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# An Unexpected *Mcvaughia* (Malpighiaceae) Species from Sandy Coastal Plains in Northeastern Brazil

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***Abstract*—*Mcvaughia sergipana*** is described and illustrated. It differs from the single other species in the genus by the metallic-sericeous, and soon deciduous indumentum on the leaves, small glands scattered throughout the lamina, lateral cincinni with 1–2 flowers, and larger posterior petal. This new species is only known from sandy coastal plains in Sergipe State, Brazil, and is critically endangered. Its distribution is estimated to be less than 100 km$^2$ in a region of extremely disturbed environments.

***Keywords*—**Atlantic Forest, *Burdachia*, *Glandonia*, Malpighiales, Sergipe State.



*Mcvaughia* W. R. Anderson is a genus of Malpighiaceae endemic to northeastern Brazil (Anderson 1979), previously with only a single species: *M. bahiana* W. R. Anderson. The genus can be easily recognized by its shrubby habit, anterior petals nested inside one another, horseshoe-shaped anthers, and nuts with the epicarp twisted a 180-degree angle (Anderson 1979). *Mcvaughia bahiana* is found only in dry, open habitats of Caatinga (dryland) vegetation in northeastern Bahia State, Brazil (Anderson 1979), with only a few collections near the type locality.

*Mcvaughia* represents an intriguing case of geographic disjunction within Malpighiaceae, due to its placement as sister-group to two Amazonian lineages, *Burdachia* A. Juss. and *Glandonia* Griseb., the so called *Mcvaughia clade* (Davis and Anderson 2010). These two latter genera are widely distributed throughout the Amazon Basin with *Burdachia* reaching the Guyanas, but absent in northeastern Brazil, from where *Mcvaughia* was first described 35 yr ago (Anderson 1979).

During recent fieldwork, and through examination of collections at the most important herbaria in Sergipe State, Brazil, we were surprised by finding a new species of *Mcvaughia*. This species is apparently endemic to sandy coastal plains (restinga vegetation) in the Atlantic Forest biome. With one exception, all specimens of the new species described here were collected within the last four years.

## Materials and Methods

The description and illustrations of the new species presented here are based on field collections and studies of herbarium specimens. Information concerning the plant height, habit, presence of color on the hairs, lamina surface, glands, sepals, petals, fruits, and other informative traits were noted while examining fresh material in the field or transcribed from the collection labels of the herbarium specimens. Descriptions, morphological illustrations, and maps are based only on plant material from field collections and additional specimens from the ALCB, ASE, CEPEC, and HUEFS herbaria. The maps were generated using Arcgis software (ESRI 2010) and the geographical coordinates obtained from herbarium specimens.

## Taxonomic Treatment

**Mcvaughia sergipana** Amorim & R. F. Almeida, sp. nov.—TYPE: BRAZIL. Sergipe: Mun. Pirambu, Estrada para Lagoa Redonda, restinga sobre tabuleiro, 10°41′79″S, 36°50′90.2″W, 96 m, 7 Oct 2013 (fl, fr), *A. M. Amorim, L. C. Marinho,* & *R. F. Almeida 8393* (holotype: CEPEC!; isotypes: ASE!, HUEFS!, MBM!, NY!, MICH!, P!, RB!, SP!).

*Mcvaughia sergipana* differs from *M. bahiana* by the former having the abaxial leaf surface sericeous, lateral cincinni with 1–2 flowers, and posterior petal limb 4.5–8.5 mm long, with the latter having the abaxial leaf surface densely tomentose or lanuginose, lateral cincinni with 2–7 flowers, and the posterior petal limb ca. 3 mm long.

Shrubs 1.5–2 m tall, basal stems 4–8 cm diam.; stipules 3–5 mm long, densely sericeous, persistent. Leaves mostly straight, opposite; petiole (0.3–)0.7–1.2 cm long, canaliculate, initially sericeous and later glabrescent, eglandular; lamina of larger leaves 8.4–10.7(–12) × (2.7–)3–5.8(–6.5) cm, chartaceous to subcoriaceous, elliptic to ovate, rarely elliptic-lanceolate, apex acute or slightly acuminate, base acute or cuneate, margins slightly revolute, rarely flattened; lamina with 2 prominent abaxial glands at base, on each side of the midrib, with other smaller impressed glands scattered throughout lamina, adaxial surface green, initially sericeous and very soon glabrescent, abaxial surface initially densely metallic sericeous and soon glabrescent, thinly sericeous proximally on and near midrib and veins. Inflorescence a terminal raceme of cincinni, (6.5–)8–11.4 cm long, 15–30 lateral cincinni, opposite to subopposite, rachis striated, densely sericeous, with brown hairs, 1–2 flowers per cincinnus; bract 5–6.5 mm long, lanceolate, spreading; bracteoles 2.5–3 mm long, triangular, subopposite, spreading, one having a conspicuous green gland at base; peduncle 4–5 mm long, sparsely sericeous; pedicel 2–3 mm long, sparsely sericeous. Flowers with sepals 2.5–3 × 1–1.5 cm, brown, straight, carinate, covering most of the androecium, apex rounded, margin short ciliate, adaxial surface glabrous, abaxial surface sericeous, glabrescent near the margin; lateral 4 sepals biglandular, anterior sepal eglandular, glands ca. 2.5 × 1 mm, yellow, obovate; petals golden yellow, soon deciduous; anterior lateral petals orbicular, cucullate, limb ca. 4 × 5 mm, margin erose, eglandular, claws 2–2.5 × ca. 0.25 mm; posterior lateral petals obovate, spreading, limb 4–6 × 4–6 mm, margin erose, eglandular, claws 1.5–2 × ca. 0.35 mm; posterior

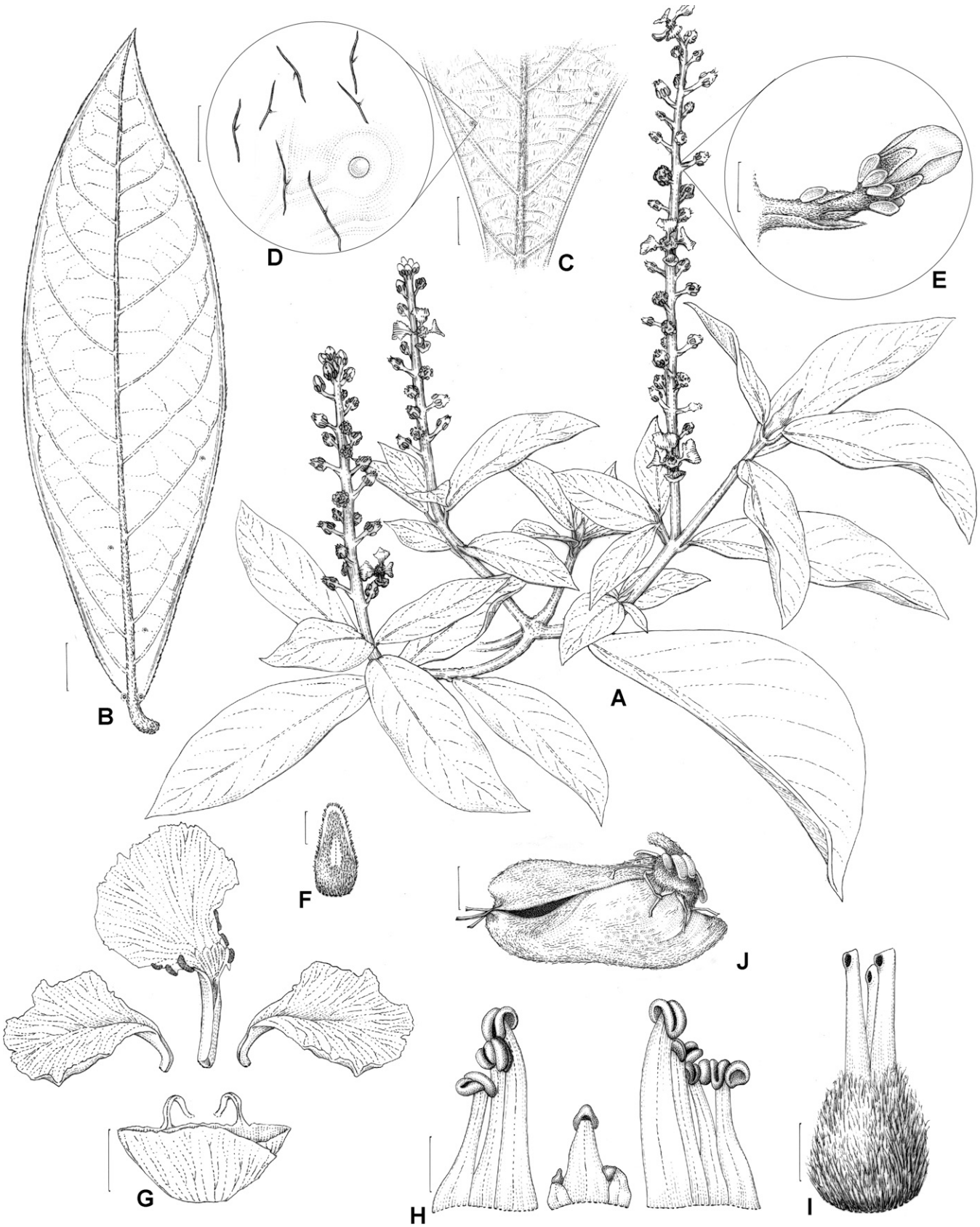




FIG. 1. *Mcvaughia sergipana*. A. Flowering branch. B. Abaxial surface of the lamina. C. Detail of the abaxial surface of the lamina. D. Detail of laminar glands and hairs. E. Lateral cincinnus general view. F. Detail of the anterior sepal showing the carina in the middle, abaxial surface. G. Petals, laid out, disposition at anthesis. H. Androecium, laid out, abaxial view, the stamen first from right opposite the anterior sepal, the stamen third from left opposite the posterior lateral petal. I. Gynoecium, posterior style in the middle, lateral view. J. Nut, lateral view. Scale bar: A–C: 1 cm, D: 0.5 mm, E, G, and H: 2 mm, F and I: 1 mm, J: 1.5 mm. Based on *A. M. Amorim et al. 8393*.

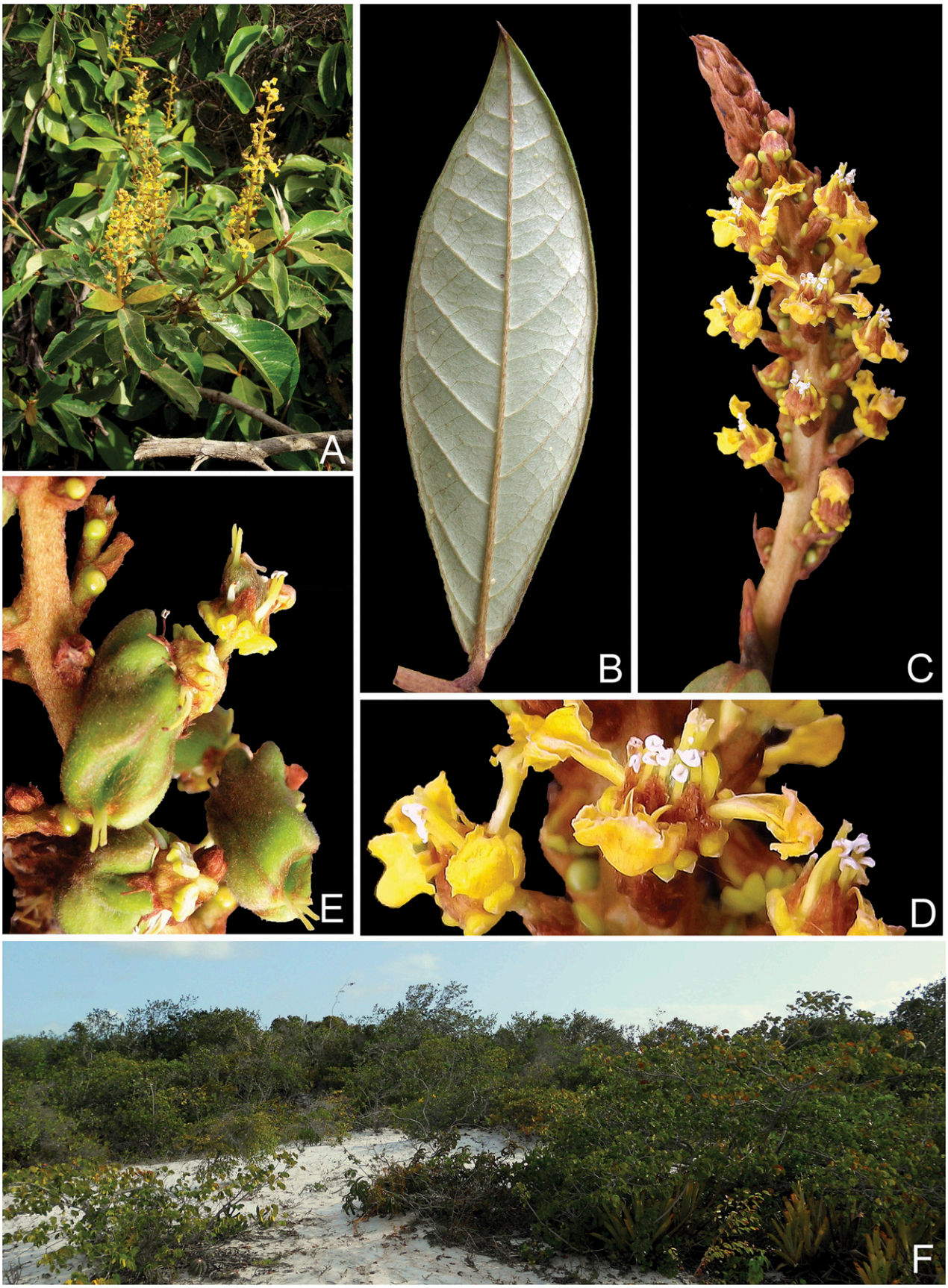




FIG. 2. *Mcvaughia sergipana*. A. Flowering branch. B. Leaf showing a metallic-sericeous surface. C. Inflorescence with buds and flowers at anthesis. D. Detail of flowers. E. Detail of old flowers and nuts. F. Habitat on a sandy coastal plain (*restinga* vegetation). Based on *A. M. Amorim et al. 8393*.

petal obovate to orbicular, suberect, erose, limb 4.5–8.5 × 6–7 mm, 2–3 pairs of reniform glands at the base of limb, proximal pair larger, claws 3.5–4 × ca. 0.5 mm. Stamens free at base, filaments 2.0–3.5 × 0.5–1.0 mm long., cylindrical, thicker at base, horse-shaped anthers, ca. 0.7–1.0 mm, glabrous; stamens opposite the posterior-lateral petals slightly curved towards the apex; stamens opposite the posterior-lateral sepals and the posterior petal reduced to staminodes; stamens opposite the posterior lateral sepals covered by sepals, filaments ca. 0.5–1.0 mm long, triangular, anthers aborted; stamen opposite the posterior petal not covered by sepals, exserted, pointing towards the posterior petal, filament 2.0–3.0 × ca. 1.0 mm long, triangular, anther 0.5–0.5 mm. Ovary 1.5–2 × 1–1.5 mm, ovoid, densely sericeous; styles 3, erect, ca. 2 × 0.5 mm, cylindrical, parallel, glabrous, anterior style slightly smaller than posterior ones; stigma lateral, circular. Nuts 7–9(–11) × 3.5–5.5 mm, green, cylindrical, slightly twisted, apex with persistent styles, base

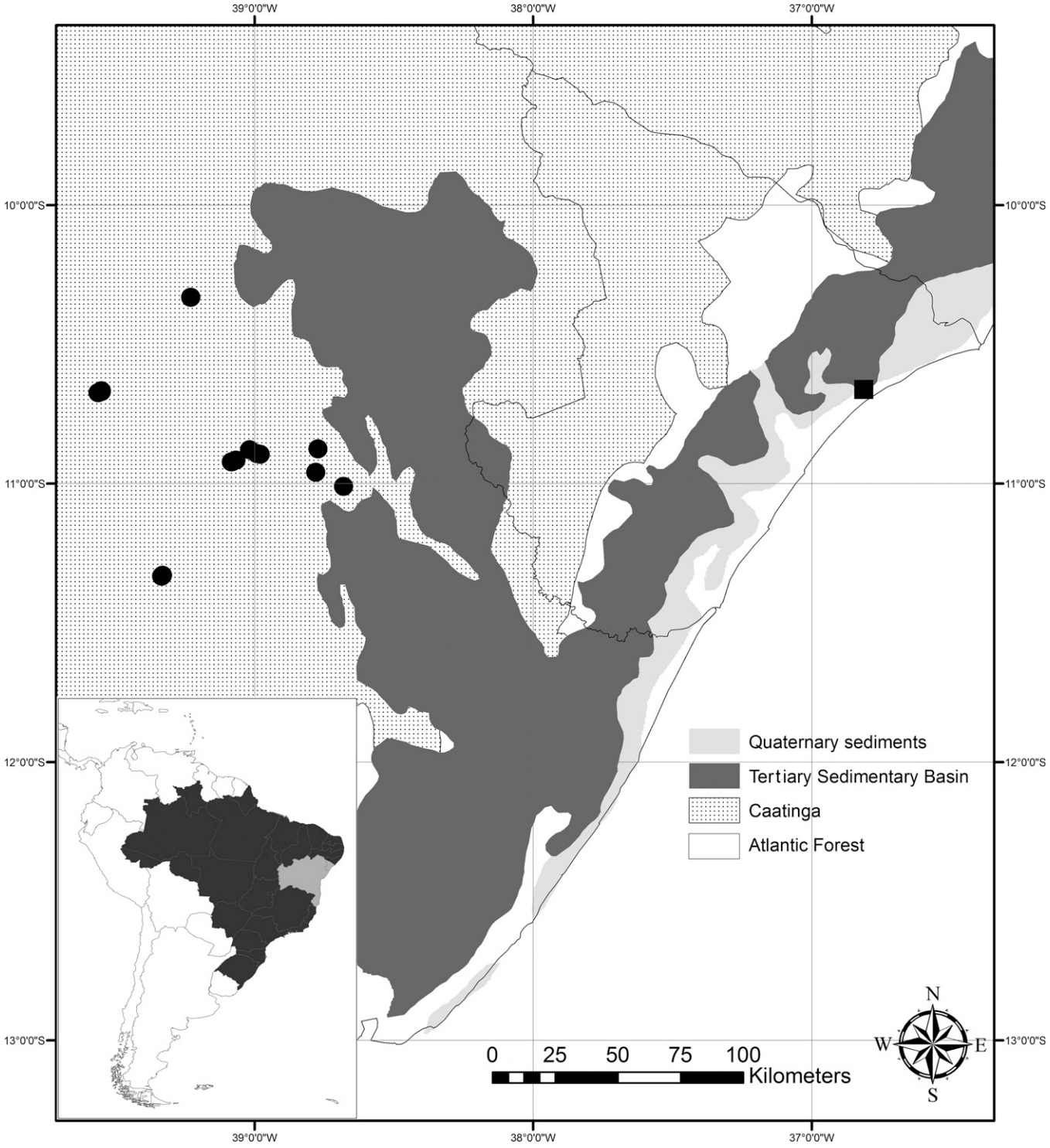


FIG. 3. Map of the geographic distributions of *Mcvaughia* species. The square shows *M. sergipana* and circles *M. bahiana*.

rugose when dried, sparsely sericeous, with brown hairs, with 2 chambers, proximal chamber containing the seed, distal chamber containing an oily substance; seed globose, rugose; embryo not seen. Figures 1, 2.

***Additional Specimens Examined***—BRAZIL. Sergipe: Mun. Pirambu, tabuleiros arenosos, 20 Dec 1978 (fl), *M. Fonseca*, without number (ASE 0671); caminho para Lagoa Redonda, restinga, 17 May 2011 (fl), *M. C. Santana et al. 911* (ASE); Lagoa Redonda, 1 Nov 2011 (fl), *E. A. Melo et al. 13* (ASE); ambiente de tabuleiro/restinga, 10°41′23″S, 36°49′08″W, 9 May 2013 (fl, fr), *G. M. A. Matos et al. 270* (ASE, CEPEC).

***Distribution and Habitat***—*Mcvaughia sergipana* appears to be endemic to sandy coastal plains (*restinga* vegetation) within the Atlantic Forest domain of Sergipe State, Brazil (Fig. 3).

***Conservation***—According to IUCN (2001) criteria, *Mcvaughia sergipana* is considered critically endangered (CR B1ab) as its distribution is restricted to an area of less than 100 $km^2$, to not more than one locality, and occurs in an extremely fragmented area.

***Phenology***—Plants were found in flower in May, October, and December; in fruit in May and October.

***Etymology***—The specific epithet refers to its occurrence in Sergipe State, Brazil.

***Taxonomy***—*Mcvaughia sergipana* can be distinguished from *M. bahiana* by the following combination of characters: leaves with petiole 0.7–1.2 cm long (vs. petiole 0.3–0.7 cm long), lamina 8.4–12 cm long (vs. lamina 4.5–8.5 cm long), abaxial surface with two pairs of glands near base and many impressed glands scattered throughout the lamina (vs. abaxial surface with two pairs of glands near base), abaxial surface initially densely metallic-sericeous and soon glabrescent (vs. abaxial surface densely tomentose or lanuginose with ferruginous indumentum, later glabrescent), lateral cincinni with 1–2 flowers (vs. lateral cincinni with 2–7 flowers), posterior petal 4.5–8.5 × 6–7 mm (vs. posterior petal ca. 3 × 4.5 mm), and ovary 1.5–2 mm tall (vs. ovary 1–1.3 mm tall). Additionally, the inflorescence of *M. sergipana* is longer, it has greater numbers of lateral cincinni, and its nuts are larger.

*Mcvaughia* appears to be restricted to sandy soils within the Tucano and Sergipe-Alagoas sedimentary basins, with a different species being endemic to each area occurring in distinct habitats (caatinga vs restinga). *Mcvaughia bahiana*, the only other known species of *Mcvaughia*, also occurs on sandy soils in the Tucano Sedimentary Basin. This area represents a conspicuous phytogeographic zone within the Caatinga vegetation domain, with a biota distinct from other Caatinga areas that grow over crystalline shield geological formations and holds endemics for some angiosperm families (Cardoso and Queiroz 2007) (Fig. 3).

*Mcvaughia* is a sister-group of *Burdachia* and *Glandonia* (*Mcvaughia clade*), both Amazonian lineages usually found growing along riversides throughout the Amazon Basin (*Burdachia* is also found in Guyana), with water-dispersed fruits (Davis and Anderson 2010). Davis et al. (2004, 2014) estimated 38.0–33.9 myr for the origin of the *Mcvaughia* clade, but 25–15 myr for the diversification of most of its current lineages. Numerous marine transgression events occurred along the Brazilian coast during this epoch (Oligo-Miocene boundary) (Rossetti et al. 2013) that may have had key roles in the evolutionary and biogeographical history of the *Mcvaughia clade*.

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