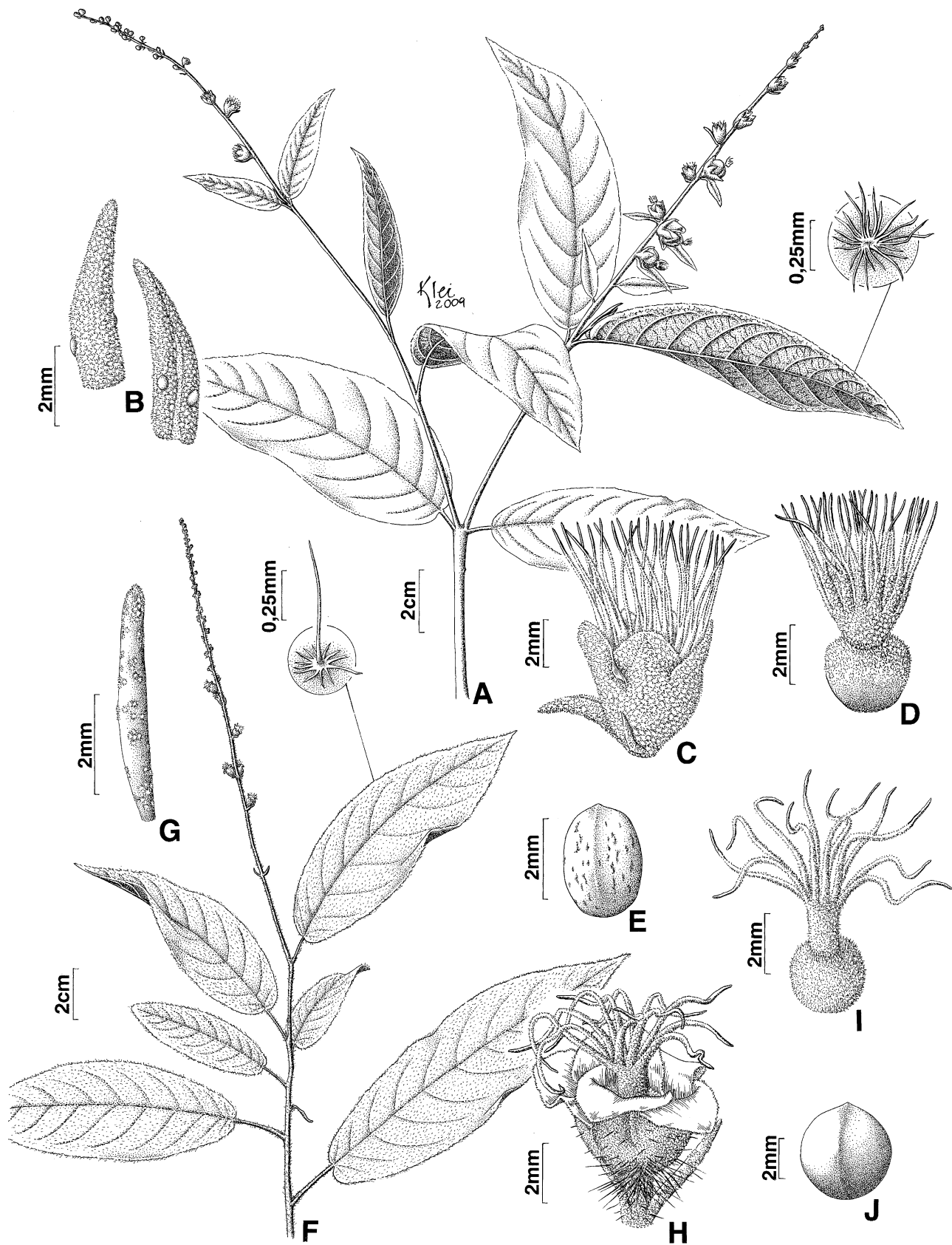
**Distribution and habitat:**—So far only known from the “Pico do Itambé”, in the Espinhaço range, Minas Gerais state, southeastern Brazil, where it grows in seasonally dry forests, at 700–900 m elevation.

**Etymology:**—The specific epithet refers to the rusty color of its stellate indument.

The species can be recognized in the field by its densely ferrugineous indumentum and the foliaceous bracts with glands similar to those found at the base of the leaves.

From the results of an ongoing taxonomic revision of *Croton* section *Cleodora* by the senior author, and following the sectional synopsis of *Croton* by Webster (1993), *Croton stellatoferrugineus* clearly belongs to that section. The features shared by members of section *Cleodora* are the arborescent or shrubby habit, presence of basilaminar or acropetiolar glands, stamens between 15–25, pistillate sepals quincuncial or imbricate, usually accrescent, and sometimes fused at the base or up to half of their length, and quadrifid or multifid styles fused at the base or higher up. This new species has a shrubby habit, basilaminar glands (Fig. 2A), 15 stamens, quincuncial sepals united up to half of their length (Fig. 1C, 2C), and multifid styles fused at the base (Fig. 1D), all features indicating that *C. stellatoferrugineus* belongs to section *Cleodora*.

*Croton stellatoferrugineus* is morphologically most similar to *Croton sphaerogynus* Baillon (1864: 326), a species from “restinga” forests of Brazil (São Paulo, Rio de Janeiro, Espírito Santo and Bahia), but differs from it in several features that are shown in Table 1. The main features that easily distinguish *C. sphaerogynus* from *C. stellatoferrugineus* are the indumentum color (whitish with some sparse points slightly ferrugineous in *C. sphaerogynus* vs. strongly ferrugineous in *C. stellatoferrugineus*; see Figs. 2 and 3), type of trichomes (appressed stellate in *C. sphaerogynus* vs. stellate or multiradiate in *C. stellatoferrugineus*), bracts



**FIGURE 1.** Comparison of *Croton stellatoferrugineus* and *C. sphaerogynus*. **A–E.** *Croton stellatoferrugineus*. **A.** Flowering branch. **B.** Floral bract, dorsal and ventral views. **C.** Pistillate flower. **D.** Gynoecium. **E.** Seed, dorsal view; **A–E.** *Cordeiro et al. 3033* (SP). **F–J.** *Croton sphaerogynus*. **F.** Flowering branch. **G.** Floral bract, dorsal view. **H.** Pistillate flower. **I.** Gynoecium. **J.** Seed, dorsal view; **F–J.** *Caruzo & Lima 121* (SP).



**FIGURE 2.** Morphological features of *Croton stellatoferrugineus*. **A.** One of the two basilaminar glands. **B.** Habit, showing senescent orange leaves (first plant to the right). **C.** Pistillate flower. Note ferrugineous indument, basally connate sepals with quincuncial aestivation of the lobes, and styles branched into at least 24 terminal tips. **D.** Staminate flowers. Note reflexed petals. **E.** Bracts with basal gland. **F.** Stipule partly hidden by ferrugineous trichomes. **G.** Inflorescence. **H.** Detail of fruit, with slightly accrescent calyx. **A-B, E-H.** Cordeiro et al. 3033 (SP). **C-D.** Caruzo et al. 120 (SP).



**FIGURE 3.** Morphological features of *Croton sphaerogynus* and *C. heterocalyx*. **A-E.** *Croton sphaerogynus*. **A.** Habit. **B.** Basilaminar glands. **C.** Pistillate flower, showing revolute sepal lobes, staminal column, and ca. 12 terminal tips. **D.** Staminate flower. **E.** Fruits; **A.** *Caruzo et al.* 65 (SP, WIS); **B-D.** *Caruzo & Lima* 121 (SP); **E.** *Sant'Ana et al.* 1122 (CEPEC). **F-I.** *Croton heterocalyx*. **F.** Staminate flowers. **G.** Stipule. **H.** Inflorescence. **I.** Fruit; **F-I.** *Caruzo et al.* 140 (HUEFS).

subtending the pistillate and staminate cymules (foliaceous in *C. stellatoferrugineus* vs. linear, not foliaceous in *C. sphaerogynus*; see Figs. 1B and 1G), and seed shape (subglobose in *C. stellatoferrugineus* vs. globose in *C. sphaerogynus*; see Figs. 1E and 1J). Besides these morphological differences, *C. stellatoferrugineus* occurs in seasonally dry forests in Minas Gerais, whereas *C. sphaerogynus* occurs in moist forests in seashore plains (“restinga” forests) in the states of São Paulo, Rio de Janeiro, Espírito Santo, and Bahia (see Table 1).

**TABLE 1.** Main characters distinguishing *Croton stellatoferrugineus* from *C. sphaerogynus* and *C. heterocalyx*.

Character	<i>C. stellatoferrugineus</i>	<i>C. sphaerogynus</i>	<i>C. heterocalyx</i>
Leaf indument (lower surface)	pubescent	hirsute to glabrescent	pubescent
Trichomes	stellate and multiradiate	adpressed-stellate	stellate and multiradiate
Leaf base	slightly cordate, lobes not overlapping	auriculate to strongly cordate, lobes usually overlapping	rounded to cordate, lobes not overlapping
Bracts	foliaceous, with glands	not foliaceous, without glands	not foliaceous, without glands
Staminate flower shape	campanulate	campanulate	cupola-shaped
Pistillate flower shape	campanulate	flask-shaped	flask-shaped
Pistillate flower sepals	united up to half their length, lobes erect	united at the base, lobes revolute	united at the base, lobes erect
Pistillate flower indument color	ferruginous	glaucous	ferruginous
Style division	> 24 terminal tips	12 terminal tips	> 24 terminal tips
Seed shape	subglobose	globose	subglobose
Habitat	seasonally dry forests	“restinga” wet forests	seasonally dry forests and “restinga” forests

Another species morphologically similar to *Croton stellatoferrugineus* is *C. heterocalyx* Baillon (1864: 324), which has a disjunct distribution between dry forests and “restinga” forests in southeastern and northeastern Brazil (Caruzo & Cordeiro, in prep.). Both these species occur in dry forests and have similar ferruginous indument. However, *C. stellatoferrugineus* can be easily distinguished from *C. heterocalyx* due to the different characters listed in Table 1, among which leaf shape (ovate to cordate in *C. heterocalyx* vs. narrowly ovate to ovate-elliptic in *C. stellatoferrugineus*), morphology of branchlets (cylindric in *C. heterocalyx* vs. flat in *C. stellatoferrugineus*), and staminate flowers (cupola-shaped in *C. heterocalyx* vs. campanulate in *C. stellatoferrugineus*; see Figs. 2D and 3F) are the most notable.

**Additional specimens examined (paratypes):**—BRAZIL: Minas Gerais: Serra do Espinhaço, southeastern drainage of Pico do Itambé, about 5 km directly west and north of Santo Antônio do Itambé, 9 February 1972, fl., fr., W.R. Anderson *et al.* 35673 (MBM, MICH, NY, UB, US, VEN); Santo Antônio do Itambé, ponte de pedra sobre o riacho mãe-d’água, 1833’8.4’’S e 4320’15.8’’W, 811 m, fr., 18 February 2009, I. Cordeiro *et al.* 3033 (SP).

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