adansonia

2019 • 41 • 4

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art. 41 (4) — Published on 8 April 2019
www.adansonia.com

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PUBLICATIONS SCIENTIFIQUES

Couverture / *Cover* :
P. gracilipes O.Lachenaud & Ntore, sp. nov., from *Lachenaud et al. 1981*, seed in SEM.

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CP 41 – 57 rue Cuvier F-75231 Paris cedex 05 (France)
Tél. : 33 (0)1 40 79 48 05 / Fax : 33 (0)1 40 79 38 40
diff.pub@mnhn.fr / http://sciencepress.mnhn.fr

ISSN (imprimé / *print*) : 1280-8571/ ISSN (électronique / *electronic*) : 1639-4798

Two new species and a new combination in the genus *Pauridiantha* Hook.f. (Rubiaceae) from tropical Africa

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Submitted on 12 April 2018 | accepted on 25 October 2018 | published on 8 April 2019

Ntore S. & Lachenaud O. 2019. — Two new species and a new combination in the genus *Pauridiantha* Hook.f. (Rubiaceae) from tropical Africa. *Adansonia*, sér. 3, 41 (4): 29-40. https://doi.org/10.5252/adansonia2019v41a4. http://adansonia.com/41/4

ABSTRACT
A morphological study of the monospecific genus *Rhipidantha* Bremek. from Tanzania leads to its inclusion in *Pauridiantha* Hook.f.; a new combination, *Pauridiantha chlorantha* (K.Schum.) Ntore & O.Lachenaud, sp. nov., is therefore published, and a full description of this hitherto little-known species is provided. Two new *Pauridiantha* species from Atlantic Central Africa are also described and illustrated: *Pauridiantha gracilipes* O.Lachenaud & Ntore, sp. nov. and *Pauridiantha principensis* Ntore & O.Lachenaud, sp. nov. The former species is endemic to the Ogooué delta in Gabon, and resembles *P. liebrechtsiana* (De Wild. & T.Durand) Ntore & Dessein, but differs by the 2-locular ovary, the very long fruiting pedicels (12-18 mm) and the frequent presence of spines on the older stems – the last two characters being unique in the genus. The second species is endemic to Príncipe island, and differs from *P. insularis* (Hiern) Bremek., from the neighbouring island of São Tomé, by the more ascending secondary leaf veins lacking domatia in their axils, longer pedicels, and glabrous stipules. The conservation status of all three species is evaluated acccording to IUCN criteria: *P. chlorantha* (K.Schum.) Ntore & O.Lachenaud, comb. nov. is assessed as Endangered, *P. gracilipes* O.Lachenaud & Ntore, sp. nov. as Critically Endangered, and *P. principensis* Ntore & O.Lachenaud, sp. nov. as Vulnerable. Finally, *Pauridiantha microphylla* R.D.Good is placed into synonymy of *P. canthiiflora* Hook.f.

KEY WORDS
Príncipe Island,
Gabon,
Tanzania,
Uluguru Mountains,
Urophylleae,
Rubiaceae,
Conservation assessment,
Red List,
IUCN,
new synonyms,
new combination,
new species.

RÉSUMÉ

Deux espèces et une combinaison nouvelles dans le genre Pauridiantha *Hook.f. (Rubiaceae) en Afrique tropicale.*

L'étude morphologique du genre monospécifique *Rhipidantha* Bremek., de Tanzanie, montre la nécessité de le réunir à *Pauridiantha* Hook.f. ; une nouvelle combinaison, *Pauridiantha chlorantha* (K.Schum.) Ntore & O.Lachenaud, comb. nov., est donc publiée, ainsi qu'une description complète de cette espèce jusqu'à présent mal connue. Deux nouvelles espèces de *Pauridiantha* d'Afrique centrale atlantique sont également décrites et illustrées : *Pauridiantha gracilipes* O.Lachenaud & Ntore, sp. nov. et *Pauridiantha principensis* Ntore & O.Lachenaud, sp. nov. La première, endémique du delta de l'Ogooué au Gabon, ressemble à *P. liebrechtsiana* (De Wild. & T.Durand) Ntore & Dessein, dont elle diffère par l'ovaire 2-loculaire, les pédicelles fructifères très longs (12-18 mm) et la présence fréquente d'épines sur les vieilles tiges – ces deux derniers caractères étant uniques dans le genre. La seconde espèce, endémique de l'île de Príncipe, diffère de *P. insularis* (Hiern) Bremek., de l'île voisine de São Tomé, par ses feuilles à nervures secondaires plus ascendantes et dépourvues de domaties à leurs aisselles, ses pédicelles plus longs, et ses stipules glabres. Le statut de conservation de ces trois espèces est évalué selon les critères de l'UICN : *P. chlorantha* (K.Schum.) Ntore & O.Lachenaud, comb. nov. est évalué comme En danger, *P. gracilipes* O.Lachenaud & Ntore, sp. nov. comme En danger Critique, et *P. principensis* Ntore & O.Lachenaud, sp. nov. comme Vulnérable. Enfin, *Pauridiantha microphylla* R.D.Good est mis en synonymie de *P. canthiiflora* Hook.f.

MOTS CLÉS
Île de Príncipe,
Gabon,
Tanzanie,
Monts Uluguru,
Urophylleae,
Rubiaceae,
évaluation de la conservation,
Liste rouge,
IUCN,
synonymes nouveaux,
combinaison nouvelle,
espèces nouvelles.

INTRODUCTION

The genus *Pauridiantha* Hook.f. (Rubiaceae) includes about 50 species in tropical Africa, one of which is also found in Madagascar. It belongs to the tribe Urophylleae *s.l.* (Verdcourt 1958, Bremer & Manen 2000, Robbrecht & Manen 2006, Smedmark & Bremer 2011), a mostly Paleotropical group characterized by valvate corolla aestivation, usually axillary inflorescences with small flowers, raphides usually present (apparently absent in *Raritebe*, Bremer & Manen 2000: 57) and berries with numerous small seeds having small perforations in the radial walls of the exotesta cells (Ntore 2008). Additional characters of the genus *Pauridiantha* are bisexual, heterostylous flowers, and ovaries with false septa in the upper part of the locules.

The genus is rather polymorphic, and several satellite genera, namely *Commitheca* Bremek., *Pamplethantha* Bremek., *Poecilocalyx* Bremek., *Stelechantha* Bremek., and *Rhipidantha* Bremek., were segregated by Bremekamp (1940). All but *Rhipidantha* have been reduced to synonymy of *Pauridiantha* (Hepper 1959; Ntore *et al.* 2003; Smedmark & Bremer 2011), a position supported by molecular data (Smedmark & Bremer 2011).

The last revision of the genus (Ntore 2008) included 38 species. Four new species have been described since (Ntore *et al.* 2009) and the inclusion of *Poecilocalyx* and *Stelechantha* resulted in the transfer of an additional seven species (Smedmark & Bremer 2011). The area known as Lower Guinea (White 1979, 1983), which extends from Nigeria to the mouth of the Congo River, is the main centre of species diversity of the genus.

As a result of both field and herbarium work, several novelties and taxonomic issues have come to light in recent years. In the current paper we elucidate the status of the monospecific East African genus *Rhipidantha*, and conclude, based on morphological characters, that it is not distinct from *Pauridiantha*; its only species becomes *P. chlorantha* (K.Schum.) Ntore & O.Lachenaud, comb. nov., and an updated description of it is given. We also describe two new species: *P. gracilipes* O.Lachenaud & Ntore, sp. nov. from the Ogooué delta in coastal Gabon, and *P. principensis* Ntore & O.Lachenaud, sp. nov., from the island of Príncipe. Finally, *Pauridiantha microphylla* (R.D.Good) Bremek. is considered a synonym of *P. canthiiflora* Hook.f. A separate publication will deal with species formerly included in the genus *Poecilocalyx*, which represent a distinctive group with several undescribed taxa.

MATERIAL AND METHODS

This paper is based on a study of herbarium collections from BR, BRLU, EA, K, P and WAG; type specimens from other herbaria were consulted online. One of the new species (*P. gracilipes* O.Lachenaud & Ntore, sp. nov.) was also studied in the field by the second author. All specimens cited have been seen, except when indicated by "n.v.". Unless otherwise stated, the dimensions given in the descriptions refer to dry material, and the colours to living material. Descriptive terminology for simple symmetrical plane shapes follows Anonymous (1962).

For observations of external seed features, the seeds were mounted without treatment on stubs and observed with a Jeol JSM 7100F SEM. To remove the outer tangential wall of the exotesta cells, the seeds were hydrated in Agepon for 24 h, boiled for 5 min, fixed in Carnoy's medium and transferred into acetic acid 95° during 10 minutes and then in a 27% peroxide solution in which the seeds were boiled for a further 10 min. Prior to observation the seeds were cleaned ultrasonically for at least 30 min and dried at 60°C.

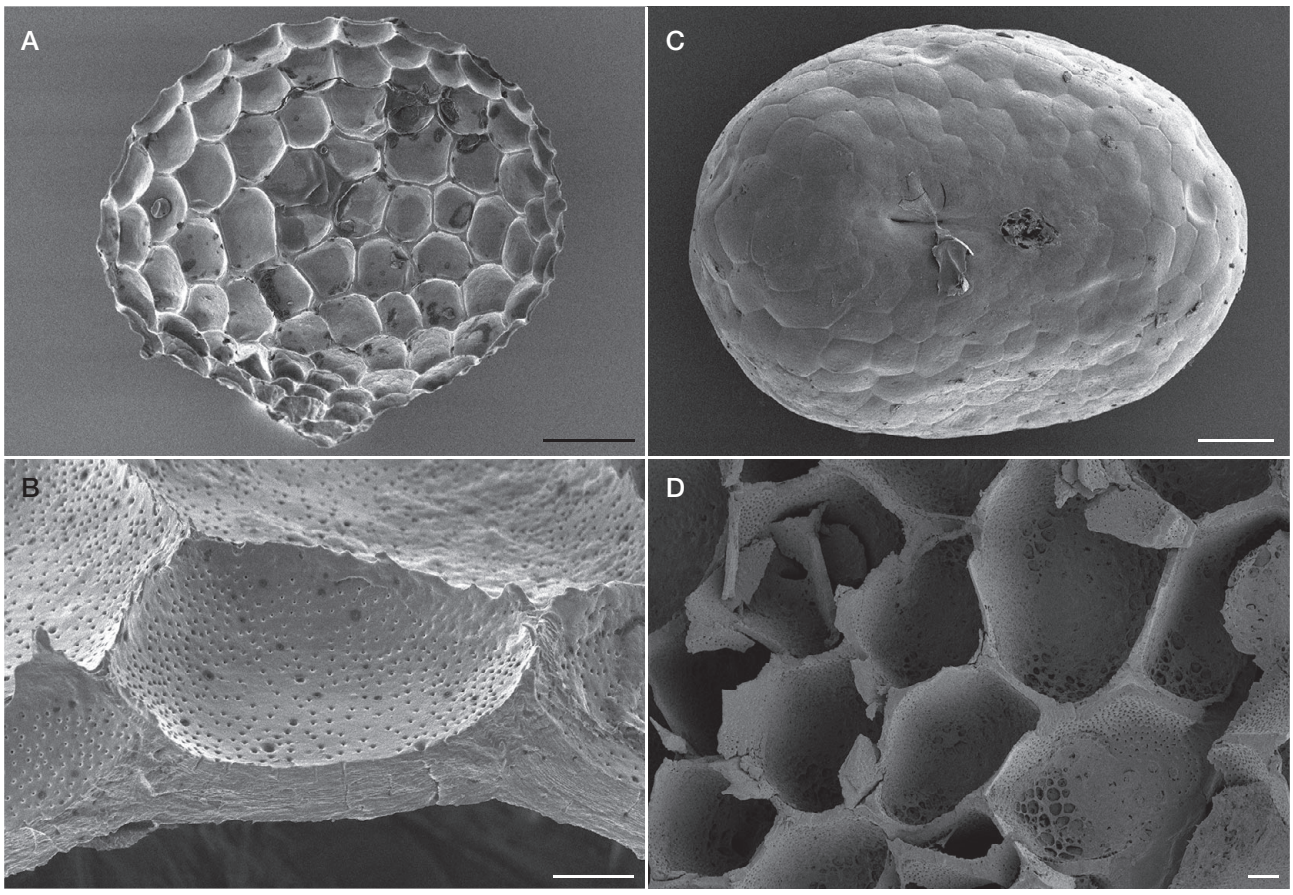

FIG. 1. — Seeds of *Pauridiantha chlorantha* (K.Schum.) Ntore & O.Lachenaud, comb. nov., from *Jannerup & Mhoro 129* (**A**, **B**) and *P. gracilipes* O.Lachenaud & Ntore, sp. nov., from *Lachenaud et al. 1981* (**C**, **D**) in electron microscopy: **A**, **C**, entire seed; **B**, detail of exotesta cells with outer tangential wall removed, showing thickened radial walls with small pits, and large pits in the inner tangential walls; **D**, detail of exotesta cells with outer tangential wall removed, showing thin radial walls with small pits, and large pits in the inner tangential walls. Scale bars: A, C, 100 µm; B, D, 10 µm.

The conservation status of the species was assessed by calculating the extent of occurrence (EOO) and area of occupancy (AOO) using GeoCAT – Geospatial Conservation Assessment Tool (Bachman *et al.* 2011; http://geocat.kew.org) and applying the IUCN Red List Categories and Criteria, v. 3.1 (IUCN 2012; IUCN Standards and Petitions Subcommittee 2014). For the EOO and AOO calculations, cell size was set to 2 × 2 km. Since our knowledge of the species does not allow a detailed estimation of the population sizes and trends (criteria A and C), only the criteria B and D have been applied. The maps were made with SimpleMappr (Shorthouse, David P. 2010. SimpleMappr, an online tool to produce publication-quality point maps; https://www.simplemappr.net/).

TAXONOMIC TREATMENT

THE INCLUSION OF THE GENUS *RHIPIDANTHA* IN *PAURIDIANTHA*

Pauridiantha Hook.f.

In Genera Plantarum 2: 69 (1873). — Typus: *P. canthiiflora* Hook.f.

Rhipidantha Bremek., *Botanische Jahrbücher für Systematik, Pflanzengeschichte und Pflanzengeographie* 71: 222 (1940), **syn. nov.** — Typus: *R. chlorantha* (K.Schum.) Bremek.

REMARKS

Rhipidantha has always been regarded as a monospecific genus endemic to the Uluguru Mountains of Tanzania. Its only species was originally described in *Urophyllum* Wall. (Schumann 1899: 57) before Bremekamp (1940) erected a new genus for it. Bremekamp separated *Rhipidantha* from *Pauridiantha* by its (4-)5-locular ovary (vs 2-locular in *Pauridiantha*), and from *Poecilocalyx* by its lax and pedunculate inflorescences, dentate (vs deeply lobed) calyx, sessile stigmas (actually connate into a style, though very shortly so in brevistylous flowers) and absence of conspicuous indumentum. Verdcourt (1976) accepted the genus as distinct from *Pauridiantha*, chiefly based on the number of ovary locules, but the subsequent inclusion of *Commitheca* (with 2- to 4-locular ovaries) and *Poecilocalyx* (with 2- to 5-locular ovaries) in *Pauridiantha* makes this character no longer reliable. In fact, on morphological grounds *Rhipidantha* is even closer to *Pauridiantha* s.str. than are *Poecilocalyx* and *Stelechantha* (both of which are now included in *Pauridiantha*), and its great similarity to *Pauridiantha insularis*

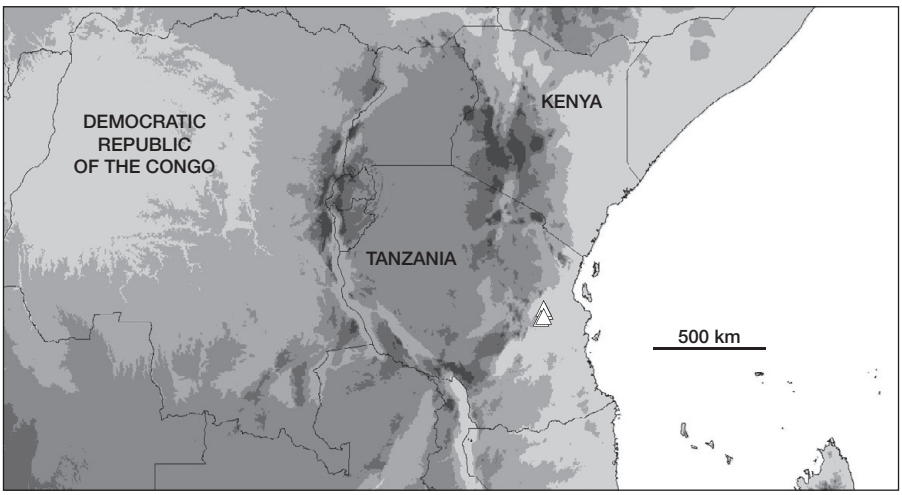

Fig. 2. — Distribution map of *Pauridiantha chlorantha* (K.Schum.) Ntore & O.Lachenaud, comb. nov.

(Hiern) Bremek. has already been noted by Ntore (2008: 109). The fruits and seeds of *Rhipidantha*, previously unknown, have recently been collected and also agree very well with the genus *Pauridiantha* - the seeds in particular (Fig. 1A, B) are extremely similar to those of *P. insularis*, illustrated in Ntore (2008: fig. 29). Therefore, despite the absence of molecular data for *Rhipidantha*, there can be no reason for keeping the two genera separate.

The inclusion of *Rhipidantha* in *Pauridiantha* requires the new combination below. Since *R. chlorantha* is rather little-known and its previous descriptions (Schumann 1899; Bremekamp 1940; Verdcourt 1976) were incomplete on several points, a complete and updated account of this species is presented here.

Pauridiantha chlorantha (K.Schum.) Ntore & O.Lachenaud, comb. nov.

Urophyllum chloranthum K.Schum., *Botanische Jahrbücher für Systematik, Pflanzengeschichte und Pflanzengeographie* 28: 57 (1899). — *Rhipidantha chlorantha* (K.Schum.) Bremek., *Botanische Jahrbücher für Systematik, Pflanzengeschichte und Pflanzengeographie* 71: 222 (1940). — Typus: **Tanzania**. Uluguru Mts, Ngamba, 19.X.1894, *Stuhlmann 8883* (holo-, B, delet.). — Neotypus: **Tanzania**. Uluguru Mountains, 15.XI.1967, *Harris, Hedberg & Mwasumbi 1148* (neo-, EA[EA000065027!], here designated; isoneo-, BR[BR0000017774529!], K!).

Distribution. — Zanzibar-Inhambane regional mosaic. Endemic to the Uluguru Mts in central-eastern Tanzania (Fig. 2).

Habitat. — Montane evergreen forest, 1400-1845 m in elevation.

Phenology. — Flowers from September to December (young inflorescences in August); fruits in November-December (immature), January (almost mature), March and May (immature).

Preliminary conservation assessment. — Endangered [EN B1a b(i,ii,iii,iv,v)+2ab(i,ii,iii,iv,v)]. *Pauridiantha chlorantha*, comb. nov. was previously assessed by Lovett & Clarke (1998) as Vulnerable B1+2b, D2, but this appears to be an underestimation of its threat status. Its extent of occurrence (EOO) is calculated to be 75 km², and its area of occupancy is estimated to be 36 km², which fall respectively within the limits for Critically Endangered under sub-criterion B1 and Endangered under sub-criterion B2. The species is endemic to the Uluguru Mountains in Tanzania, where it grows in submontane forest between 1400 and 1845 m in elevation. It is known from 15 herbarium specimens collected between 1914 and 2009, representing two subpopulations, around 15 km apart. Although its range lies within a protected area (Uluguru Nature Forest Reserve, declared in 2009), its habitat is under serious threat from agriculture, logging, firewood collection, and invasive exotic species (*Rubus* and *Maesopsis*) (Burgess *et al.* 2002). A third subpopulation (not taken into account in EOO and AOO calculations), at *c.* 7°05'S, 37°25'E, is now probably extinct due to deforestation, no suitable habitat being left in the area according to GoogleEarth images. A decline in EOO, AOO, habitat extent and quality, number of subpopulations, and number of individuals is therefore obvious. The two subpopulations represent two 'locations' (*sensu* IUCN 2012) and the species qualifies for Endangered status according to the conditions B1ab(i,ii,iii,iv,v)+2ab(i,ii,iii,iv,v).

Affinities. — *Pauridiantha chlorantha*, comb. nov. is similar to *P. insularis* (Hiern) Bremek. and *P. principensis* Ntore & O.Lachenaud, sp. nov., both from the Gulf of Guinea islands; the similarities and differences between them are discussed under *P. principensis*, sp. nov. below.

Other material studied. — **Tanzania**. Uluguru Mts, Bondwa-Lupanga col, 6°54'S, 37°42'E, 1.V.1970, *Harris & Pócs 4543* (EA[EA000065025!], K[K000352753!)]; Mwere Valley (Bondwa/Mwere col), Uluguru Mts, 26.IX.1970, *Harris, Pócs, Faden & Csontos 5124* (EA [EA000065028!], K[K000352750!, K000352756!]); Uluguru North Catchment F.R., on the path Tegetero-Luhungo, just W of the ridge from Bondwa Peak to Nziwane, 14.I.2001, *Jannerup & Mhoro 129* (K); *ibid.*, *Jannerup & Mhoro 135* (K); North Uluguru F.R., 8.XII.1993, *Kisena 2123* (K[K000352755!]); Ng'ubabule, North Uluguru F.R., 9.XII.1993, *Kisena 2124* (BR[BR0000009210059!], K!); Lupanga Peak, 6°52'S, 37°42.5'E, 28.VIII.1981, *Lovett 212* (K[K000352752!]); Uluguru North Forest Reserve, permanent sample plot 1 (near Mwele River), 6°54'09"S, 37°41'03"E, 1640 m, 15.X.2009, *Mwangoka, Shirima, Hamisi, Swai, John, Seki & Kasimu 6409* (MO[MO-3025815]); Uluguru Mts, Bunduki Forest Reserve, III.1953, *Paulo 52* (EA[EA000065029!], K[K000352759!]); Uluguru, Urwald sudöstl. van Mission Schlesien uber Morogoro, 1.XI.1914, *Peter 52120* (BR[BR0000017774536!], K[K00352754!]); N-Uluguru

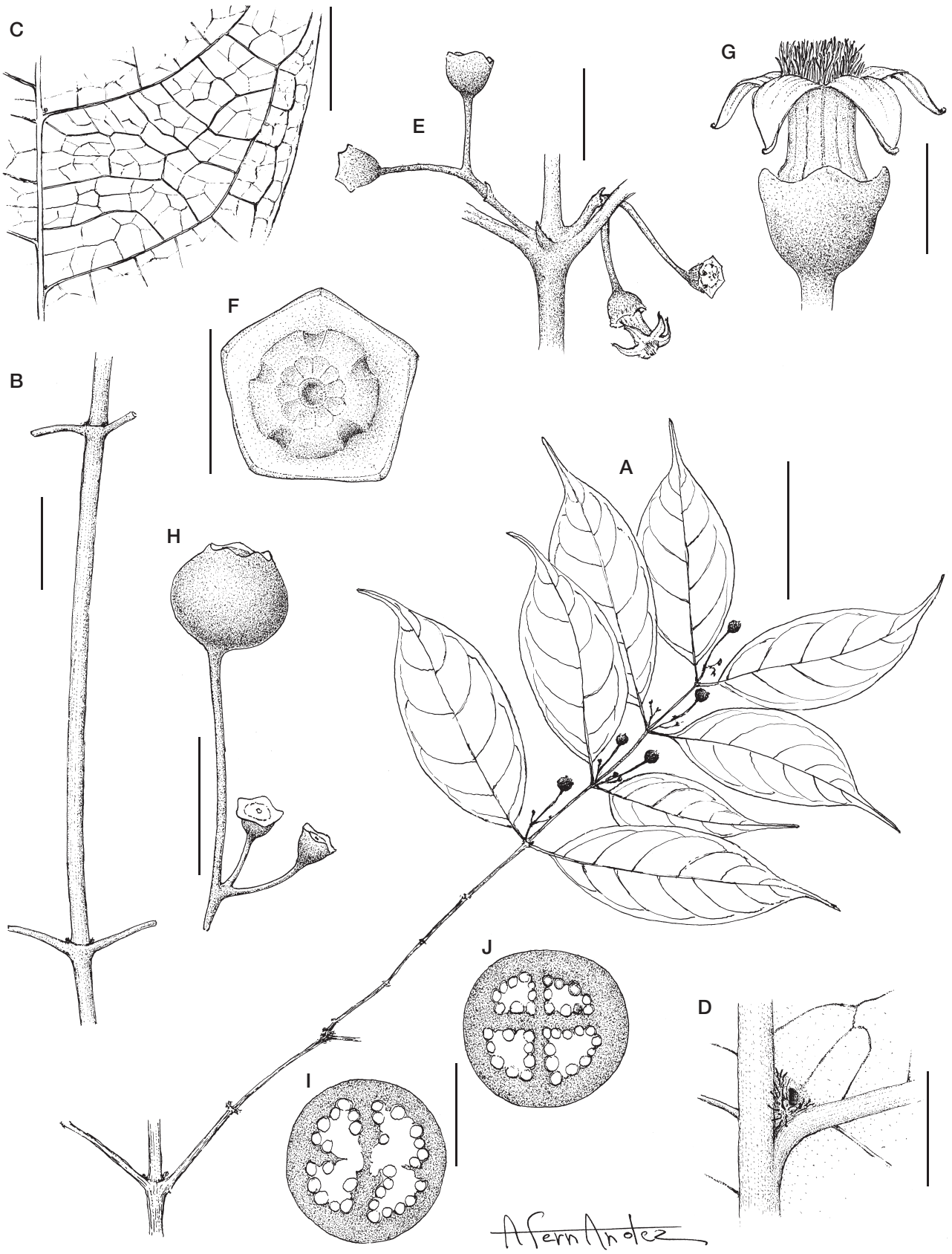

Fig. 3. — *Pauridiantha gracilipes* O.Lachenaud & Ntore, sp. nov.: **A**, fruiting stem; **B**, portion of old leafless stem, with spines formed by the persistent basal part of old twigs; **C**, detail of lower leaf surface, showing reticulate venation; **D**, detail of lower surface showing a domatia; **E**, node with paired inflorescences and stipule; **F**, calyx and disk, seen from above; **G**, flower; **H**, infructescence with one fruit and two undeveloped persistent ovaries; **I**, cross-section of fruit, basal part; **J**, cross-section of fruit, apical part. All details from *Lachenaud et al. 1981*. Scale bars: A, 4 cm; B, 2 cm; C, E, I, J, 5 mm; D, 1 mm; F, G, 2 mm; H, 1 cm. Illustration: Antonio Fernandez.

Mts, E slopes of Lupanga, 10.X.1971, *Pócs & Mwanjabe 6469/B* (EA[EA000065588!]); N-Uluguru Mts, N slope of Bondwa near the springs, 24.X.1972, *Pócs 6804B* (EA[EA000065026!]); Morogoro District, 3600ft; 25.XI.1932, *Wallace 490* (K[K000352751!, K000352757!, K000352758!]).

Description

Shrub

2-4 m tall; twigs cylindrical or slightly 4-sulcate, 1.5-5 mm thick, glabrous or minutely puberulous just above the nodes.

Stipules

Rather soon caducous and leaving corky scars, triangular, 3.5-9 × 1.5-3 mm, thickened with margins recurved inwards, narrower than the twig, glabrous or very sparsely puberulous.

Leaves

Petiole. 0.6-2.3 cm long, with very sparse short appressed hairs;

Leaf-blade. Elliptic to obovate, 8.5-23 × 2.5-12 cm, cuneate at base, abruptly acuminate at apex with acumen 0.8-2 cm long, coriaceous, sparsely appressed-puberulous on both sides when very young, soon becoming glabrous (or sometimes with very sparse hairs persistent on the underside of the main veins), drying olive green to olive brown; midrib flat or faintly impressed above; secondary veins (10-)12-15 pairs, weakly to moderately ascending, forming conspicuous loops 0.5-5 mm from the margin; tertiary veins prominently reticulate below, forming areolae < 0.5 mm in diameter.

Domatia. Present as glabrous pits in primary and secondary vein axils.

Inflorescences

Axillary, 1-3 in each axil, laxly cymose, 3-8-flowered, 1-2.5 cm long, minutely and sparsely pubescent.

Peduncle. 0.5-1.5 cm long, with a pair of stipulate prophylls *c.* 2.5 × 0.5 mm inserted between ¼ and ½ of its length from the base.

Floral bracts. Absent.

Flowers

5-merous.

Pedicel. 1.5-4 mm long, slender, shortly and sparsely pubescent.

Calyx. Cupuliform, entirely glabrous or sparsely pubescent outside, with a tube 0.2-0.5 mm high and minute triangular lobes 0.2-0.5 mm long, lacking colleters.

Corolla. White or pale green, with cylindrical to campanulate tube 1.7-2(-3) × 1.2-2.3 mm, glabrous outside, densely villose inside at the throat, and triangular lobes 1-1.5(-2.3) × 0.7-1(-1.5) mm, glabrous outside, papillate inside.

Floral bud. With cylindrical base and ellipsoid, obtuse apex.

Stamens. Fully exserted with filaments *c.* 1 mm long in brevistylous flowers, half-exserted and subsessile in longistylous flowers, anthers elliptic, *c.* 0.7 × 0.3 mm (including minute sterile appendage).

Disk. Hemispherical, *c.* 0.5 mm high, ± grooved, minutely papillose.

Ovary. (4-)5-locular below, (8-)10-locular by false septa in the upper part, *c.* 1 mm high, sparsely puberulous.

Style. Included, *c.* 0.8 mm long including the 5-lobed stigma *c.* 0.5 mm long, glabrous at base and papillose at apex in brevistylous flowers, or exserted, *c.* 2.3 mm long including the 5-lobed stigma *c.* 0.3 mm long, glabrous at base and villose at apex (the exserted portion) in longistylous flowers.

Fruits

Broader than long, 2-3 × 3-4 mm, glabrous, crowned with persistent calyx slightly accrescent in width, 1.5-2 mm wide ; pedicels slightly accrescent in the fruiting stage, 4-6 mm long.

Seeds

Numerous, ellipsoid, *c.* 0.5-0.55 × 0.45 mm.

Exotesta cells

Polygonal with strongly raised margins, forming a conspicuous reticulum; radial walls thickened with small pits; inner tangential wall thickened, with large pits (Fig. 1A, B).

Remarks

For an illustration of this species see Verdcourt (1976: fig. 15). The type collection has presumably been destroyed during the Second World War, and no duplicates have been traced. Later collections from the same area are certainly conspecific (no similar species being found in the region) although some details of the protologue do not agree with them (Verdcourt 1976). In particular, Schumann described the calyx as 1.5 mm long and the corolla tube as 5 mm long (both measurements apparently somewhat exaggerated) and the petiole as 1-2 mm long (presumably a slip for 1-2 cm). He also described the anthers as included, and the gynoecium as consisting of 5 very short free styles 0.6 mm long. The material we have seen actually shows two distinct flower morphs, none of which completely fits this description: brevistylous flowers have a short style divided nearly to the base – thus more or less as described by Schumann – but exserted anthers, while longistylous flowers have partly included anthers but a long exserted style divided only at the apex. Schumann's description of the style and anthers may therefore have been based on a flower in bud. Among the extant collections, *Harris et al. 1148* was chosen as neotype since it is a good flowering specimen and is represented in several herbaria.

The description of the species by Verdcourt (1976) is incomplete as regards the heterostyly, the domatia (not mentioned) and the fruits and seeds, unknown then and described here for the first time. The maximum height of 15 m tall, mentioned by Verdcourt, seems very dubious: all collections seen by us are reported as shrubs 2-4 m high.

TABLE 1. — Differences between *Pauridiantha gracilipes* O.Lachenaud & Ntore, sp. nov. and related species.

Characters	***P. gracilipes* O.Lachenaud & Ntore, sp. nov.**	***P. letestuana* (N.Hallé) Ntore & Dessein**	***P. liebrechtsiana* (De Wild. & T.Durand) Ntore & Dessein**	***P. smetsiana* Ntore & Dessein**
Habit	sarmentose	shrubby	shrubby/sarmentose	shrubby
Spines	present (on older individuals only)	absent	absent	absent
Stipules	triangular, 1.3-2 mm	linear, 3-6 mm	triangular to subulate, 1.5-5 mm	narrowly triangular, inrolled, 4-6 mm
Acumen of the leaves	gradually narrowed	spathulate	gradually narrowed	gradually narrowed
Secondary leaf veins	brochidodromous	brochidodromous	brochidodromous	camptodromous
Tertiary leaf veins	dense, reticulate, discolorous	dense, reticulate, discolorous	dense, reticulate, discolorous	lax, subparallel, concolorous
Domatia	hairy, crypt-like	glabrous, pit-like	hairy, tuft- or crypt-like	glabrous, pit-like
Inflorescence	(2-)3-flowered, umbelliform	3-15-flowered, umbelliform	3-9-flowered, usually with distinct rhachis	2-5-flowered, umbelliform
Flowering pedicels	3-5 mm	0.5-1.5 mm	2-5 mm	1-2.5 mm
Fruiting pedicels	12-18 mm	1.5-2.5 mm	2-8 mm	3.5-5 mm
Ovary	2-locular	2-locular	3-4-locular	2-locular
Calyx	lobed, shorter than disk	truncate or lobed, shorter than disk	lobed, shorter than disk	truncate, much longer than disk
Disk	densely papillose	glabrous	densely pubescent	glabrous
Seeds	ellipsoid, *c.* 0.7 × 0.6 mm, reticulation not conspicuous	ovoid, *c.* 0.6 × 0.4 mm, prominently reticulate	oblong, 1.4-1.5 × 0.7-0.8 mm, reticulation not conspicuous	ellipsoid, 1-1.2 × 0.8 mm, prominently reticulate
Habitat	seasonally flooded forest	forest on well-drained soils	seasonally flooded forest	forest on well-drained soils

TWO NEW SPECIES OF *PAURIDIANTHA* FROM ATLANTIC CENTRAL AFRICA

Pauridiantha gracilipes O.Lachenaud & Ntore, sp. nov. (Figs 1C, D; 3)

Stipulis breviter triangularibus quam ramis angustioribus, ramis gracilibus glabris vel subglabris, foliis domatiis pubescentibus exceptis glaberrimis subtus dense et conspicue reticulatis, seminibus sublaevibus (nec prominente reticulatis ut in omnibus alteribus congeneribus) P. liebrechtsianae *(De Wild. & T.Durand) Ntore & Dessein affinis, sed pedicellis fructiferis 12-18 mm longis (nec 2-8 mm), ovario basi 2-loculare et apice 4-loculare (nec basi 3-4-loculare et apice 6-8-loculare), inflorescentiis 2(-3)-floris et umbelliformibus (nec 3-9-floris et saepe racemosis) caulibusque nodis inferioribus saepe spinosis (nec inermibus) differt.*

TYPUS. — **Gabon**. Ogooué-Maritime, Région du Lac Alombié, ± 7 km au nord de Mpaga, 0°50'32"S, 9°27'19"E, 17.X.2014, *Lachenaud, Ikabanga & Lafferty 1981* (holo-, BRLU!; iso-, BR[BR0000024391191!]; G!; LBV!; MO!; P!; WAG!).

PARATYPI. — **Gabon**. Préfecture de Mpaga, à environ 7 km au nord du Lac Alombié, 0°49'59"S, 9°26'09"E, 15.X.2014, *Bidault & Lissambou 1726* (BR[BR0000016176461!]; BRLU!; LBV n.v.) ; *ibid.*, 0°47'29"S, 9°29'34"E, 16.X.2014, *Bidault, Stévart, Nguema & Lissambou 1735* (BR[BR0000016173255!]; BRLU!; LBV n.v.); Préfecture de Mpaga, nord du Lac Alombié, 0°49'06"S, 9°27'22"E, 25.X.2014, *Zébazé, Barbier, Niangadouma & Stévart 419* (BR[BR0000016173910!]; BRLU!; LBV n.v.).

ETYMOLOGY. — The specific name refers to the particularly long and slender fruiting pedicels, a diagnostic character of the species.

DISTRIBUTION. — Lower Guinea subcentre of endemism. Endemic to the lower Ogooué basin in Gabon (Fig. 4), where it is only known from a small area north of Lake Alombié; locally abundant in its highly restricted range.

HABITAT. — Restricted to seasonally flooded swamp forests dominated by *Ctenolophon englerianus* Mildbr., *Dactyladenia eketensis* (De Wild.) Prance & F.White and *Anthostema aubryanum* Baill., where it is locally dominant in the undergrowth and forms dense thickets. This peculiar habitat is described by Vandeweghe & Stévart (2017: 207-209) as "forêt inondable monodominante" (although, in fact, *Ctenolophon* is not always strictly monodominant) and, from an analysis of satellite images, is estimated to cover around 50 km² in a restricted area north of Lake Alombié. *Ctenolophon* is believed to have been a key species for the maintenance of forest micro-refugia in the Ogooué delta during dry periods, due to its unusual ability to grow both on well drained and seasonally flooded soils (Vandeweghe & Stévart 2017: 159, 177).

PHENOLOGY. — Fruits (not fully mature) in October, corresponding to the onset of the rainy season.

PRELIMINARY CONSERVATION ASSESSMENT. — Critically Endangered [CR B1ab(iii)+B2ab(iii)]. The extent of occurrence (EOO) of *Pauridiantha gracilipes* O.Lachenaud & Ntore, sp. nov. is estimated to be 8.252 km², and its area of occupancy (AOO) to be 8 km², both values being within the limit for Critically Endangered status under subcriteria B1 and B2. The species is endemic to the coastal part of the Ogooué delta in Gabon, and occurs in *Ctenolophon englerianus* seasonally flooded forests, a highly localized habitat, which is estimated to cover around 50 km² in the delta (Vandeweghe & Stévart 2017: 207-209). It is known from four specimens representing four subpopulations, all situated outside protected areas (although its presence in the adjacent Wonga-Wongué National Park is highly probable). Though its habitat currently suffers little from human activities, forest exploitation has impacted it in the past and may do so again in the future; a decline in the quality of the habitat may therefore be expected. The four subpopulations represent one 'location' according to IUCN (2012), and the species is evaluated as Critically Endangered according to the conditions B1ab(iii)+B2ab(iii).

AFFINITIES. — *Pauridiantha gracilipes* O.Lachenaud & Ntore, sp. nov. appears to be most closely related to *P. liebrechtsiana* (De Wild. & T.Durand) Ntore & Dessein. The two species share nearly glabrous vegetative parts, stipules narrower than the twigs, leaves

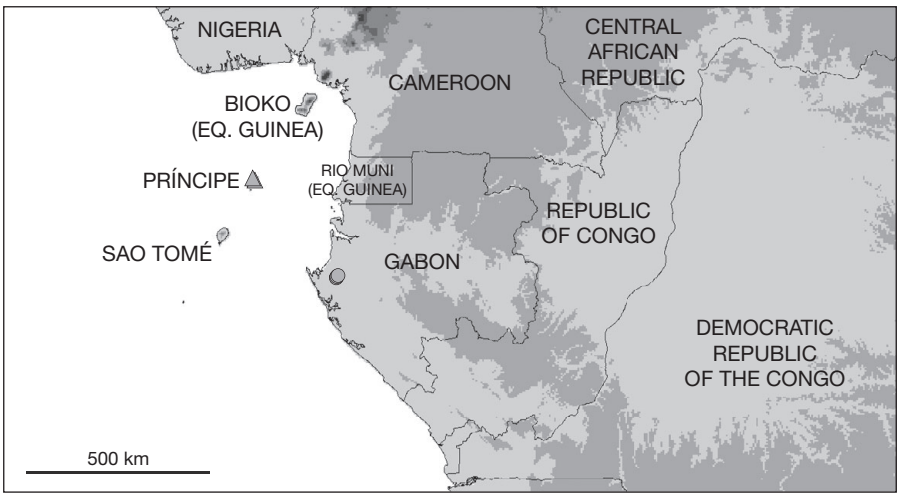

Fig. 4. — Distribution of *Pauridiantha gracilipes* O.Lachenaud & Ntore, sp. nov. (◉) and *P. principensis* Ntore & O.Lachenaud, sp. nov. (△).

with hairy domatia and densely reticulate tertiary veins, and, most importantly, a nearly smooth seed surface (in all other species of the genus the margins of the exotestal cells are markedly raised). It is also related, though more distantly, to *P. letestuana* (N.Hallé) Ntore & Dessein and *P. smetsiana* Ntore & Dessein. The differences between these four species are shown in Table 1. Remarkably, three of them are endemic to west-central Gabon; only *P. liebrechtsiana* is more widespread, occurring in seasonally flooded forests both in the Congo and the Ogooué basins, its westernmost known locality being Lake Gomé in Gabon, *c.* 120 km northeast of the range of *P. gracilipes* O.Lachenaud & Ntore, sp. nov.

Description

Lianescent shrub

To 3-4 m tall, with drooping branches bearing divaricate, ± horizontal flowering twigs; older stems sometimes bearing opposite spines, 0.8-1.7 cm long, formed by the persistent base of twigs; twigs cylindrical, 0.7-1.5 mm thick, glabrous or with sparse minute appressed hairs towards the apex.

Stipules

Tardily caducous, narrowly triangular, 1.3-2 × 0.5-0.7 mm, ± thickened, narrower than the twig and slightly diverging from it, sparsely appressed-puberulous.

Leaves

Petiole. 0.4-0.7 cm long, canaliculate, shortly pubescent on the upper side.

Leaf-blade. Elliptic, 5.5-10.8 × 2.1-4.1 cm, acute to rounded at base, narrowly acuminate at apex with acumen 1-2 cm long, papyraceous, glabrous except the underside of the nerves very sparsely appressed-puberulous, dark green above and pale green below, drying reddish on both sides; midrib concave above; secondary veins 5-7 pairs, strongly curved and brochidodromous, forming loops 1.5-2 mm from the margin; tertiary veins reticulate, conspicuous and dark green in life on the lower side of the leaf, forming a dense network with areolae 0.7-1.5 mm in diameter.

Domatia. Present in the main axils but not very conspicuous, crypt-like, ± pubescent.

Inflorescences

Axillary, solitary in each axil, in contracted cymes, (2-)3-flowered, *c.* 0.8 cm long in the flowering stage and 1.8-2.5 cm long in fruit, sparsely appressed-puberulous.

Peduncle. 0.2-0.6 cm long, with a pair of prophylls *c.* 0.5 mm long in the upper half.

Floral bracts. Absent.

Flowers

5-merous.

Pedicel. 3-5 mm long, sparsely appressed-puberulous.

Calyx. Pale green, cupuliform, *c.* 0.7 mm long, divided for 1/3 to 1/2 of its length, the lobes broadly triangular and acute at apex, puberulous on both sides.

Corolla (only one seen, dry). With tube 1.5 × 1.5 mm, inflated near the base, glabrous outside and densely hairy in the throat, and lobes triangular, 1.5 × 1 mm, reflexed, glabrous on both sides.

Floral bud. Not seen.

Stamens and style. Not seen, apparently included.

Disk. *C.* 0.5 mm high, hemispherical with 5 lateral grooves and 10 apical fossulae (formed by the imprints of the filaments and anthers), whitish, papillose.

Ovary. 2-locular below, 4-locular by false septa in the upper part, sparsely appressed-puberulous.

FIG. 5. — *Pauridiantha principensis* Ntore & O.Lachenaud, sp. nov.: **A**, leafy stem; **B**, node with stipules; **C**, inflorescence; **D**, disk, viewed from above; **E**, short-styled flower; **F**, same, with calyx and ovary cut longitudinally and corolla laid open; **G**, long-styled flower; **H**, same, with calyx and ovary cut longitudinally and corolla laid open. All details from *Oliveira 192/98*. Scale bars: A-C, 1 cm; D, 1 mm; E-H, 5 mm. Illustration: Marijke Meersman.

TABLE 2. — Differences between *Pauridiantha chlorantha* (K.Schum.) Ntore & O.Lachenaud, comb. nov., *P. insularis* (Hiern) Bremek. and *P. principensis* Ntore & O.Lachenaud, sp. nov. Note: The ovary of *P. insularis* is described by Hiern (1877: 73) and Ntore (2008) as 4-5-locular, but is actually 2-locular at the base and 4-locular by false septa at the apex in the material we have seen.

Characters	***P. chlorantha*, comb. nov.**	***P. insularis* (Hiern) Bremek.**	***P. principensis*, sp. nov.**
Stipules	glabrous to sparsely pubescent	sparsely pubescent	glabrous
Leaf domatia	in primary and secondary axils	in primary axils only	absent
Secondary leaf veins	10-16, weakly ascending	10-17, weakly ascending	8-11, strongly ascending
Prophylls	± halfway on the peduncle or below	at the apex of the peduncle	at the apex of the peduncle
Flowering pedicels	1.5-4 mm	2-3 mm	3.5-5 mm
Fruiting pedicels	4-6 mm	4-7.5 mm	7.5-10 mm
Calyx	1.5-2 mm wide	2.5-4.5 mm wide	2-3.5 mm wide
Ovary	4-5-locular at base (8-10-locular by false septa at apex)	2-locular at base (4-locular by false septa at apex)	2-locular at base (4-locular by false septa at apex)
Distribution	Tanzania	São Tomé	Príncipe

Fruits
Dark green (not fully mature), subglobose, 5.5-7.5 × 6.5-8.5 mm in life, 4-5 × 5.3-7 mm when dry, smooth, glabrous, crowned with persistent calyx slightly enlarged in diameter (2.3-4.5 mm).

Pedicels. Drooping and strongly accrescent in the fruiting stage, 12-18 mm long.

Seeds
Numerous, ellipsoid, *c.* 0.7 × 0.6 mm.

Exotesta cells
Polygonal without raised margins, forming a very faint reticulum; radial walls pitted, not thickened; inner tangential wall broadly pitted, not thickened.

REMARKS
This very peculiar species was discovered in 2014 during the botanical exploration of the Lower Ogooué, and had apparently never been collected before. Although the flowering material is incomplete (only one dried flower was found, with both the style and stamens apparently included), the plant is so distinctive that we have no hesitation in describing it. Its remarkably long fruiting pedicels are unique in the genus, as is the presence of spines on the older stems, which are formed by the persistent base of broken twigs (these spines are only seen on the older individuals). The lianescent habit, with drooping branches somewhat reminiscent of *Rubus* L. spp., is further unusual, most other *Pauridiantha* species being erect shrubs or trees, although a few, such as *P. pyramidata* (K.Krause) Bremek., can be more or less sarmentose.

Pauridiantha principensis Ntore & O.Lachenaud, sp. nov. (Fig. 5)

Ramis robustis glabris quam stipulis latioribus, foliis subtus dense reticulatis, inflorescentiis laxe cymosis, calyce truncato vel minute lobato P. insulari *et* P. chlorantha*, comb. nov. similis, sed ab ambabus foliis domatiis carentibus et nervis lateralibus valde adscendentibus differt. A* P. insulare *stipulis glaberrimis (nec sparse pubescentibus) et pedicellis longioribus sub flore 3.5-5 mm longis (nec 2-3 mm) et sub fructu 7.5-10 mm longis (nec 4-7.5 mm) etiam differt* ; a P. chlorantha*, comb. nov. pedunculis ad apicem (nec ad medium vel quartum inferiore) prophyllis munitis, ovarioque basi 2-loculare et apice spurie 4-loculare (nec basi 4-5-loculare et apice spurie 8-10-loculare) etiam distinguitur.*

TYPUS. — **Príncipe**. Plateau avant le Pico do Príncipe, 9.XII.1998, *Oliveira 192/98* (holo-, BRLU!).

PARATYPUS. — **Príncipe**. Caminho do Morro de Leste, 5.IX.1999, *Oliveira 149/99* (BRLU!).

ETYMOLOGY. — The species is named after Príncipe Island, where it is endemic.

DISTRIBUTION. — Endemic to Príncipe Island (Fig. 4) where apparently restricted to the highest areas near the peak; only collected twice and presumably uncommon.

HABITAT. — High forest, 675-750 m in altitude.

PHENOLOGY. — Flowers and immature fruits in September and December.

PRELIMINARY CONSERVATION ASSESSMENT. — Vulnerable (VU D2). *Pauridiantha principensis*, sp. nov. is endemic to Príncipe Island and occurs in submontane forest; it is only known from two specimens, representing two subpopulations. Its extent of occurrence (EOO) therefore cannot be estimated, while its area of occupancy (AOO) is estimated to be 8 km^2, within the limit for Critically Endangered status under criterion B2. Its range entirely lies within a protected area, and its two subpopulations occur in places difficult to access and unlikely to be directly impacted by human activities. However, the potential impacts of climate change on Principe's submontane forest represent a plausible threat that could drive this species to CR or EN in a very short time, so it is assessed as Vulnerable (VU D2).

AFFINITIES. — This species seems closely related to *P. insularis* (Hiern) Bremek. from the neighbouring island of Saõ Tomé, and also to *P. chlorantha*, comb. nov. from Tanzania. All three species have robust and glabrous twigs that are wider than the stipules, densely reticulate tertiary leaf veins, truncate or minutely lobed calyces, and laxly cymose inflorescences. The new species differs from *P. insularis* by its longer pedicels and entirely glabrous vegetative parts (in *P. insularis* the stipules, and often also the petioles, have sparse appressed hairs), from *P. chlorantha*, comb. nov. by the number of ovary locules and the peduncles bearing prophylls at their apex rather than around the middle, and from both species by its much more ascending (and usually fewer) secondary leaf veins that lack domatia in their axils (Table 2).

Description

Shrub (?)

Twigs slightly 4-sulcate when dry, 2.5-5 mm thick, glabrous.

Stipules

± tardily caducous, lanceolate, 5-7 × 1-1.5 mm, markedly thickened with margins recurved inwards, narrower than the twig, glabrous.

Leaves

Petiole. 1.5-3 cm long, glabrous.

Leaf-blade. Elliptic or slightly obovate, 17-23 × 7-11 cm, acute to obtuse at base, acuminate at apex with acumen 0.3-1 cm long, coriaceous, entirely glabrous, drying olive green to grey-green; midrib impressed above; secondary veins 8-11 pairs, ± uniformly curved and strongly ascending, forming inconspicuous loops near the margin; tertiary veins prominently reticulate below, forming areolae 1-1.5 mm in diameter.

Domatia. Absent.

Inflorescences

Axillary, solitary in each axil, laxly cymose, 6-14-flowered, 3-6 cm long, minutely and very sparsely pubescent.

Peduncle. 1-2.4 cm long, with a pair of stipulate prophylls c. 3 × 0.5 mm at apex.

Floral bracts. Absent.

Flowers

(4-)5-merous (see Fig. 5F-H).

Pedicel. 3.5-5 mm long, slender, glabrous.

Calyx. Cupuliform, shortly and sparsely puberulous on both sides, with a tube 0.5-1 mm high, truncate or with minute triangular lobes 0.2-0.3 mm long, lacking colleters.

Corolla. Colour not known. With barrel-shaped to ± cylindrical tube 3-5 × 1.5-2 mm, puberulous in the upper half outside, densely villose in the upper half inside, and triangular lobes 2.5-3 × 1.3-2 mm, puberulous outside at least near the apex, papillate inside.

Floral bud. Subcylindrical, acute at apex.

Stamens. Exserted with filaments *c.* 1.8 mm long in brevistylous flowers, included with filaments 0.2-0.3 in longistylous flowers, anthers elliptic-oblong, *c.* 1.7 × 0.7 mm (including sterile appendage 0.2-0.3 mm).

Disk. ± domed, *c.* 0.5 mm high, with 5 lateral grooves and 10 apical fossulae formed by the imprints of the stamens, minutely papillose.

Ovary. 2-locular below, 4-locular by false septa in the upper part, *c.* 1 mm high, sparsely puberulous.

Style. Included, *c.* 2 mm long in brevistylous flowers, or exserted, *c.* 3.6 mm long in longistylous flowers, including the bilobed stigma *c.* 0.9 mm long, shortly pubescent except at base.

Fruits

Only known when very young. Subglobose, *c.* 3.5 mm in diameter, minutely and sparsely puberulous, crowned with persistent calyx; pedicels slightly accrescent in the fruiting stage, 7.5-10 mm long.

Seeds

Unknown.

Remarks

The habit of *P. principensis,* sp. nov. and the colour of its flowers are not recorded, but it is presumably a shrub, like *P. insularis* and most other species of the genus.

A new synonym in *Pauridiantha*

Pauridiantha canthiiflora Hook.f.

In Genera Plantarum 2: 70 (1871). — Typus: **Equatorial Guinea**. Fernando Po [= Bioko island], X.1860, *Mann 167* (lecto-, K[K000172966!], designated here ; isolecto-, GH[GH01154748!]; P[P00219639!]).

Pauridiantha microphylla R.D.Good, *Journal of Botany, British and Foreign* 64, Suppl. 2: 5 (1926). — Typus: **Angola** (**Cabinda**). Belize, *Gossweiler 7006* (holo-, BM[BM000903007!]; iso-, LISC[LISC000796!, LISC000797!]), **syn. nov.**

Distribution. — Lower Guinea subcentre of endemism. Occurs from south-eastern Nigeria to Angola (Cabinda); locally abundant.

Remarks

Good (1926) separated *Pauridiantha microphylla* from *P. canthiiflora* on account of its smaller leaves with different venation, but these characters are not reliable. The key in Ntore (2008: 60-61) separates them based on the calyx ("cupuliforme" vs "denté ou lobé") and type of domatia, which are not reliable either: both taxa actually have similar domatia, i.e. crypt-like and masked by a tuft of hairs. No additional differences have been found, so the two taxa are synonymised here, which extends the range of *P. canthiiflora* to Angola (Cabinda).

The original description of *P. canthiiflora* does not cite the type specimen, but *Mann 167* is the only possible candidate, and has always been considered as the type by subsequent authors (e.g. Hallé 1966; Ntore 2008). This collection is represented by three sheets in different herbaria. Ntore (2008: 82) cited the K sheet as holotype, which is an error since no herbarium of deposit was cited in the protologue; this sheet is here selected as lectotype, since it is the only one annotated by Hooker (1873).

Acknowledgements
The botanical inventory of the Lower Ogooué Ramsar site in Gabon, during which OL and colleagues discovered *Pauridiantha gracilipes* O.Lachenaud & Ntore, sp. nov., was organised by the Missouri Botanical Garden, the National Herbarium of Gabon and the Institut de Recherche pour le Développement (IRD) with support from the Gabonese Agency of National Parks, the WWF-Gabon and the Gabonese Ministry of Waters and Forests. This work was carried out under the Memorandum of understanding between the Centre national de la Recherche scientifique et technologique (CENAREST) and the Missouri Botanical Garden (MBG). Davy Ikabanga, Dietrich Ian Lafferty, Ehoarn Bidault, Tariq Stévart, Archange Boupoya, Raoul Niangadouma, Eric Akouangou, Nicolas Barbier and Nicolas Texier are thanked for their assistance in the field. We are grateful to Marijke Meersman and Antonio Fernandez for their beautiful illustrations of the new species. We also thank Iris Van der Beeten who made the SEM pictures, and the herbarium curators of BR, BRLU, EA, K and WAG for their assistance while working in their institutes and/or for sending specimens on loan. OL's visit to the Kew herbarium, which allowed him to study the material of *Pauridiantha chlorantha*, comb. nov., was funded by a grant from the Fonds Wetenschappelijk Onderzoek (application n°K230317N). Finally, we are grateful to the reviewers (Dr Petra de Block, Dr Sylvain G. Razafimandimbison and Dr Thierry Deroin) for their detailed and helpful comments.

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Submitted on 12 April 2018;
accepted on 25 October 2018;
published on 8 April 2019.