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# Endemic Families of Madagascar. XIII. New, restricted range species of *Eremolaena* Baill. and *Schizolaena* Thouars (Sarcolaenaceae)

Porter P. Lowry II, Louis Nusbaumer, Armand Randrianasolo, George E. Schatz & Cynthia Hong-Wa

## Abstract

LOWRY II, P. P., L. NUSBAUMER, A. RANDRIANASOLO, G. E. SCHATZ & C. HONG-WA (2014). Endemic Families of Madagascar. XIII. New, restricted range species of *Eremolaena* Baill. and *Schizolaena* Thouars (Sarcolaenaceae). *Candollea* 69: 183-193. In English, French and English abstracts.

One new species of *Eremolaena* Baill. and two new species of *Schizolaena* Thouars (belonging to the family *Sarcolaenaceae*) are described, illustrated and compared with the members of their respective genera they most closely resemble. *Eremolaena darainensis* Nusb. & Lowry is similar to *Eremolaena rotundifolia* (F. Gérard) Danguy but differs from it by features of the indument on the leaves and the sepals, and occurs only in the Loky-Manambato (Daraina) region of far north-eastern Madagascar, where it occurs in semi-deciduous forest on granite. *Schizolaena charlotteae* Lowry & G. E. Schatz resembles *Schizolaena milleri* Lowry & al. but is distinguished by differences in sepal indument, petal color, the number of stamens, and the length of the processes borne on the involucre in fruit. *Schizolaena parvipetala* Randrian. & Hong-Wa is similar to *Schizolaena gereauii* Lowry & al. but differs by petal size, leaf acumen length, the number of stamens, and the number of flowers per involucre. Both new species of *Schizolaena* Thouars are only known from lowland humid forest in far south-eastern Madagascar, in the vicinity of the city of Tolagnaro. The distribution and ecology of each species are discussed and preliminary IUCN conservation assessments are provided.

## Key-words

SARCOLAENACEAE – *Eremolaena* – *Schizolaena* – Conservation – Madagascar – New species

## Résumé

LOWRY II, P. P., L. NUSBAUMER, A. RANDRIANASOLO, G. E. SCHATZ & C. HONG-WA (2014). Familles endémiques de Madagascar. XIII. Nouvelles espèces à répartition restreinte d'*Eremolaena* Baill. et de *Schizolaena* Thouars (Sarcolaenaceae). *Candollea* 69: 183-193. En anglais, résumé français et anglais.

Une nouvelle espèce du genre *Eremolaena* Baill. et deux nouvelles espèces de *Schizolaena* Thouars (appartenant à la famille des *Sarcolaenaceae*) sont décrites, illustrées et comparées avec les espèces auxquelles elles ressemblent le plus dans leur genre respectif. *Eremolaena darainensis* Nusb. & Lowry diffère de *Eremolaena rotundifolia* (F. Gérard) Danguy par les caractéristiques de pilosité de ses feuilles et de ses sépales et par sa distribution localisée à la région Loky-Manambato (Daraina), au NW de Madagascar, où elle se trouve dans des forêts semi-décidues sur granite. *Schizolaena charlotteae* Lowry & G. E. Schatz ressemble à *Schizolaena milleri* Lowry & al. mais s'en distingue par la pilosité de ses sépales, par la couleur de ses pétales, par le nombre d'étamines et par la longueur des excroissances portées sur son involucre fructifère. *Schizolaena parvipetala* Randrian. & Hong-Wa ressemble à *Schizolaena gereauii* Lowry & al. mais s'en distingue par la taille de ses pétales, par la longueur des acumens foliaires, par le nombre d'étamines et par le nombre de fleurs par involucre. Les deux nouvelles espèces de *Schizolaena* sont uniquement connues des forêts humides de basse altitude de l'extrême sud de Madagascar, à proximité de la ville de Tolagnaro. La distribution et l'écologie de chacune des espèces sont discutées et des statuts de conservation UICN préliminaires sont proposés.

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## Introduction

Over the last decade and a half each of the ten genera comprising Madagascar's largest endemic family, *Sarcolaenaceae*, has been the subject of a synoptic revision, which collectively provide an updated taxonomic treatment of the family, including the description of 29 new species (HONG-WA, 2009; LOWRY & al., 1999, 2000, 2002; RANDRIANASOLO & MILLER, 1994, 1999; SCHATZ & al., 2000, 2001). Moreover, two additional species of *Schizolaena* Thouars have since been described (LOWRY & RABEHEVITRA, 2006; RABEHEVITRA & LOWRY, 2009), largely based on material collected during recent botanical inventory work, bringing the total number of recognized species from the 33 treated in the "Flore de Madagascar et des Comores" (CAVACO, 1952) to a total of 74 (MADAGASCAR CATALOGUE, 2014). Further exploration, especially in areas that have previously received little or no attention, has continued to yield a wealth of new discoveries from throughout Madagascar. Here we describe three new, well-delimited species, one belonging to the genus *Eremolaena* Baill. occurring in semi-deciduous forests in the Loky-Manambato (Daraina) region of northeastern Madagascar, and two in *Schizolaena*, both of which are restricted to humid forests situated to the north of Tolagnaro in the extreme south-eastern portion of the island.

## Systematics

*Eremolaena darainensis* Nusb. & Lowry, **spec. nova** (Fig. 1, 2A-D).

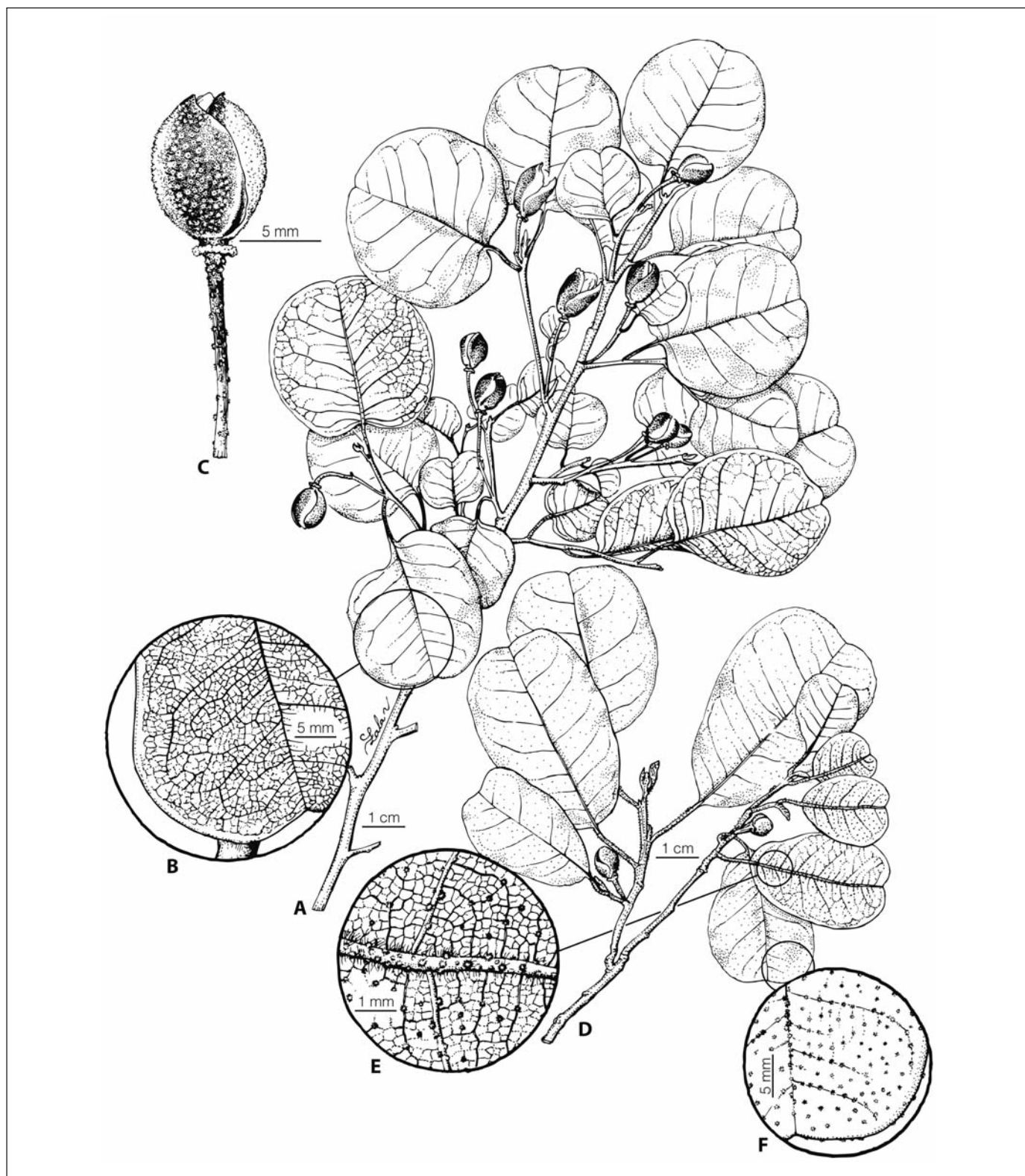
**Typus:** MADAGASCAR. Prov. Antsiranana: Région SAVA, sous-préfecture de Vohemar, commune rurale de Daraina, forêt de Bekaraoka, partie N, 13°07'06"S 49°42'34"E, 420 m, 17.I.2005, fl., Nusbaumer & Ranirison LN 1420 (holo-: G [G00019278]!; iso-: K!, MO!, P [P00722548]!, TEF!).

*Eremolaena darainensis* Nusb. & Lowry differs from *E. humblotiana* Baill. by its smaller leaves, its flowers born singly (vs. in pairs) and its shorter sepals, and from *E. rotundifolia* (F. Gérard) Danguy by its stellate-lanate indument adjacent to the primary vein on the abaxial surface of the leaf (vs. absent), its smaller and less dense strigose-stellate indument on the sepals, and its presence in semi-deciduous forest on granite (vs. littoral forest on sand)

Small trees 8-12 m, 10-20 cm DBH, branched. Branches gray brown to reddish, glabrescent, with grayish lenticels, bark smooth; twigs of current year flattened, reddish-brown pubescent with gray to whitish stellate-strigose scattered trichomes. Leaves ovate to obovate, green, slightly discoloured, whitish on abaxial surface (brown when dry), chartaceous, 30-55 × 25-43 mm, 1-1.4(-1.7) times as long as wide, with erect white stellate indument 0.4-0.8(-1.1) mm long on abaxial surface

adjacent to the primary vein, glabrous elsewhere, base subcordate to attenuate, margin flat in dry material, irregularly and weakly undulate when fresh, apex emarginate (rarely almost round), venation brochidodromous, with (5 or) 6 to 8 pairs of alternate to subopposite secondary veins, primary and secondary veins raised below, secondary and tertiary venation dark green, brown to purplish black in dry material, with sparse stellate-strigose indument on the venation of both surfaces and along the margin; *petiole* 8-17 mm long, with gray to whitish stellate-strigose indument, adaxially canaliculate; stipules triangular, 1.5-3 × 1-2 mm, canaliculate, brown, with white stellate-strigose indument, caducous. Flowers solitary, erect; pedicel green, brown-blackish when dry, 4-14(-16) mm long, with sparse to dense gray to whitish stellate-strigose indument, especially toward the apex; *bracts* foliose, 2-4(-5) × 1-2 mm, triangular, then 1.5 × 1 mm, covered with both dense white stellate-strigose and reddish-brown indument, caducous; flower subtended by a 3-lobed collar, the lobes 1.2 × 1.5 mm, with dense whitish stellate-strigose indument, giving it a whitish cast in fresh material; *sepals* 5, green, blackish when dry, entire, unequal, the 2 external ones smaller, triangular to deltoid, coriaceous, 1.5-3 × 1-2 mm, green, slightly purplish when fresh, the 3 internal ones imbricate, usually clockwise but sometimes counter-clockwise, ovate, asymmetrical, 9-14 × 6-9 mm, glabrous, coriaceous or membranaceous where overlapped by an adjacent sepal, with gray to whitish stellate-strigose indument (trichomes to 0.25-0.35 mm diam.) where overlapping an adjacent sepal, trichomes of the overlapping part less dense at anthesis on the left side than on the right side, such that the foliaceous part (blackish in dry material) is visible; *petals* 5, obovate, white, equal, usually overlapping counter-clockwise, sometimes clockwise, always in the opposite direction from the sepals, convoluted, sub-irregular, 19-22 × 8-10 mm, glabrous on both surfaces, apex rounded; extrastaminal disc cupuliform, 1 mm high, with an irregular margin; *stamens* ca. 90 to 110, filaments slender, white, 4-8 mm long, glabrous, anthers brown, 1-2 × 1 mm, introrse, anther sacs often oblique; pollen pale yellow; *ovary* spherical to shortly conical, with dense, cream to yellowish stellate-strigose indument (glabrous at the apex), 3-locular; *style* cylindrical, erect, pale yellow, 5-6 mm long, glabrous; *stigma* pale yellow, 3-lobed, 2 mm long, crateriform, margin distinctly undulate. Fruit unknown.

**Distribution and ecology.** – *Eremolaena darainensis* is restricted to the Bekaraoka and Ampondrabe forests in the Loky-Manambato (Daraina) region in north-eastern Madagascar (Fig. 3). Among the more than 54,000 individual plants documented during recent floristic inventory work and vegetation studies conducted in this area, only 39 were found of *E. darainensis* (NUSBAUMER & al., 2011), including just two fertile trees. *Eremolaena darainensis* is the northernmost member of the genus, separated by nearly 250 km from the closest known locality of



**Fig. 1.** – *Eremolaena darainensis* Nusb. & Lowry. **A.** Branch with buds and nearly open flowers; **B.** Detail of adaxial surface of leaf; **C.** Bud with pedicel; **D.** Branch with buds; **E.** Detail of abaxial surface of leaf; **F.** Detail of adaxial surface of leaf.

[**A-C:** Ranirison & Nusbaumer PR 936; **D-F:** Nusbaumer & Ranirison LN 1420] [Drawing: R. L. Andriamiarisoa]



**Fig. 2.** – Photographs of *Eremolaena darainensis* Nusb. & Lowry (**A-D**) and *Schizolaena charlotteae* Lowry & G. E. Schatz (**E**). **A.** Flower, from above (petals fallen); **B.** Detail of midvein on abaxial leaf surface showing long white stellate trichomes near the margin and small stellate-strigose indument on nerves; **C.** Flower, from side (2 petals remaining); **D.** Detail of abaxial surface of a sepal, with stellate-strigose indument on the overlapping part less dense on the left side than on the right side; **E.** Flower and buds with young involucres.

[**A-D:** Nusbaumer & Ranirison LN 1420; **E.** Randriatafika & al. 653] [Photos: **A-D:** L. Nusbaumer; **E:** P. Lowry].

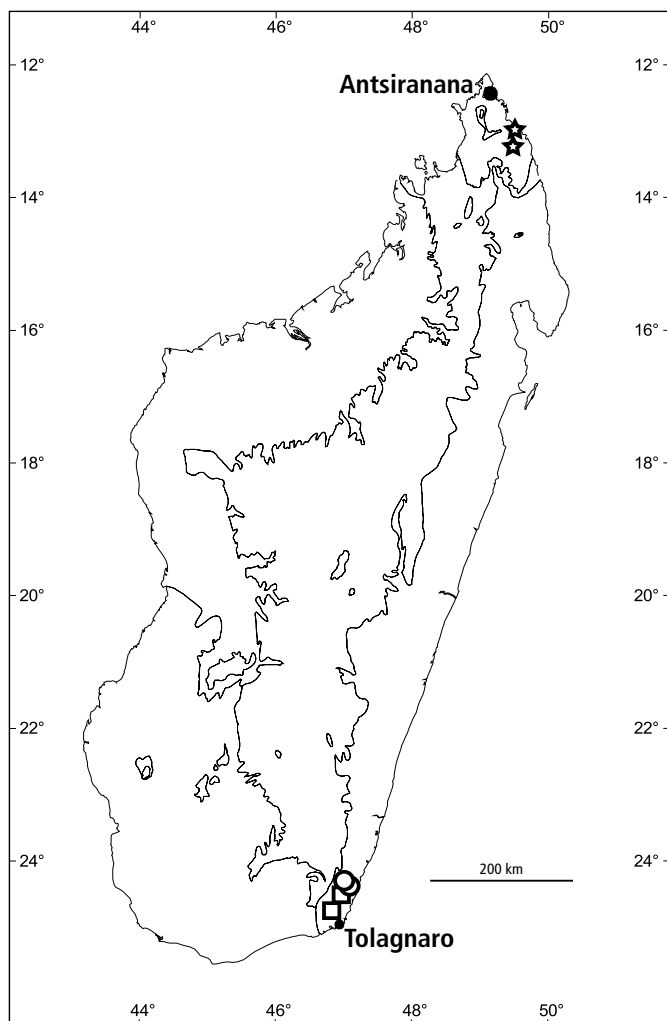


Fig. 3. – Geographic distribution of *Eremolaena darainensis* Nusb. & Lowry (stars), *Schizolaena charlotteae* Lowry & G. E. Schatz (circles) and *Schizolaena parvipetala* Randrian. & Hong-Wa (squares), mapped on the bioclimatic zones of Madagascar (after CORNET, 1974; see SCHATZ, 2000).

*E. rotundifolia* (F. Gérard) Danguy just north of Cap Est, and almost 350 km from the most northern population of *E. humblotiana* Baill. *Eremolaena darainensis* is only known from flowering material gathered in January and February; no fruiting collections have yet been made. It grows in semi-deciduous (transitional) forest with a dense canopy reaching to 7–12 m and a dense under-storey of shrubs. Our new species occurs at 250–550 m elevation and is usually found on fairly steep (20–40°) slopes in fine soil on rocky outcrops. The most abundant co-occurring species include, in decreasing order, *Euphorbia geroldii* Rauh (*Euphorbiaceae*), *Asteropeia amblyocarpa* Tul. (*Asteropeiaceae*), *Cleistanthus suarezensis* Leandri (*Phyllanthaceae*), and *Rinorea angustifolia* (Thouars) Baill. (*Violaceae*).

**Conservation status.** – *Eremolaena darainensis* is currently known from five subpopulations, all of which are encompassed within the Loky-Manambato forest, which has been accorded temporary protection by the Malagasy government as a “Station Forestière à usages Multiples” (SFUM, Multiple Use Forestry Station), which falls short of full protection, indicating that some continuing decline of the quality of the habitat can be projected. Therefore, with an Extent of Occurrence (EOO) of 81 km<sup>2</sup>, an Area of Occupancy (AOO) of 54 km<sup>2</sup>, and five locations (calculated following CALLMANDER & al., 2007), as well as estimated number of mature individuals (based on extrapolation of the inventory data) of less than 2,500, with none of the five subpopulations estimated to contain more than 250 mature individuals, *E. darainensis* can be assigned a risk of extinction of “Endangered” [EN B1ab(iii)+2ab(iii); C2a(i)] following the IUCN Red List Categories and Criteria (IUCN, 2012).

**Notes.** – Using the key to species of *Eremolaena* provided by LOWRY & al. (2000), material of this new species would be identified as *E. rotundifolia*. It can, however, be distinguished from the two other members of the genus by several foliar and floral features, as well as differences in substrate preferences and geographic distribution (Fig. 3). In order to facilitate identification of material of *Eremolaena*, the following updated key is provided.

#### Key to the species of *Eremolaena* Baill.

1. Leaves subcoriaceous, largest blades at least 9 cm long, secondary and tertiary venation distinctly raised on abaxial surface; sepals 15–19 mm long at anthesis; flowers borne in pairs, subtended by 5 small, scale-like involucral lobes; humid and subhumid forest on laterite, Betampona RNI and the area E of Zahamena NP, S to near Vatoman-dry ..... *E. humblotiana*
- 1a. Leaves chartaceous, largest blade not exceeding 5(–6) cm long, secondary and tertiary venation weakly raised on abaxial surface; sepals 9–14 mm long at anthesis; flowers borne singly, subtended by a very small, 3-lobed collar .... 2
2. Abaxial surface of leaves with erect stellate white trichomes 0.4–0.6(–1.1) mm long borne along the midvein, apex emarginate (rarely sub-rounded), base subcordate to attenuate; sepals with stellate-strigose trichomes to 0.25–0.35 mm in diam., abaxial portion overlapped by adjacent sepal with scattered stellate-strigose trichomes revealing the foliaceous surface (blackish in dry material); semi-deciduous forest on ridge crests, granite, Loky-Manambato (Daraina) region ..... *E. darainensis*

2a. Abaxial surface of leaves without white stellate trichomes along the midvein, apex usually rounded (rarely sub-emarginate), base attenuate; sepals with stellate-strigose trichomes to 0.35–0.5 mm in diam., abaxial portion overlapped by adjacent sepal totally covered with stellate-strigose indument at anthesis, obscuring the surface; littoral forest on sand, Masoala PN to Ft. Dauphin area ..... *E. rotundifolia*

*Paratypes.* – **MADAGASCAR. Prov. Antsiranana:** Région Sava, sous-préfecture de Vohemar, commune rurale de Daraina, forêt d'Ampondrabe, 12°57'07"S 49°41'36"E, 450 m, fl., 17.II.2005, *Ranirison & Nusbaumer* 936 (G [G00019280]!, K!, MO!, P [P00722550]!, TEF!).

*Schizolaena charlotteae* Lowry & G. E. Schatz, **spec. nova** (Fig. 2E, 4).

**Typus:** **MADAGASCAR. Prov. Toliara:** Région Anosy, Bemangidy, Commune Iabokoho, Fokontany Antsotso, Ivohibe forest, 24°34'10"S 47°12'37"E, 41 m, 24.V.2006, fr., *Antilahimena* 4876 (holo-: MO-6564308!; iso-: G!, K!, P [P00722627]!, TAN!, WAG!).

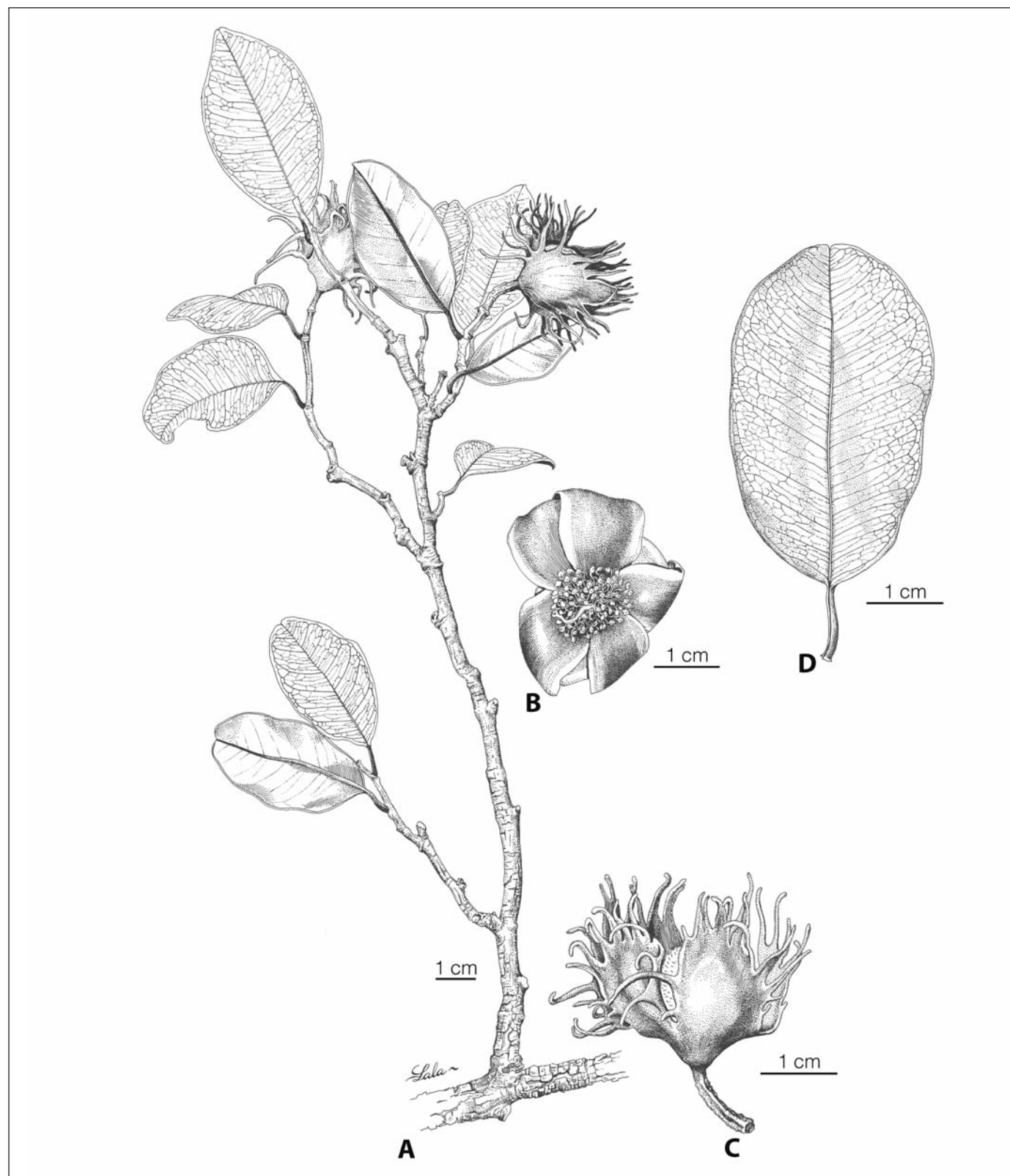
*Schizolaena charlotteae* Lowry & G. E. Schatz differs from its most similar congener, *S. milleri* Lowry & al., by its sparse grayish stellate indument obscuring the dark outer surface of the sepals beneath (vs. dense whitish stellate indument not obscuring the sepal surface), large petals 10–14 mm long that are bright pinkish red grading to yellow toward the margins (vs. 7–8 mm long and white), 90 to 100 stamens (vs. ca. 265), and an involucre in fruit with processes that are 10–16 mm long and 1 mm wide below the apex (vs. 3–9 mm long and 0.2–0.5 mm wide).

*Shrubs to trees* 2–15 m tall. *Twigs* glabrous or sparsely hispidulose, with small, elongate lenticels. *Leaves* elliptic to slightly ovate or obovate, chocolate brown above (in dry material), lighter and more orangish below, subcoriaceous, (3–)4–7.5 × (1.2–)1.5–3 cm, glabrous on both surfaces, base broadly cuneate to rounded, margin entire, minutely thickened, slightly revolute, apex acute to nearly rounded, sometimes slightly retuse, venation brochidodromous, with 6 to 9 pairs of alternate to subopposite, weakly raised secondary veins joined by rounded arches, midrib plane above, raised below; *petiole* 6–9 mm long, glabrous or with scattered stellate indumentum; stipules narrowly ovate to ovate, membranous, with nearly obscure parallel venation, 10–12 × 5–7 mm, base rounded, apex acute, caducous, leaving a small scar. *Inflorescence* comprising 1 or 2 (rarely 3) unbranched axes, each with a pair of bracts borne near the middle and bearing 1 or 2 terminal flowers, axis ca. 10 mm in bud, expanding to 20–22 mm at anthesis, moderately to densely papillose stellate-strigose, *bracts* broadly elliptic to nearly circular, 4 × 3–4 mm, apex rounded, minutely stellate on abaxial surface, pubescent on adaxial surface, caducous, ultimate axes below the involucre 6–10 mm long,

moderately papillose stellate, *involucre* in flower broadly cupuliform, with numerous cylindrical to narrowly triangular teeth, moderately to densely papillose stellate on both surfaces, containing 1 or 2 sessile flowers; *sepals* 3, imbricate, broadly ovate, adaxially concave, 9–10 × 6 mm at anthesis, with short stellate-papillose indumentum on the exposed part of the abaxial surface, the portion hidden by the overlapping adjacent sepal with both papillose stellate and short lanate indumentum, margins entire, the hidden portion tinged deep pinkish-red, apex rounded to acute; *petals* 5, obovate, bright pinkish red, yellow toward the margins, slightly succulent in fresh material, chartaceous when dry, 10–14 × 6–8 mm, with dense, appressed sericeous indument in the central portion of the abaxial surface, glabrous toward the entire margins, glabrous on the adaxial surface, apex rounded to broadly acute; *stamens* ca. 90–100, filaments slender, ca. 4 mm long, glabrous, anthers elliptic to nearly circular, 0.8 mm long, introrse, dehiscent through longitudinal slits; *ovary* broadly conical, densely white woolly tomentose, 3-locular; *style* cylindrical, erect, ca. 9 mm long, *stigma* terminal, minutely 3-lobed, glabrous. *Fruit* subglobose, ca. 15 mm in diam., with dense stellate indumentum, most trichomes with the central branch much longer than the others, capsule dehiscent by 3 longitudinal sutures, exocarp cartilaginous, rugose, dry sepals and filaments persistent; *involucre* expanded, broadly cupulate, fleshy and sticky, green in nearly mature fresh material, ca. 25 × 20 mm, sparsely stellate pubescent to glabrous on both surfaces, with 5 broadly ovate, nearly equal lobes divided ca. 1/2 of the way to the base, each lobe with 7 to 10 narrowly triangular to lanceolate or cylindrical, occasionally bifid processes, each 7–16 mm long, ca. 1 mm wide just below the apex; *seeds* 1 per locule.

*Distribution and ecology.* – *Schizolaena charlotteae* is known only from lowland humid forest at Bemangidy-Ivohibe, situated just a few km to the west of the village of Antsotso in the Tsitongambarika New Protected Area, which encompasses much of the Vohimena range to the north of Tolagnaro (Fig. 3).

*Conservation status.* – The sole forest (Bemangidy-Ivohibe) from which *Schizolaena charlotteae* is currently known has temporary protection status as part of the larger Tsitongambarika New Protected Area. However, until permanent protection has been established, the forest is still potentially subject to local disturbance and illicit exploitation, especially along its eastern edge where *S. charlotteae* has been collected. Therefore, with a very restricted AOO of ca. 20 km<sup>2</sup> and only a single location, coupled with the possibility for rapid decline due to the effects of human activities if protection of the Bemangidy-Ivohibe forest is not maintained, *S. charlotteae* can be assigned a risk of extinction of “Vulnerable” [VU D2] following IUCN Red List Categories and Criteria (IUCN, 2012).



**Fig. 4.** – *Schizolaena charlotteae* Lowry & G. E. Schatz. **A.** Branch with fruiting involucre; **B.** Flower (from above); **C.** Involucre surrounding mature fruit; **D.** Detail of leaf; [**A-B, D:** Antilahimena 4786; **C:** Randriatafika & al. 653] [Drawing: R. L. Andriamiarisoa]

*Notes.* – *Schizolaena charlotteae* is part of a morphologically coherent group of species that also includes *S. laurina* Baill., *S. milleri* Lowry & al. and *S. rosea* Thouars, characterized by several features including: glabrous petioles and young branches; dense, straight, appressed indumentum on the abaxial surface of the petals; ovate and usually persistent stipules and inflorescence bracts; and an involucre in fruit that is broadly to narrowly cupuliform or funnelform. Indeed, one of the collections of our new species, *Service Forestier 28662*, was originally assigned by LOWRY & al. (1999) to *S. milleri*, known otherwise only from littoral forest on white sand and low elevation humid forest on laterite, from near the village of Ambavala (north of Sambava) extending south to Foulpointe, fully 800 km to the north of the only known locality of *S. charlotteae*.

Using the key to species of *Schizolaena* provided by LOWRY & al. (1999), material of this new species would be identified as *S. milleri*. However, it differs in several features of the flower and fruiting involucre, as indicated below in Table 1. Specimens of *Service Forestier 28662* at P were originally annotated as ‘*S. delphinensis*’ by J.-F. Leroy, but the name was never validly published.

The Bemangidy-Ivohibe forest has been the focus of intensive botanical inventory conducted over the last decade by teams from the Missouri Botanical Garden and the Rio Tinto-QMM mining company in order to assess its suitability as a conservation offset site (BIRDLIFE INTERNATIONAL, 2011 ; TEMPLE & al. 2012). Dozens of new taxa have been documented from Bemangidy-Ivohibe, some of which have already been described, including new genera of *Sapotaceae*, *Bemangidia* L. Gaut. (GAUTIER & al., 2013) and *Asteraceae*, *Lowryanthus* Pruski (PRUSKI, 2014) and new species in several families such as *Gnidia razakamalalana* Z. S. Rogers (*Thymelaeaceae*; ROGERS, 2006), *Ivodea anosiensis* Rabarim. & al. and *I. macrocarpa* Rabarim. & al. (*Rutaceae*; RABARIMANARIVO & al., in press), and *Micronychia bemangidiensis* Randrian. & Lowry (*Anacardiaceae*; RANDRIANASOLO & LOWRY, 2009).

*Etymology.* – This species is named in honor of our friend and colleague Professor Charlotte Rajeriarson, recently retired from the Université d’Antananarivo, who has played a key role in training an entire generation of Malagasy botanists, and who served as the first President of the IUCN Madagascar Plant Specialist Group, helping to ensure the successful establishment of this important national initiative.

*Paratypes.* – **MADAGASCAR. Prov. Toliara:** Région Anosy, Tsitongambarika, Commune Iabokoho, Fokontany Antsotso, forêt dense humide d’Ivohibe, 24°34’S 47°11’E, 5.IV.2008, fl., *Ramison & al. 581* (G, MO-6564309, P [P00722628], TEF); *ibid. loc.*, 24°34’04’’S 47°12’37’’E, 90 m, 9.II.2006, fl., *Randriatafika & al. 653* (MO, P [P00722633], TEF); Forêt de Bemangidy, entre les fleuves Vatomena et Manambato, au N de Ft. Dauphin, [24°34’S 47°12’E], 14.XII.1968, fl., *Service Forestier 28662* (MO-5189144, P [P00490165, P00490166]).

*Schizolaena parvipetala* Randrian. & Hong-Wa, **spec. nova** (Fig. 5).

**Typus:** **MADAGASCAR. Prov. Toliara:** Région Anosy, Tolagnaro, Iabokoho, Antsotso, TKG 42, forêt de Bemangidy, 24°35’17’’S 47°08’42’’E, 28 m, [2008], fl., *Randriatafika 877* (holo-: MO-6564307!; iso-: G!, K!, MO-6406252!, P [P00722634]!, TEF!).

*Schizolaena parvipetala* Randrian. & Hong-Wa differs from its most similar congener, *S. gereau* Lowry & al., by its ovate to elliptic leaves (vs. elliptic to slightly obovate) with an acumen (5-)7-14 mm long (vs. 3-6(-12) mm), the presence of two flowers per involucre (vs. one), smaller petals measuring 4-6 × 1.8-2 mm (vs. 10-14 × 7-8 mm), 30 to 40 stamens (vs. 100 to 120) with the filaments 3-3.5 mm long (vs. ca. 1.5 mm), and styles ca. 3.5 mm long (vs. ca. 2 mm).

*Shrubs* to small *trees* 2-6 m tall. *Twigs* glabrous to sometimes sparsely pubescent, with small, roundish lenticels. *Leaves* ovate to elliptic, medium brown above, light brown below (in dry material), chartaceous, 2-6 × 1.2-2.4 cm, glabrous on both surfaces, base rounded to truncate, margin entire, minutely thickened,

**Table 1.** – Characters distinguishing *Schizolaena charlotteae* Lowry & G.E. Schatz from *S. milleri* Lowry & al.

|   | <i>S. charlotteae</i>  | <i>S. milleri</i>  |
|---|--|--|
| <b>Sepals (outer surface)</b>               | with sparse grayish stellate indument not obscuring the dark surface beneath | with dense whitish stellate indument obscuring the surface beneath |
| <b>Petals</b>                               | bright pinkish red, yellow toward the margins, 10-14 mm long                 | white, 7-8 mm long   |
| <b>Number of stamens</b>                    | 90 to 100  | ca. 265  |
| <b>Involucre in fruit:</b>                  |  |  |
| length of longest process [mm]              | 10-16  | 3-9  |
| width of processes ca. 1 mm below apex [mm] | 1.0  | 0.2-0.5  |



**Fig. 5.** – *Schizolaena parvipetala* Randrian. & Hong-Wa **A.** Branch with flowers; **B.** Detail of leaf; **C.** Peduncle with 2 flowers subtended by undeveloped involucre. [Randriatafika 877] [Drawing: R. L. Andriamiarisoa]

slightly revolute and undulate, apex acuminate, acumen (5-)7-14 mm long, venation brochidodromous, with 8-12 pairs of alternate to subopposite, abaxially slightly raised secondary veins joined by depressed-rounded arches, midrib slightly canaliculate above, raised below; *petiole* 3-5 mm long, glabrous to sparsely stellate-strigose; stipules 2, united at their base, brownish when dry, lanceolate, 2-3.5 × 1-1.5 mm, membranaceous, somewhat triplinerved, glabrous on adaxial surface, stellate on abaxial surface, base truncate, margin entire, apex acute to rounded, caducous, leaving a small scar. *Inflorescences* axillary, 2-4-flowered, with 1 or 2 unbranched axes, each with a pair of basally connate bracts borne in the middle and bearing 2 terminal flowers, axes 2-3 mm long in bud, reaching 8 mm long at anthesis, densely short stellate, *bracts* brownish, widely ovate, 1 × 1.2 mm, base truncate, glabrous on adaxial surface, densely stellate on abaxial surface, membranaceous, caducous, leaving a rimmed scar, margin entire, apex rounded, ultimate axes below the involucre 1.5-4.5 mm long, densely stellate, *involucre* in flower a shallowly 5-lobed rim, densely papillose stellate on both surfaces, subtending 2 sessile flowers, lobes minutely crenate; *sepals* 3, imbricate, broadly ovate, adaxially concave, 3-4 × 2.5-2.8 mm at anthesis, glabrous on adaxial surface, densely stellate on the exposed part of the abaxial surface, the portion hidden by the overlapping adjacent sepal glabrous and darker-colored, base truncate, margin entire, apex acute to rounded, occasionally shallowly bifid; *petals* 5, white, oblong, chartaceous (in dry material), 4-6 × 1.8-2 mm, glabrous on both surfaces, base truncate, margin entire, apex rounded, caducous; disc cupuliform, denticulate, 0.8-1 mm long; *stamens* 30 to 40, filaments slender, often contorted in dry material, 3-3.5 mm long, glabrous, anthers ovoid to subglobose, 0.3-0.4 mm long, introrse, dehiscent through longitudinal slits; *ovary* ovoid to subglobose, 1.5-2.5 × 2 mm, densely white tomentose, 3-locular, *style* cylindrical, contorted in dry material, ca. 3.5 mm long, *stigma* terminal, truncate to slightly 3-lobed, glabrous. *Fruit* unknown.

*Distribution and Ecology.* – *Schizolaena parvipetala*, like *S. charlotteae* described above, appears to be restricted to lowland humid forest of southeastern Madagascar, where it has been recorded to the W of Mahatalaky and at Bemangidy-Ivohibe in the Tsitongambarika New Protected Area, respectively ca. 20 and 55 km N of Tolagnaro (Fig. 3).

*Conservation status.* – *Schizolaena parvipetala* is known from only two localities, one of which (Bemangidy-Ivohibe) currently has temporary protection (but see the assessment of *Schizolaena charlotteae* above) while the other (W of Mahatalaky) lacks any protection. Therefore, with an AOO of ca. 20 km<sup>2</sup> and projected continuing decline as a result of forest conversion and degradation at the second location, *S. parvipetala* can be assigned a risk of extinction of “Endangered” [EN B2ab(ii,iii,iv,v)] following IUCN Red List Categories and Criteria (IUCN, 2012).

*Notes.* As its name suggests, *Schizolaena parvipetala* stands out by having the smallest flowers of any member of the genus. It closely resembles *S. gereau*, which also occurs in south-eastern Madagascar, and specimens would be identified as that species using the key provided by LOWRY & al. (1999). However, *S. parvipetala* differs by several foliar and floral characters, as summarized in Table 2.

*Paratypes.* – MADAGASCAR. **Prov. Toliara:** Région Anosy, Tolagnaro, Iabokoho, Antsotso, TKG 42, forêt de Bemangidy, 24°35'17"S 47°08'42"E, 28 m, s.d., fl., *Randriatafika* 876 (MO-6407630, P [P00722635], TAN); Mahatalaky, Farafara Vatambe, forêt humide de basse altitude de Farafara Andohavolo située au S du village de Farafara, 24°51'05"S 47°00'07"E, 179 m, 19.II.2009, fr., *Rakotova* 4343 (G!, K!, MO-6404251, P [P00722636], TAN, WAG!).

**Table 2.** – Characters distinguishing *Schizolaena parvipetala* Randrian. & Hong-Wa from *S. gereau* Lowry & al.

|                                 | <i>S. parvipetala</i> | <i>S. gereau</i>             |
|---------------------------------|-----------------------|------------------------------|
| Leaf blade shape                | ovate to elliptic     | elliptic to slightly obovate |
| Leaf acumen length [mm]         | (5-)7-14              | 3-6(-12)                     |
| Number of flowers per involucre | 2                     | 1                            |
| Petal size [mm]                 | 4-6 × 1.8-2.0         | 10-14 × 7-8                  |
| Number of stamens               | 30 to 40              | 100 to 120                   |
| Filament length [mm]            | 3.0-3.5               | ca. 1.5                      |
| Style length [mm]               | ca. 3.5               | ca. 2.0                      |

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