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Four endemic new species of *Manihot* (Euphorbiaceae) from the Brazilian Cerrado

Cuatro nuevas especies endémicas de *Manihot* (Euphobiaceae) del Cerrado Brasilero

Quatro novas espécies endémicas de *Manihot* (Euphobiaceae) do Cerrado Brasileiro

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ABSTRACT

A new contribution to taxonomy knowledge of the genus *Manihot* in the Cerrado biome is presented: M*anihot aecioi*, *M. marceloi*, *M. nayrae* and *M. reginae*, are described and illustrated as new species. These new discoveries are part of current botanical exploration, focused on the taxonomy and phylogeny of the genus in South America; and these new species are restricted to the state of Goiás. Notes on diagnostic morphological characteristics are provided and compared with closely related taxa and their ecology and natural distribution, plates of photographs of living plants highlighting differences between them.

Key words: Cerrado Biome, endemic, diversity center, taxonomy.

RESUMEN

Se presenta una nueva contribución al conocimiento taxonómico del género *Manihot* para el bioma Cerrado: *Manihot aecioi*, *M. marceloi*, *M. nayrae* y *M. reginae*; son descritas e ilustradas como nuevas especies. Estos nuevos descubrimientos son parte de las actuales exploraciones botánicas, enfocadas en la taxonomía y filogenia del género en Sudamérica, siendo estas novedades restrictas al estado de Goiás. Se proporcionan notas sobre las características morfológicas diagnósticas que discuten con especies más estrechamente relacionadas, y planchas fotográficas de plantas vivas que muestran diferencias resaltantes entre ellas.

Palabras clave: Bioma Cerrado, centro de diversidad, endémico, taxonomía.

RESUMO

Uma nova contribuição ao conhecimento taxonômico do gênero *Manihot* para o bioma Cerrado é apresentada: *Manihot aecioi*, *M. marceloi*, *M. nayrae* e *M. reginae*, são descritas e ilustradas como novas espécies. Estas novas descobertas são parte de atuais explorações botânicas, focadas na taxonomia e na filogenia do gênero na América do Sul, sendo restritas ao estado de Goiás. Notas sobre as características morfológicas diagnósticas são disponibilizadas em comparação com espécies mais estreitamente relacionadas; além disso, pranchas fotográficas de plantas vivas que destacam diferenças estre elas.

Palavras chave: Bioma Cerrado, centro de diversidade, endêmico, taxonomia.

INTRODUCIÓN

The Cerrado Biome despite being limited to Bolivia and Brazil, constitutes one of the most important centres of diversity and endemism for *Manihot*. From the work of Rogers & Appan (1973), where they recognized the Cerrado of Central Brazil as the primary centre of diversity for the genus. This peculiar biome continues to surprise us with the recent description of numerous new restricted and endemic species (e.g. Mendoza. 2014; Silva, 2015; Martins & Ledo, 2015; Mendoza *et al*., 2018). Taxonomic novelties have also have been found in: *Bonamia* (Convolvulaceae, Moreira *et al*., 2018); *Diplusodon* (Lythraceae, Cavalcanti, 2007); *Mimosa* (Leguminosae-Mimosoideae, Atahuachi *et al*., 2016; Simon *et al*., 2010); *Myrcia* (Myrtaceae, Villarroel *et al*., 2016). The number of new species described in the area suggests that the floristic inventory of Cerrado Biome is far from complete.

The present article aims to continue the study of the species of *Manihot* in the Chapada dos Veadeiros complex and adjacent areas. The Chapadas is a large zone with a mosaic of plateaus and mountains in northern Goiás, in the highlands of Central Brazil, and are formed by a heterogeneous landscape with different vegetation types (Mendoza *et al*., 2016). It is an area that is still botanically poorly-explored, but is a rich region in plant endemism (e.g. Cavalcanti, 2011; Mendoza *et al*., 2018; Moreira *et al*., 2019; Noblick & Lorenzi, 2010); as a new contribution to the knowledge of *Manihot* in Cerrado Biome of Brazil, four new species are described below.

MATERIALS AND METHODS

The new species here described are based in detailed examination of exsiccatae available in the follow herbaria: BR, CEN, CGMS, G, HB, HUEFS, IBGE, MG, K, LPB, MO, NY, R, RB, SP, UFG, UB, US, USZ and W (acronyms follow Thiers, continuously updated), complemented by several *in-situ* observations for each species, made between February 2013 and April 2018. Illustrative platers have been organized from images of live plants, highlighting salient features of each species, and each new species is compared with closely related ones.

TAXONOMIC TREATMENT

Manihot aecioi M.Mend., ***sp. nov.*** (Fig. 1).

Type: BRAZIL. **Goiás**: Mun. Alto Paraíso de Goiás, GO-239, ca. 28.5 km L. do trevo GO-118, sentido Nova Roma, 14°04′08″S, 47°19′18″W, 660 m, 5 Mar. 2015, *M. Mendoza, J.B.A. Bringel, T.S. Reis & A. Amaral-Santos 4834* (holotype: CEN-110860!; isotypes: K!, LPB!, NY!, RB!, UB!, USZ!).

Species nova affine Manihot inflexae M.Mend. & T.B. Cavalc. (2015: 13) sed inflorescentia racemosa, floribus masculis pedicellatis 1–3 mm longis (non spiciformibus, brevipedicellatis, <1 mm longis), bracteis 10–13 mm longis (non 3–5 mm longis), fructis globosis, sine costis (non subglobosis nec costatis).

Erect shrub, 40–60 cm with a single erect stem or rarely two arising from a woody base, the branching moderate and strictly in the upper part; branches 1–2 times, erect and dichotomous. Leaves not peltate, variable in size, the basal larger and the apical very reduced, petiolate, spirally alternate, glabrous on both surfaces, strongly inflexed and appearing falcate from the side, intense green adaxially and pale green abaxially; stipules caducous, linear-lanceolate, 6–7 mm long, the margin 2–3-dentate, attenuate apically, glabrous; petioles cylindrical, (5–)8–10(–13) cm long in basal leaves and (0.5–)1–2(–2.5) cm long in apical leaves; laminas membranous, base strongly cordate and overlapping, strictly 3-lobed, rarely with a 1–2-lobed leaf at inflorescence base; lobes strongly overlapping at sinus; central lobes orbicular or orbicular-obovate, the basal (6.5–)9–12 × (4–)6–8 cm, and apical (1.5–)2–4(–5) × (1.5–)2–3 cm, the margin entire, apex truncate and mucronate, glabrous; the primary veins prominent abaxially; the secondary veins evident on both faces; lateral lobes slightly reduced and asymmetric in the base. Inflorescences generally apical, reduced, 2–4(–5) cm long, formed by 2–3-racemes, all arising from the same point, rarely a small branch in the central axis; bracts and bracteoles persistent; bracts linear-lanceolate, 10–13 × 2–2.5 mm, the margin entire or rarely 2–3-dentate at apex, apex attenuate, glabrous; bracteoles reduced. Flowers briefly pedicellate, glabrous outside and with simple fine hairs inside, pale green to yellowish-green; pedicels 1–2(–3) mm long on staminate flowers, 4–6 mm long on pistillate flowers; staminate flowers tubular-campanulate, 7–8 × 5–6 mm, the tube 4–5 mm long, the tepal lobes slightly opening, 3–4 mm long, and apex acute; pistillate flowers opposite at base of lateral racemes, dialytepalous, open, 7–8 × 5–6 mm, the tepals slightly reflexed, apex acute; stigma formed by 3 styles

with junction area very reduced at the base, and apex papillose, cream to whitish. Capsule globose, 11–12 mm, bright green and glaucous; fine red lines replacing ribs. Immature seeds elliptic, 7–8 × 4–5 mm; caruncle strongly prominent, brief-triangular and apex acute.

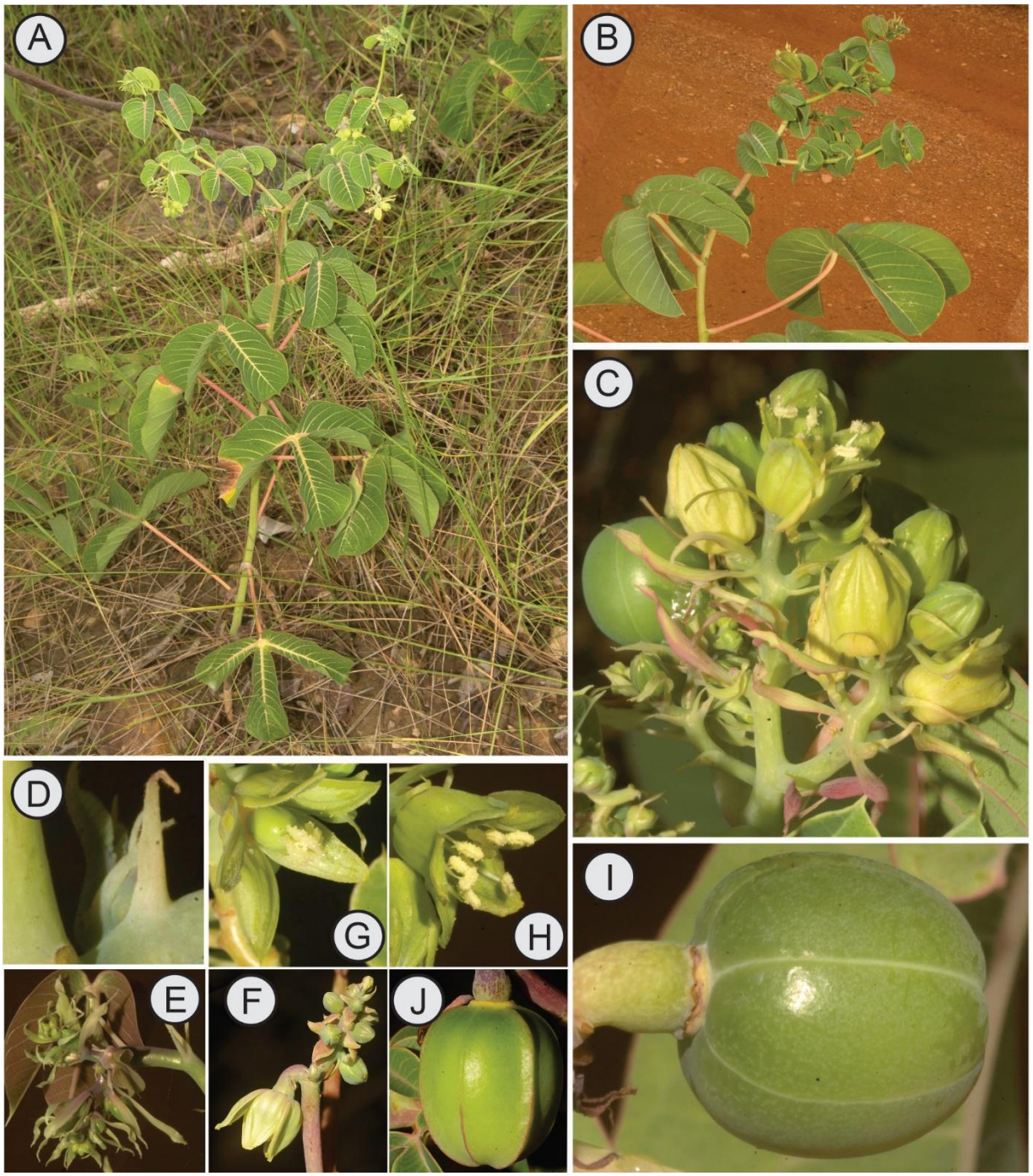

FIGURE 1. *Manihot aecioi***. A**. Plant habit, with a single erect stem and branches upper part. **B**. Fertile branch showing leaf variation. **C**. Inflorescence. **D**. Stipule. **E**. Detail of bracts and bracteoles. **G**. Female flower. **H**. Male flower. **I**. Globose fruit without ribs. *Manihot inflexa*. **F**. Detail of bracts and bracteoles. **J**. Subcylindrical fruits with reduced ribs. A, E, G, H from *Mendoza 4836*; B, C, D, I from *Mendoza 4834* (Type); F, J from *Mendoza 4285*. Fotos M. Mendoza.

Additional specimens examined (paratype): BRAZIL. **Goiás**: Mun. Alto Paraíso de Goiás, GO-239, ca. 31.4 km L do trevo GO-118, sentido Nova Roma, 14°05′02″S, 47°18′11″W, 335 m, 5 Mar. 2015, *M. Mendoza et al. 4836* (CEN, HUEFS, K, LPB, MG, MO, NY, RB, UB, USZ).

Distribution and ecology: Endemic to the Chapada dos Veadeiros area in Goiás state. This species so far is known only from two reduced and nearby populations in the vicinity of Alto Paraiso de Goiás city. It grows

in well-preserved fragments of Cerrado *sensu strictu*, or grassland on rocky slopes but with some shadow, in mountain areas, at elevations from 350 to 660 m.

Phenology: Collected in flower and fruits (immature) in March.

Etymology: This species is named after Aecio Amaral Santos, driver and very experimented experienced para-botanic from Embrapa/Cenargen, Brasilia; in recognition for his work and constant help in all field activities, during my Ph.D. studies in Brazil.

Discussion: *Manihot aecioi* is distinguished by its reduced size <0.6 m tall; stipules linear-lanceolate, 6–7 mm long with dentate margin; raceme inflorescence with longer linear-lanceolate bracts (10–13 mm long), pedicels of 1–3 mm long on staminate flowers and globose fruits without ribs. Morphologically it is most similar to *Manihot inflexa* M.Mend. & T.B. Cavalc. with which it shares 3-lobate like falcate leaves, basal leafs larger and the apical ones reduced; and pistillate flowers dialytepalous. *Manihot inflexa* differs from *M. aecioi* by its larger size 1–1.8 m; stipules setaceous, 1.5–2.5 mm long with entire margin; spiciform inflorescence with reduced triangular-lanceolate bracts (3–5 mm long), pedicels ≤1 mm long on staminate flowers and subcylindrical fruits with mildly prominent ribs.

Manihot marceloi M.Mend., ***sp. nov.*** (Fig. 2).

Type: BRAZIL. **Goiás**: Mun. Cavalcante, GO-241, ca. 13.5 km de Cavalcante na estrada para Serra do Tombador, e subindo como 30 m pela encosta, 13°41′27″S, 47°28′09″W, 1112 m, 30 Jan. 2015, *M. Mendoza, M. F. Simon, J. B. A. Bringel & T. K. M. Arquelão 4591* (holotype: CEN-110808!; isotypes:, HUEFS!, K!, LPB!, MO!, NY!, RB!, UB!, USZ!).

Species nova affinis Manihot quinquelobae Pohl (1827: 21) sed foliis virido-flavis, lobis acuminata instructis (non virido-glaucis, lobis truncatis et mucronatis), estipulis linear-lanceolatis, dentatis (non setactis, integris), inflorescentia breve 1.5–2.5 cm longa et floribus femineis dialytepalis (non >5 cm excedentibus nec gamotepalis).

Erect shrub, 0.8–1 m high, with 3–5 stems arising from a woody base, branching moderate and usually in the upper part; branches 1–2 times, erect and dichotomous. Leaves not peltate, petiolate, spirally alternate, glabrous on both surfaces, a lustrous pale green adaxially and green-glaucous abaxially (with reddish tinction in younger shoots); stipules quickly caducous, linear-lanceolate, 2–2.5 mm long, the margin slightly dentate, glabrous; petioles cylindrical, (1–)5–10(–15) cm long; laminas membranous, the base strongly cordate, rarely overlapping, 5-lobed and usually 3-lobed at inflorescence base; lobes not overlapping at sinus; central lobes elliptic to elliptic-obovate, (4–)7–9(–13) × (1.5–)3–5(–6.5) cm, the margin entire, apex acuminate, glabrous; the primary veins moderately prominent on both faces, the secondary veins evident on both faces; lateral lobes gradually reduced and asymmetric in the base. Inflorescences generally apical, reduced, 1.5–2(–2.5) cm long, formed by 2–3-racemes, all arising from the same point; bracts caducous and bracteoles not early caducous; bracts lanceolate, 3–4 × 1–1.5 mm, the margin entire and apex attenuate, fine and sparsely pubescent; bracteoles reduced. Flowers pedicellate, glabrous on outer surface and with simple hairs on inner surface, yellowish to pale green, usually with reddish tinge on externally; pedicels 3–4 mm long on staminate flowers, 4–5 mm long on pistillate flowers; staminate flowers tubular-campanulate, 7–8 × 5–6 mm, tube 4–5 mm long, the tepal lobes slightly open, 3–4 mm long, apex acute; pistillate flowers opposite at base of lateral racemes, dialytepalous, open, 6–7 × 4–5 mm, the tepals reflexed, apex acute; stigma formed by 3 styles with junction area reduced at the base and apex papillose, creme to yellowish-cream. Capsule subglobose, 13–14 × 12–13 mm, pale green to whitish; ribs moderately prominent. Seeds and caruncle not seen.

Additional specimens examined (paratype): BRAZIL. **Goiás**: Mun. Cavalcante, ca. 13.3 km de Cavalcante na estrada para Engenho Vão do Moleque, e subindo como 20 m pela encosta, 13°41′44″S, 47°28′15″W, 1085 m, 11 Feb. 2014, *M. Mendoza, T.S. Reis & A.A. Santos 4127* (CEN, NY, RB, USZ).

Distribution and ecology: This species is known so far only from Goiás state in Brazil. It is endemic to the Chapada dos Veadeiros region in the municipality of Cavalcante, where it grows in well-preserved areas of "Cerrado denso" vegetation in rocky outcrops of red sandstone, on moderate to strong slopes close to the top of the mountain, at ca., 1100 m elevation.

Phenology: Collected in flower on January and fruits (immature) on February.

Etymology: With pleasure I naming this species in honour to Marcelo Fragomeni Simon, botanical researcher from Embrapa/Cenargen, Brasília; in recognition of his visionary work in botanical research, also for his permanent help in field activities and technical orientations during all my post-graduate studies in Brazil.

Discussion: *Manihot marceloi* is distinguished by the lustrous pale green leaves, with apex of its lobes acuminate; stipules linear-lanceolate with dentate margin; reduced inflorescence with racemes of 1.5–2.5 cm long; and pistillate flowers dialytepalous. Morphologically it is most similar to *M. quinqueloba* Pohl with which it shares 5-lobate leaves; inflorescences formed by 2–3-raceme arising from the same point; staminate flowers pedicellate and fruits with moderately prominent ribs. *Manihot quinqueloba* differs from *M. marceloi* by its the glaucous green leaves, with apex of its lobes truncate but long-mucronate; stipules setaceous with entire margin; long racemose inflorescence >5 cm long, and pistillate flowers gamotepalous.

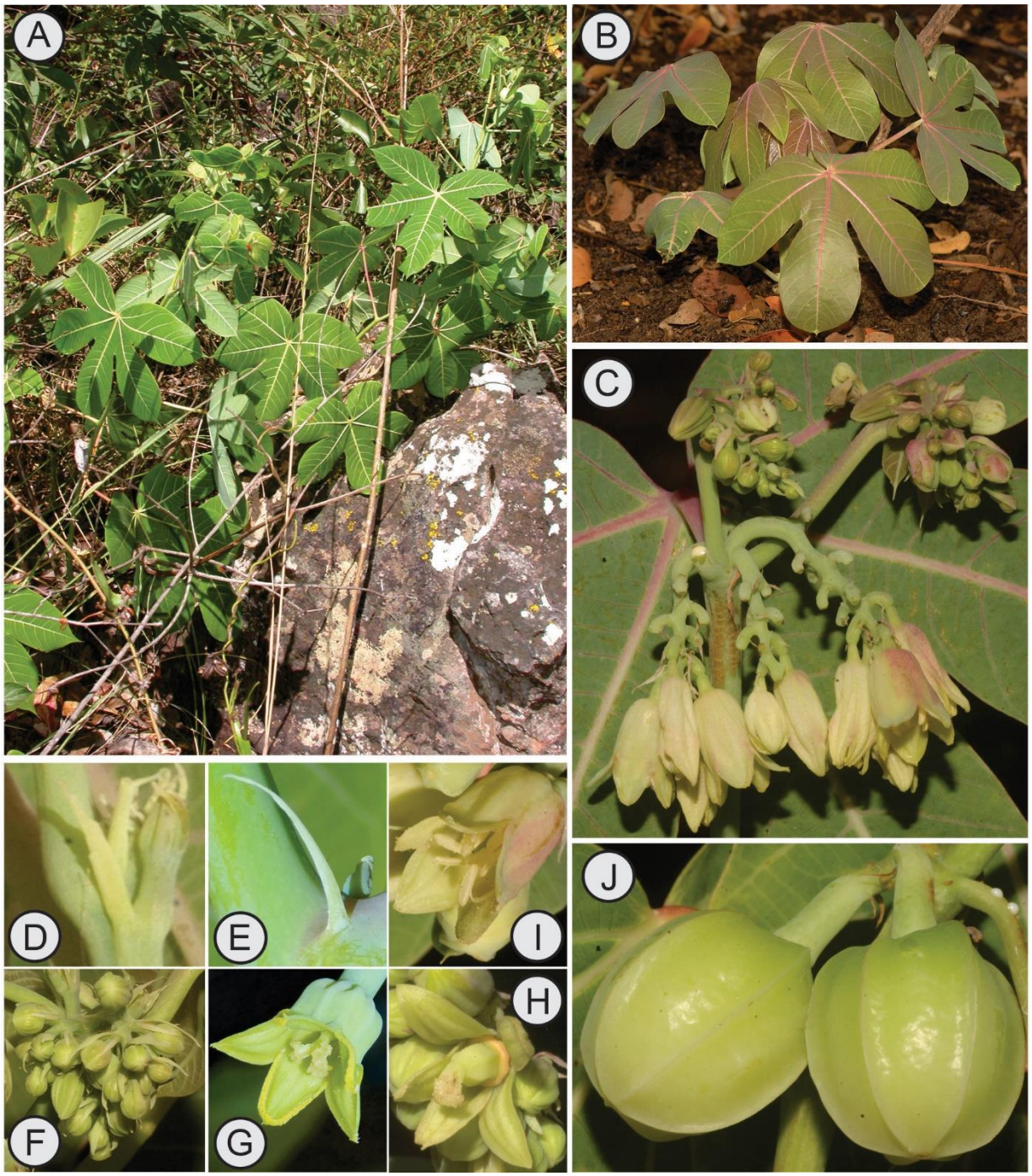

FIGURE 2. *Manihot marceloi***. A**. Plant habit. **B**. Sterile branch, with reddish tinction in younger shoots; **C**. Inflorescence. **D**. Stipule. **F**. Detail of bracts and bracteoles. **H**. Female flower. **I**. Male flower. **J**. Globose fruit with ribs. *Manihot quinqueloba*. **E**. Stipule with entire margin. **G**. Female flower. A, B, from *Mendoza 4127*; C, D, F, H–J from *Mendoza 4591* (Type); E, G from *Mendoza 5094*. Fotos M. Mendoza.

Manihot nayrae M.Mend., ***sp. nov.*** (Fig. 3).

Type: BRAZIL. **Goiás**: Mun. Cavalcante, ca. 9,3 km da praza central de Cavalcante, pela estrada para Colinas do Sul, 13°51′13″S, 47°29′34″W, 832 m, 3 Fev. 2015, *M. Mendoza, M. F. Simon, J. B. A. Bringel & T. K. M. Arquelão 4632* (holotype: CEN-110815!; isotypes: BR!, CGMS!, G!, HUEFS!, K!, LPB!, MO!, NY!, RB!, SP!, UB!, USZ!, W!).

Species nova affinis Manihot alutaceae D.J. Rogers & Appan (1973: 130) sed ab ea foliis basalis 5-lobatis et lobis basis evidenter superpositis (non 5–7-lobatis, lobis basis non superpositis), inflorescentia congesta, 2–6 cm longa (non laxa >15 cm longa), bracteis 1–1.5 mm longis (non >3 mm longis excedentibus), floribus 6–7 mm longis (non >10 mm longis) differt.

Erect shrub, 1–1.5 m high, with 3–5 stems arising from a woody base, the branching moderate and strictly in the upper part; branches 1–2 times, erect and 2- to 3-chotomous. Leaves not peltate, petiolate, spirally alternate, glabrous on both surfaces, a dark green adaxially and glaucous abaxially; stipules caducous, linear-lanceolate, 1.5–2 mm long, the margin entire, glabrous; petioles cylindrical, (1–)6–10(–18) cm long; laminas membranous, almost coriaceous when old, the base strongly cordate and clearly overlapping, 3–5-lobed, rarely a non-lobate leaf at inflorescence base; lobes not overlapping at sinus; central lobes elliptical to obovate, (2–)4–7(–14) × (1–)1.5–5(–7) cm, the margin entire, apex rotunde-mucronate or acute-mucronate in leaves near inflorescence, glabrous; the primary veins prominent both faces, the secondary veins evident on both faces; lateral lobes gradually reduced and asymmetric at their base. Inflorescences generally apical, reduced, (2–)3–4(–6) cm long, formed by one central panicle and 2–4 reduced lateral racemes, all arising from the same point; bracts and bracteoles quickly caducous; bracts narrowly triangular-lanceolate, 1–1.5 × 0.4–0.7 mm, the margin entire, apex acute, glabrous; bracteoles reduced. Flowers pedicellate, glabrous on outer surface and with simple and fine hairs on inner surface, yellowish to green-yellow, usually with reddish tinge externally; pedicels 1–4 mm long on staminate flowers, 6–7 mm long on pistillate flowers; staminate flowers subglobose-campanulate, 6–7 × 5–6 mm, tube 4–5 mm long, the tepal lobes slightly opening, 2–3 mm long, apex acute; pistillate flowers opposite at base of lateral racemes, dialytepalous, strongly opened, 6–7 × 4–5 mm, the tepals reflexed, apex obtuse; stigma formed by 3 styles with junction area very reduced at the base and the apex papillose, creme to yellowish-cream. Capsule subglobose, 11–14 × 10–12 mm, pale green; ribs obsolete, or with thinly prominent purple-tinged lines replacing the ribs. Seeds elliptic, 8–9 × 5–4.5 mm, grayish; caruncle moderately prominent, briefly triangular on dorsal side and reniform on ventral side, apex acute.

Additional specimens examined (paratype): BRAZIL. **Goiás**: Mun. Cavalcante, 0,8 km após Cavalcante, sentido Colinas do Sul, estrada de terra, 13°50′50″S, 47°29′11″W, 858 m, 5 Abr. 1995, *W.L. Werneck 450* (CEN); ca. 13,3 km da praza central de Cavalcante, pela estrada para Colinas do Sul, 13°50′46″S, 47°30′58″W, 665 m, 12 Nov. 2014, *M. Mendoza et al. 4394* (CEN); estrada de Cavalcantea Colinas de Goías, a 8,2 km a NW de Cavalcante, 13°45′S, 47°28′W, 860 m, 30 Mar. 1988, *I.R.S. Costa et al. 35* (CEN).

Distribution and ecology: Restricted to the state of Goiás, Brazil. This species is endemic to the Chapada dos Veadeiros area; it has been collected so far only from the municipality of Cavalcante, usually in the slopes with some rocky outcrops and white stony soil. Growing in well-preserved areas of cerrado rochoso mixture with campo sujo and cerrado *sensu strictu* fragments, in areas at the bottom of narrow valleys between high mountains, at elevations from 650 to 1320 m.

Phenology: It was collected in flower from December to January and fruit from February to April.

Etymology: I'm very happy to called this species in honour of Nayra Nascimento Bomfim Fernandes, a true friend who helped me in different ways from my first days in Brasilia: administrative, academic and logistic. This expression of thanks is also extended to her family for making me at home.

Discussion: *Manihot nayrae* is distinguished by its basal leaves always 5-lobed with base cordate and overlapping, giving a stellate appearance; inflorescence congested and reduced (2–6 cm long); smaller bracts, 1–1.5 mm long, and subglobose-campanulate staminal flowers, 6–7 mm long. *Manihot nayrae* is morphologically most similar to *M. alutacea* D.J. Rogers & Appan with which it shares a reddish coloration of the plants; leaves not peltate; pistillate flowers dialytepalous, and fruits subglobose with ribs mildly prominent. *Manihot alutacea* differs from *M. nayrae* by its basal leaves palmate 5–7-lobed with base cordate but not overlapping (plane) and without a stellate appearance; lax and longer inflorescence (>15 cm long); bracts, >3 mm long; and tubular-campanulate staminal flowers, >10 mm long.

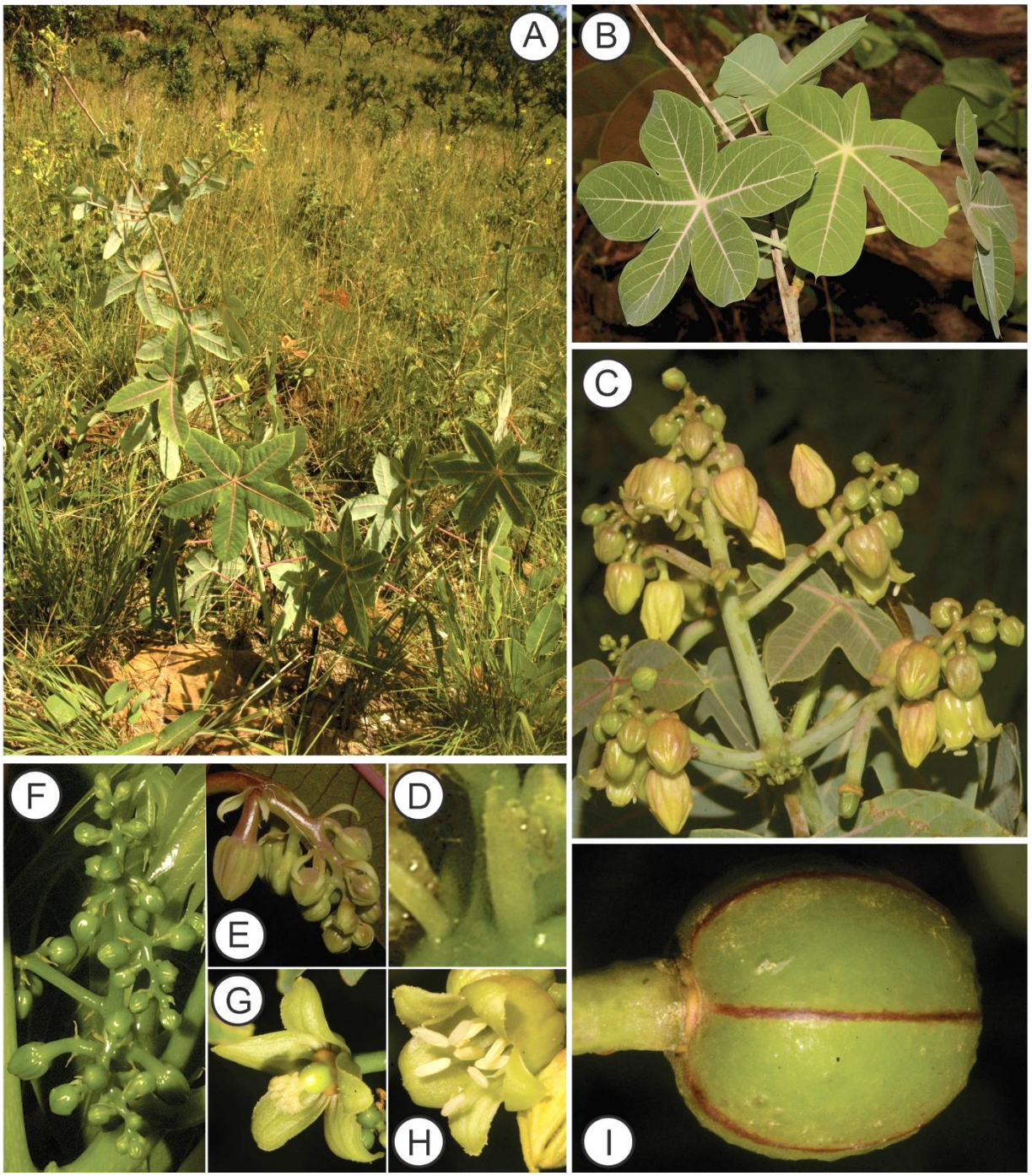

FIGURE 3. *Manihot nayrae***.** A. Plant habit. B. Sterile young branch, in regrowth. C. Inflorescence. D. Stipule. F. Detail of bracts and bracteoles. G. Female flower. H. Male flower. I. Subglobose fruit with obsolete ribs. Manihot *alutacea*. E. Detail of bracts and bracteoles. A, C, D, G – I from *Mendoza 4632* (Type); B, F, *from Mendoza 4394*; E from *Mendoza 4635*. Fotos M. Mendoza.

Manihot reginae M.Mend., ***sp. nov.*** (Fig. 4).

Type: BRAZIL. **Goiás**: Mun. Niquelândia, GO-237, ca. 8.8 km do trevo GO-132, sentido Moquén, 14°31′23″S, 48°09′03″W, 538 m, 4 Dez. 2015, *M. Mendoza, A.A. Santos & T.K.M. Arquelão 5097* (holotype: CEN-102521!; isotypes: IBGE!, K!, LPB!, NY!, RB!, USZ!).

Species nova affinis Manihot falcatae D.J. Rogers & Appan (1973: 125), sed inflorescentia spiciforme, floribus anguste campanulatis 6–7 mm longis, 2.5–3 mm lata, flavis vel virido-flavis (non inflorescentia racemosa, floribus subglobi-campanulatis >10mm longis, 5–6 mm lata excedentibus, purpurescentibus), floribus masculis sessilis (non pedicellatis, 1–2 mm longis), floribus femineis gamotepalis (non dialytepalis).

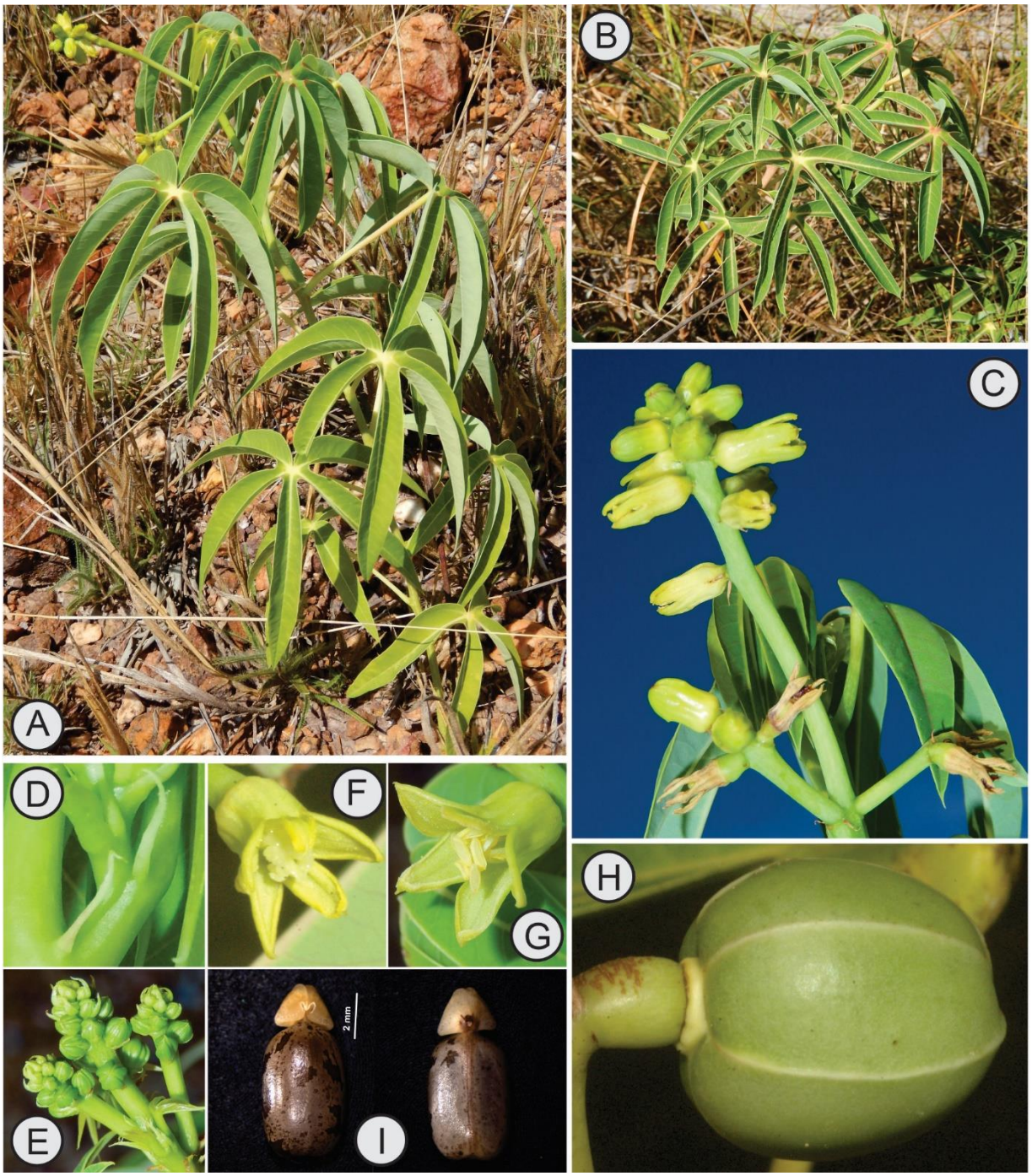

FIGURE 2. *Manihot reginae***. A**, **B**. Plant habit. **C**. Inflorescence. **D**. Stipule. **E**. Detail of bracts and bracteoles. **F**. Female flower. **G**. Male flower. **H**. Subglobose fruit with obsolete ribs. **I**. Seeds. A–E, G from *Mendoza 5097* (Type); F, H, I from *Mendoza 4810*. Fotos M. Mendoza.

Erect shrub, 25–50 cm high. Single erect stems or rarely two arising from a woody base, branching absent or at top if present; branches 1–2 times, erect and usually dichotomous. Leaves not peltate, petiolate, spirally alternate, glabrous on both surfaces, inflexed and falcate from the side, a bright yellowish green adaxially and glaucous abaxially; stipules quickly caducous, linear, 2–3 mm long, entire, apex attenuate, glabrous; petioles cylindrical, (3–)5–8(–10) cm long; laminas semi-membranaceous, almost coriaceous when old, the base cordate not overlapping, 5–7-lobed, rarely 3-lobate at inflorescence base; lobes lightly overlapping at sinus; central lobe sub-elliptic to linear-lanceolate, (3.5–)4–6(–9) × (1–)1.3–1.6(–1.8) cm, the margin entire, apex attenuate and apiculate, glabrous; the primary veins prominent abaxially; the secondary veins evident on both surfaces; lateral lobes gradually reduced and asymmetric in the base. Inflorescence usually apical, reduced, 3–4.5 cm long, formed by one central spike and two reduced lateral spikes, all arising from the same point; bracts

and bracteoles not early caduceus; bracts narrowly oval-lanceolate, 2–2.5 × 0.3–0.5 mm, the margin entire, apex acuminate-attenuate, glabrous; bracteoles reduced. Flowers sessile, glabrous on the outer surface and finely pubescent on inner surface, yellow or yellowish green, pale green when in bud; pedicels absent on staminate flowers, 2–3 mm long on pistillate flowers; staminate flowers narrowly tubular-campanulate, 6–7 × 2.–3 mm, the tube 3–4 mm long, the tepal lobes lightly reflexed, 3–4 mm long, apex acute to obtuse; pistillate flowers opposite at base of lateral racemes, gamotepalous, narrowly tubular-campanulate, 7–8 × 2.5–3 mm, tube 3.5–4 mm long, the tepal lobes smoothly reflexed, 3.5–4 mm long, the apex acute; stigma formed by 3 styles with junction area very reduced at the base, and apex papillose, white to yellowish. Capsule briefly conical, 1–1.1 × 0.9–1 cm, pale green; ribs hardly prominent. Seeds elliptic, 6.5–7 × 3.5–4 mm; caruncle strongly prominent, briefly triangular, apex acute.

Additional specimens examined (paratype): BRAZIL. **Goiás**: Mun. Niquelândia, ca. 4 km de Moquém, 14°31′14″S, 48°09′08″W, 495 m, 8 Mai. 1998, *M.L. Fonseca et al.1820* (IBGE); GO-237, ca. 8.5 km do trevo GO-132, sentido Moquén, 14°31′16″S, 48°09′07″W, 542 m, 4 Dez. 2015, *M. Mendoza et al. 5096* (CEN, K, LPB, MO, NY, SP, USZ); Moquén, ca. 6.6 km do centro, sentido Niquelândia, 14°31′15″S, 48°09′08″W, 547 m, 3 Mar. 2015, *M. Mendoza, A. A. Santos & T. S. Reis 4810* (CEN, IBGE, HUEFS, K, NY, RB, UB, USZ).

Distribution and ecology: An endemic species from Goiás state in Brazil. This species is known so far only from a reduced area in the vicinity of Moquén in the municipality of Niquelândia, where it inhabits slopes and close to the top of the mountains, on stony soil. Growing in preserved or moderately disturbed areas of "cerrado ralo" vegetation, with more appearance to campo sujo in mountain areas, at elevation of 490–550 m.

Phenology: It was collected in flowers on December and fruit from March to May.

Etymology: With real gratitude, I naming this species in honour to Regina Célia de Oliveira, my teacher in the Botany Postgraduate Program of the Universidade de Brasília. With this symbolic honour, I wish to thank you for helping me, both in academic and in field work, and may you continue to help and support students in the future.

Discussion: *Manihot reginae* is distinguished from others species in the genus by the presence of the stipules linear and entire; reduced spiciform inflorescence (3–4.5 cm long) with short and very narrowly tubular-campanulate flowers, 6–7 × 2–3 mm; staminate flowers sessile and pistillate gamotepalous, of yellow-greenish colour; and fruits briefly conical with hardly prominent ribs. *Manihot reginae* is morphologically most similar to *M. falcata* D.J. Rogers & Appan with which it shares the erect shrub habit, <50 cm tall; falcate leaves with narrow subelliptic to lanceolate lobes. *Manihot falcata* differs from *M. reginae* by its stipules linear-lanceolate and variably dentate; inflorescence in lax raceme (>5 cm long) with long and globose-campanulate flowers, 10–12 × 6–8 mm; staminate flowers pedicellate and pistillate dialytepalous, booth of purplish colour; and fruits subcylindrical without ribs.

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