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SHORT COMMUNICATION

A new species of *Drypetes* (Putranjivaceae) discovered by J. Léonard in the Democratic Republic of the Congo

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Background – During his stay in Yangambi in the 1940s, the Belgian botanist J. Léonard collected a species of the genus *Drypetes* endemic to the Democratic Republic of the Congo. He named it *D. morocarpa* on herbarium labels, but never published it.
Methods – The present study is based on the revision of 26 collections of *D. morocarpa*. Morphometric measurements on herbarium specimens belonging to the new species and its closest relatives in *Drypetes* were carried out in order to describe this new species.
Results – We describe here *D. morocarpa* J.Léonard ex D.J.Harris & Quintanar. It is easily recognisable by its blackish twigs and young branchlets, orbicular stipules, leaf blades usually entire, and hard fruits, covered with irregular protuberances. It has been collected in two areas along the course of the Congo river or its tributaries. A differential diagnosis, a detailed morphological description, a key to distinguish it from the most similar species, an illustration and all the available information about its habitat, distribution and conservation status are provided.

Keywords – Central Africa; Congo Basin; *Drypetes*; new species; Putranjivaceae; Yangambi.

INTRODUCTION

The Belgian botanist Jean Joseph Gustave Léonard (1920–2013) played a prominent and fundamental role in the knowledge of the flora of Central Africa. His first steps in the floristic study of this region date back to 1942, as a collaborator of the well-known Institut national pour l'Étude agronomique du Congo (INEAC). From 1945 to 1948, he worked in the Jardin botanique d'Éala and became curator of the Herbarium national du Congo in Yangambi (Tshopo District, Democratic Republic of the Congo). In 1976, the extremely rich and biodiverse Yangambi region, covered by semi-deciduous and evergreen rainforest, was declared an UNESCO Biosphere reserve, thanks to the work and efforts of scientists like Léonard. He was one of the founders and the Secretary of the Association pour l'Étude taxonomique de la flore d'Afrique tropicale (AETFAT) in 1950, whose objective was to promote the collaboration between botanists working in floristics and taxonomy of African tropical plants (Fabri 2013). In the 1960s, working for the Institut royal des Sciences naturelles de Belgique, he continued his studies of the flora and vegetation of Central Africa, especially in the families Euphorbiaceae Juss. and Leguminosae Juss. During his long career, his contribution to plant taxonomy was outstanding as author of more than 200 research articles and he described many new taxa from the rank of species to family (Jardin botanique Meise 2014).

One of the plants collected by Léonard during his stay in Yangambi was a tree of the genus *Drypetes* Vahl. (family Putranjivaceae Endl., order Malpighiales Juss. ex Bercht. &

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J.Presl). *Drypetes* is a pantropical genus of approximately 210 species (Govaerts et al. 2000) of trees and shrubs found in dry and wet forests, and in savannas. Of this genus, 70 species are said to occur in Africa and Madagascar (Radcliffe-Smith 2001). They are dioecious species with flowers solitary or fasciculate, arranged in the leaf axils or on the branches or the trunk. Their morphology is characterized by simple, alternate or subdistichous, petiolate leaves, the leaf bases with oblique to unequal sides. Both male and female flowers are apetalous and bear a nectariferous disk that, in the male ones, is surrounded by a variable number of stamens that sometimes penetrate it. The female flowers usually have annular disks and thick, flattened stigmas sessile or on short styles that persist in the fruit. The latter is a single to many-seeded drupaceous fruit with a somewhat fleshy exocarp that becomes hardened on drying (Pax & Hoffmann 1922; Radcliffe-Smith 2001).

The first collection of this new species goes back to 1940s by the Belgian collector Jean Laurent Prosper Louis (1903–1947), who, also working in Yangambi, assigned it to the genus *Drypetes* and recorded its vernacular name in the Turumbu language, namely "likwa li libande" (other species of this genus are simply called "likwa"). However, it was Léonard who afterwards detected the distinctiveness of this species and who, repeatedly, in herbarium labels named it "*Drypetes morocarpa*", a name presumably due to its characteristic mulberry-like globose fruits. He also noted the resemblance of the specimens collected by Louis or by himself to *D. urophylla* Pax & K.Hoffm., a species of tree that occurs in Cameroon, the Central African Republic, the Republic of the Congo, as well as in the Democratic Republic of the Congo. Both species have male flowers with a characteristic cup-like, central nectariferous disk surrounded by four stamens, as well as *D. ituriensis* Pax & K.Hoffm. Both of them occur in the same area as *D. morocarpa* in Yangambi and surroundings. We will discuss the similarities and differences of these two species, *D. urophylla* and *D. ituriensis*, with *D. morocarpa* in this article.

Although Léonard did not publish this species, its name has been used in several publications (INEAC 1957; Mayné & Donis 1960; Duculot 1964). Within the framework of our ongoing research on the African species of *Drypetes*, we think it is time to formally describe this species discovered by Léonard to allow the scientific use of its name and as a tribute to his memory.

MATERIAL AND METHODS

The description presented here, as well as all the information about the habitat and distribution, is based on the revision of 26 collections of *D. morocarpa* (see the list of studied specimens below) and additional herbarium specimens belonging to the species *D. urophylla* and *D. ituriensis* from the following herbaria: B, BR, C, FHO, M, MO, P, PR, US, and WAG (Thiers continuously updated). Measurements were carried out using a Mitutoyo CD-15CD digital caliper and a manual scale with precision of 0.1 mm to record quantitative morphological characters, to build up the new species' description, and for comparative purposes as well. The descriptive terminology follows that used in Stearn (1973).

The information about the habitat of the involved species, as well as their phenology, and chorology were based on collection data from labels. Geographical data were used to build a distribution map for *D. morocarpa* with ArcView GIS v. 3.2 for Windows (Esri 2019). A preliminary assessment of conservation status using the IUCN categories and criteria (IUCN 2019) is provided. The geographical parameters of Area of Occupancy (AOO) and Extend of Occurrence (EOO), estimated using a 2 × 2 km grid, were calculated using GeoCAT (Bachman et al. 2011). We also present a detailed drawing of *D. morocarpa* and two historical photographs that illustrate its habit and morphology.

RESULTS AND DISCUSSION

Drypetes morocarpa J.Léonard ex D.J.Harris & Quintanar, **sp. nov.**

Figs 1–4

Diagnosis – Differt haec species a propinquis *D. urophylla* et *D. ituriensi* Pax & K.Hoffm. ramulis junioribus petiolisque nigrescentibus, fructu protuberante glaucescente indurato, stipulis orbicularibus, margine foliorum persaepe integro.

Type – D.R. Congo: Tshopo, Grande île Tolele entre Lilèko et Basoko, 1°5′N, 23°50′E, 28 Sep. 1938, fl. male, fr., *J. Louis 11413* (holotype: BR[BR0000008893628]! (BR-S.P. 889 362); isotypes: BR[BR0000008893642]! (BR-S.P. 889 364), K[K000406363]web, P[P04706897]!).

Description – Medium-sized to high slender tree, 5–35 m high, the crown narrow, the foliage noticeably dark, the wood very hard; trunk 11–30 cm in diameter, cylindrical or with 4–6 slightly marked buttresses, the bark 3–4 mm thick, hardly adherent to the cambium, the rhytidome greyish or grey-olive-green, smooth or finely cracked, and with lenticels; twigs and young branchlets brownish to blackish, slightly angled, glabrescent, the hairs, if any, up to 0.2 mm; buds glabrous to minutely hairy, the hairs 0.04–0.15 mm. Leaves simple, alternate, dark green, shining above, paler beneath, with small, soon falling colleters up to 0.1 mm when appear from the tips; petiole 3.8–8.3 × 0.9–1.9 mm, blackish, glabrous or glabrescent, with hairs, if any 0.1–0.2 mm; stipules 2.6–2.8 × 2–2.2 mm, orbicular, deciduous, glabrous, with marginal cilia up to 0.2 mm; leaf blade (7.5–)10.4–11.9 (–15.3) × (3.1–)4.1–4.8(–6.6) cm, elliptic, oblique, sometimes slightly acute, acuminate or rarely slightly caudate, the apex 7–19 mm, the base oblique, quite often unequal-sided, acute to, rarely, slightly obtuse, the margin entire and flat, rarely slightly recurved towards the leaf base, often undulate in the upper half, rarely very slightly and obscurely crenulate in the upper half, the underside glabrous; midrib glabrous, secondary nerves 4–7 on the right side, ascending, glabrous. Male inflorescence axillary, sometimes just below the leafy twig, 3–15 flowers per fascicle; bracts 0.8–1.2 × 0.8–1.5 mm, lately ovate to oblong, shortly hairy, the hairs up to 0.1 mm. Male flowers greenish or yellow-greenish, scented, pedicel 2.5–4.1(–6.5) × 0.2–0.4 mm, minutely hairy, the hairs up to 0.1 mm, golden yellowish; sepals (3–)4, 1.7–2.15 × 2.1–2.7 mm, ovate-orbicular, minutely to shortly hairy outside, the hairs up to 0.3 mm, golden yellowish, shortly hairy inside, glabrescent, the hairs up to 0.2 mm, with marginal cilia up



Figure 1 – *Drypetes morocarpa* J.Léonard ex D.J.Harris & Quintanar. **A**. Branchlet and leaves. **B**. Apical tip showing stipules (lighter colour) and young leaves (darker colour). **C**. Colleters along young leaves' margin. **D**. Male inflorescence. **E**. Male flower. **F**. Male flower without sepals and one stamen, showing the disk. **G**. Female inflorescence. **H**. Female flower. **I**. Female flower without sepals, showing the disk. **J**. Fruit. **K**. Seed. A from *J. Louis 16365*, BR0000014952036; B, C from *J. Louis 311*, BR0000014951978; D–F from *J. Louis 7527*, BR0000014951923; G–I from *J. Louis 16365*, BR0000014951992; J, K from *J. Louis 16781bis*, BR0000014952067. Illustration by Román García Mora.



Figure 2 – Habit of *Drypetes morocarpa* J.Léonard ex D.J.Harris & Quintanar. D.R. Congo, Territoire Isangi, Yangambi, 27 May 1947, *J. Léonard 1244* (BR0000014951787). Photograph taken by E. Lebied at the Yangambi Station of the Institut National pour l'Étude Agronomique du Congo Belge (INEAC). © Meise Botanic Garden, all rights reserved; reproduced with permission. This image is not distributed under the terms of the Creative Commons licence of this publication. For permission to reuse, please contact the rights holder.

to 0.1 mm; stamens 4, surrounding the disk, neither enfolded nor penetrating it, the filaments 2.1–3.6 mm, whitish, the anthers 0.4–0.6 × 0.3–0.5 mm, red-brownish, glabrous; disk cup-like, 0.8–2.8 mm in diameter, 0.2–0.8 mm high, without pistillode, glabrous. Female inflorescence axillary, sometimes just below the leafy twig, 1–2 flowers; bracts 1.3 × 1 mm, ovate to oblong, glabrous. Female flowers with pedicel 3–3.3 × 0.6–0.8 mm, shortly hairy, with hairs 0.1–0.3 mm, golden yellowish; sepals 4, 2.8–3.4 × 3.6–3.7 mm, ovate-orbicular, minutely to shortly hairy outside, with hairs 0.1–0.2 mm, golden yellowish, shortly hairy inside, with hairs 0.2–0.3 mm, without or with marginal cilia 0.15–0.2 mm; style 0.9–2.1 mm, 2-branched, the common part 0.1–0.4 mm; stigma 0.2–0.6 × 1.8–2.1 mm, flabellate; ovary 1.5–1.8 × 2.1–2.6 mm, globose, 2-celled, densely and shortly hairy, the hairs 0.2–0.4 mm; disk 3.5–3.7 mm in diameter, 0.4–0.5 mm high, glabrous. Fruit 15–19.3 × 17.6–22 mm, usually solitary, globose, depressed distally, completely covered by irregular protuberances, hard, greyish-blue, 2-seeded, the sepals deciduous and frequently absent, minutely to shortly hairy, the hairs 0.1–0.5 mm; pedicel 8–16.4 × 1–1.6 mm, glabrescent, the hairs, if any, up to 0.2 mm; seeds 2, 8.2–12.7 × 7.8–10.3 mm.

Distribution – Endemic to D.R. Congo and the phytogeographic territory "Central Forest VI" following Robyns (1965). It has been collected in two separate areas along the course of the Congo River or its tributaries (Elila River), in the provinces of Tshopo and Maniema (fig. 4). Elevation: 460–470 m a.s.l.

Habitat – Forest. *Drypetes morocarpa* has been mostly collected close to water courses, in forests with sandy, periodically flooded soils, in company of *Lannea welwitschii* (Hiern) Engl. (Anacardiaceae R.Br.); also inland, in primary forest with more or less well-drained soils, in company of species of the genera *Lannea* A.Rich. and *Pseudospondias* Engl. (Anacardiaceae).

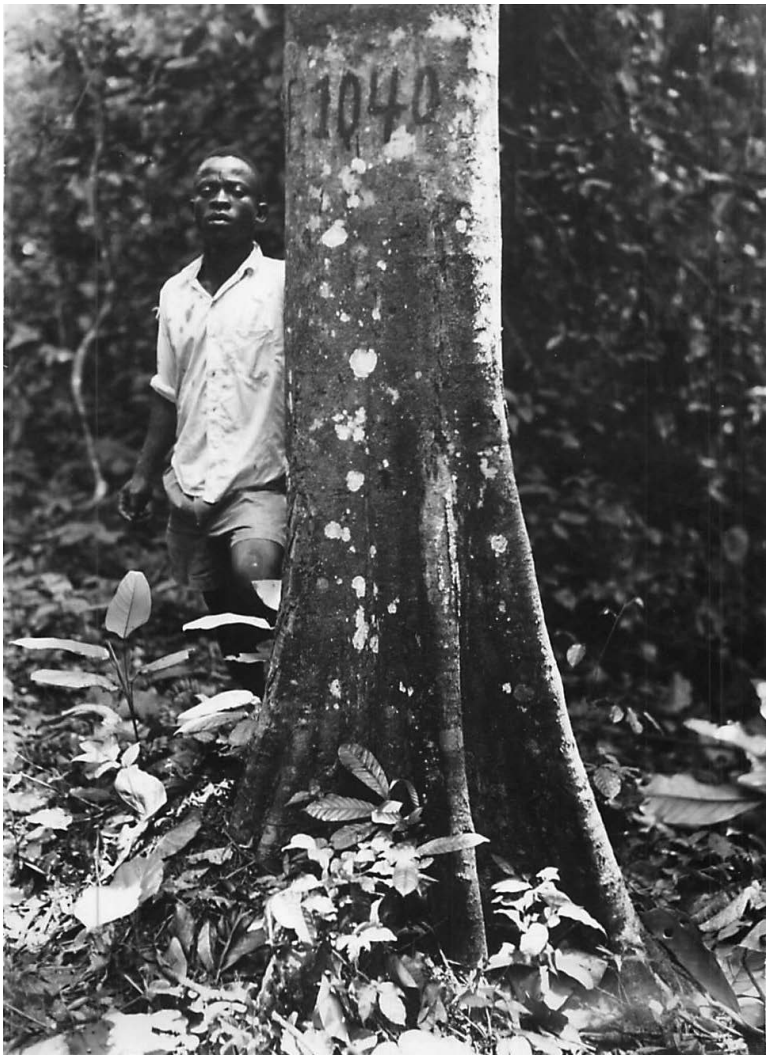


Figure 3 – Base of the trunk of *Drypetes morocarpa* J.Léonard ex D.J.Harris & Quintanar. D.R. Congo, Territoire Isangi, Yangambi, 29 Mar. 1947, *J. Léonard 1156* (BR0000006769949 (BR-S.P. 676 994)). Photograph taken by E. Lebied on the southern slope of the Isalowe Plateau. © Meise Botanic Garden, all rights reserved; reproduced with permission. This image is not distributed under the terms of the Creative Commons licence of this publication. For permission to reuse, please contact the rights holder.

Key to *D. morocarpa* and two similar species

1. Leaf blade (6.2–)8–9.2(–10.4) × (2.3–)3.2–3.6 cm, the basal lateral nerves quite strongly marked and running parallel to the leaf margin for about half the length of the leaf, the leaf margin not undulate and crenulate-toothed towards the upper part; petiole shortly hairy, sometimes glabrescent; ripe fruit < 10 mm long, often in groups of 2–3; trunk sometimes with spines; cut bark smelling of mustard oils .... ***D. ituriensis*** Pax & K.Hoffm.

1'. Leaf blade (7.5–)9.4–11.9(–15.3) × (2.5–)3.6–4.8(–6.6) cm, the basal lateral nerves of the leaf not strongly marked and not running parallel to the leaf margin or if so for a much shorter distance, the leaf margin frequently undulate and sometimes obscurely crenulate in the upper part; petiole glabrous, ripe fruit 14–20 mm long, habitually solitary; trunk almost never with spines; cut bark not smelling of mustard oils 2

2. Fruit rounded to globose, smooth, somewhat fleshy; branchlets of a light colour, petiols of dark-to-light colour, rarely blackish; stipules narrowly elliptic, sometimes somewhat oblong, up to 4.7 × 1.5 mm; sepals shortly hairy outside, the hairs often concentrated in the central part, glabrescent towards the margin; pedicel of male flowers 5–10 mm long ..... ***D. urophylla*** Pax & K.Hoffm.

2'. Fruit globose completely covered with irregular protuberances, hard; branchlets and petioles blackish; stipules orbicular, up to 2.8 × 2.2 mm; sepals shortly hairy outside, the hairs more or less homogeneously distributed; pedicel of male flowers 2.5–4.1(–6.5) mm long..... ..... ***D. morocarpa*** J.Léonard ex D.J.Harris & Quintanar

Vernacular name – "likwa li libande", language Turumbu (Lombo).

Etymology – Greek τὸ μόρον, mulberry, blackberry (Latin *morum*, *-i*); new Latin *-carpus, -a, -ium*, -fruit, -fruited. Léonard left no information, at least on the labels of the specimens he studied, about the etymology of the name he assigned to this species. It presumabley refers to the peculiar and distinctive aspect of the fruits of this species, whose surface has numerous irregular protuberances, that resembles that of the fruits of mulberries (*Morus* L.) and blackberries (*Rubus* L.).

Preliminary IUCN conservation assessment – Endangered [EN]. The extent of occurrence (EOO) of *D. morocarpa* is estimated to be 8,460 km^2, which falls within the limits for 'Vulnerable' status under the criterion B1, whereas its area of occupancy (AOO) is estimated to be 40 km^2, which falls within the limits for 'Endangered' status under the criterion B2. The species is known from 26 collections that represent five subpopulations, one of which is situated in a protected area, the Yangambi Biosphere Reserve. *Drypetes morocarpa* has been collected in two distant major areas along the course of the Congo river or its tributaries; one of them is centered in Yangambi, and the other along the Elila river. All the collections of this species available to us were made in its natural environment and the most recent are from the mid to late 1940s.

Of the 26 studied collections of this species, 18 were collected in Yangambi and surroundings, mostly in what is now the Yangambi Biosphere Reserve. In a recent article on the dynamics of deforestation in this reserve, Koy et al. (2019) have provided information about the changes in this area during the last thirty years and report that, despite of its inclusion in the worldwide network of biosphere reserves since the 1970s, it is one of the main protected areas under threat from human activities in the region. They identified four current zones with distinct socio-enviromental dynamics in this reserve: INERA (previously INEAC) forest reserve logging concession, zones along main roads, zones along abandoned roads and isolated zones in the central part of the reserve. Almost all of the collections associated with Yangambi (which are the majority of those studied for this species) can be associated with the first of these areas, and none can be safely assigned to the other areas, so we are forced to consider all of them the same location. As can be seen in the land use maps offered by Koy et al. (2019), within a radius of about 7–12 km around Yangambi, an area that broadly coincides with the former INEAC forest reserve, the degradation of the habitat by human activities has been very intense since the 1980s, and, of course, the degree of degradation in those years can be presumed to be much more pronounced than it was in the 1930s and 1940s, when the specimens were collected. Because of this, we have to consider the possibility that most of these populations may have disappeared. The data offered on recent times does not allow much optimism: the annual rate of deforestation increased from 0.18% in 1986–2003 to 0.38% in 2003–2016, and during the latter period, the deforestation rate was higher in primary forests (4.5%) than secondary forests (0.4%). The main causes of deforestation are said to be slash-and-burn farming, artisanal ore extraction and the manufacture of dug-out canoes. It is likely, given the aforementioned information, that this pressure will be intensified in the coming years.

Few collections of *D. morocarpa* have been made outside the Yangambi area. The other locations in the province of Tshopo are located downstream from Yangambi on two islands of the Congo River, called Etembo and Tolele. Recent satellite images allow us to observe a complete vegetation cover, without any sign of major deforestation. The similar degree of knowledge, or ignorance, that we have about the

potential threats that may be affecting these islands leads us to treat them as one location.

A. Michelson collected his specimens in the 1940s in Maniema. The first one, *Michelson 924*, was made along a road and we assume that it carries the usual degree of threat considered for populations easily accessible to people and related to logging, collecting of fuelwood for small-scale subsistence, and slash-and-burn farming. The second location, *Michelson 662*, is on a tributary of the Elila River near its confluence with the Congo River. Current satellite images show dense forest canopy throughout this area and little or no sign of forest clearance. Despite the elapsed time since these collections were made, it seems likely that the populations represented by the latter location may currently still be in a good state.

Thus, the five subpopulations represent four different locations, which means that the species falls within the limits of the Endangered status under the subcriterion 'a' of criterion B2.

The known deforestation of Yangambi Biosphere Reserve and the projected ongoing loss of the habitat of *D. morocarpa* due to urbanization in the main area where it has been collected, Yangambi and surroundings, leads us to think that mature individuals have already disappeared and to infer a decline of the number of subpopulations and locations, and thus, also of its EOO and AOO. *Drypetes morocarpa* therefore qualifies as 'Endangered' [EN B2ab(i,ii,iii,iv,v)] according to the IUCN Red List Categories and Criteria (IUCN 2019).

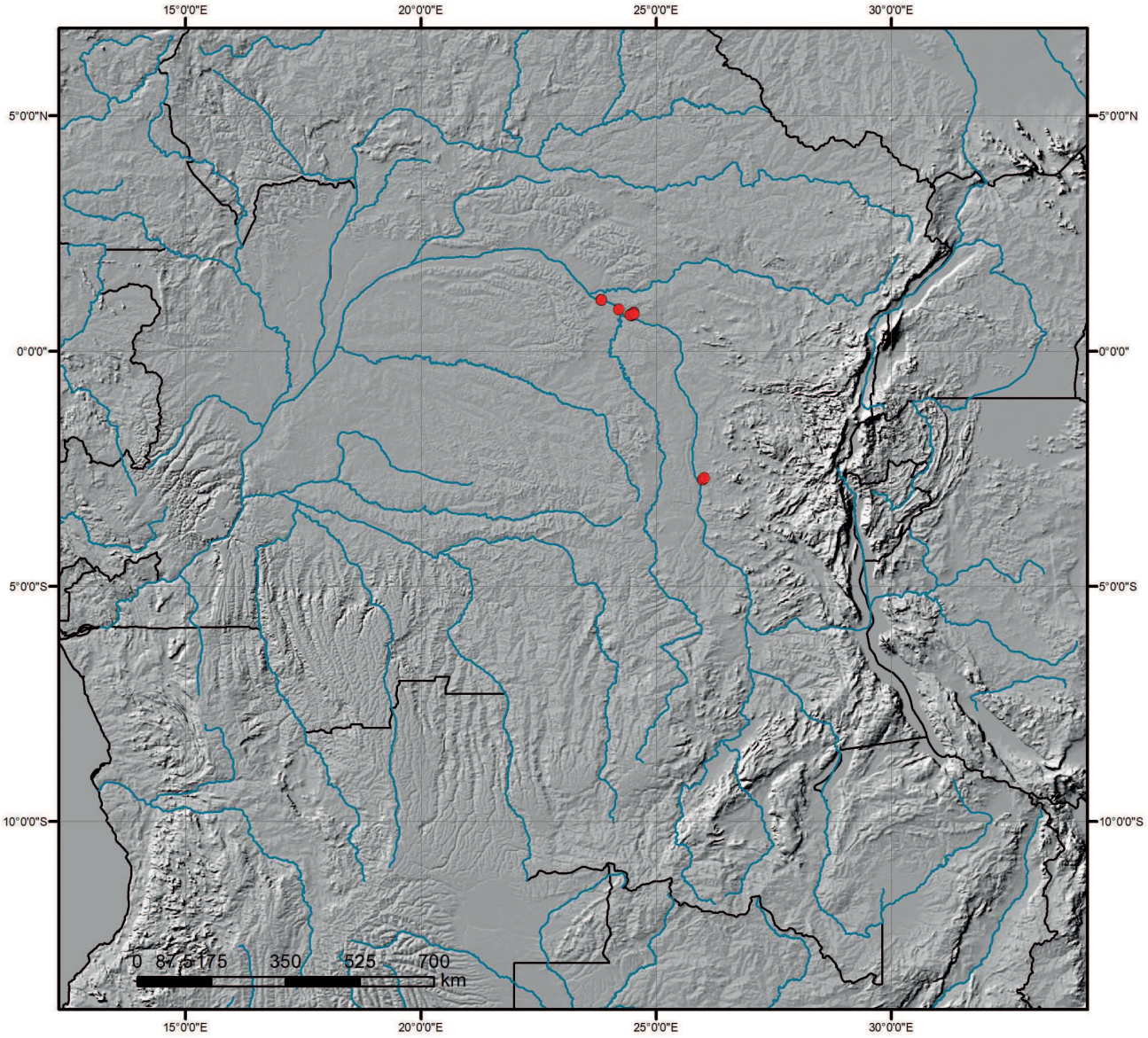


Figure 4 – Distribution map of *Drypetes morocarpa* J.Léonard ex D.J.Harris & Quintanar. Map created using ArcView GIS v. 3.2 (Esri 2019). © Esri and its licensors, all rights reserved. This image is not distributed under the terms of the Creative Commons licence of this publication. For permission to reuse, please contact the rights holder.

Additional material examined – **D.R. Congo**: **Manieema**: Au bords du km 4 de la route Kaseka, Prov. Kivu territoire Mwenga, 2°42′S, 26°1′E, 460 m, 2 Mar. 1949, sterile, *A. Michelson 924* (BR[BR0000014952104, BR0000013019860], WAG[WAG.1564435]web); Forêt sur la rivière Lonioma, affluent droite de l'Elila, près de l'embouchure de cette dernière dans la Lualaba, 2°44′S, 25°59′E, Oct.–Nov. 1945, sterile, *A. Michelson 662* (BR[BR0000014952098]). **Tshopo**: Grande île Tolele entre Lilèko et Basoko, 1°5′N, 23°50′E, 470 m, 20 Apr. 1939, fr., *J. Louis 14597* (BR[BR0000014952036, BR0000014952029, BR0000014952043], MO[MO-1600552]); same locality as preceding, 26 Feb. 1940, female fl., *J. Louis 16365* (BR[BR0000014951992, BR0000014952005]); Territoire Isangi, entre Isangi-Lileko, île Etembo, 0°53′N, 24°12′E, 470 m, 27 Feb. 1940, male fl., *R. Germain 190* (BR[BR0000013019815], M[M257143], WAG[WAG.1564436]web); Territoire Isangi, Île Tolele près de Lileko (environs de Isangi), 1°5′N, 23°50′E, sterile, 17 Jan. 1948, *J. Léonard 1618* (BR[BR0000014951763], MO[MO-2252305, MO-2651817], WAG[WAG.1564430, WAG.1564431, WAG.1564432]web); Territoire Isangi, km 5 Yangambi, 0°46′N, 24°27′E, 470 m, 26 Jan. 1936, sterile, *J. Louis 1141* (BR[BR0000014951954, BR0000014951961], MO[MO-2252223], WAG[WAG.1564428]web); same locality as preceding, 21 Oct. 1935, sterile, *J. Louis 311* (BR[BR0000014951978, BR0000014951985], MO[MO-2653185], WAG[WAG.1564433, WAG.1564434] web); Territoire Isangi, Yangambi, 0°46′N, 24°27′E, 29 Mar. 1947, female fl., *J. Léonard 1156* (BR[BR0000006769949] (BR-S.P. 676 994), MO[MO-2252294]); same locality as preceding, Jun. 1938, fr., *G. Gilbert* [*DiFOR, Division Forestière 1256*] (BR[BR0000014951855, BR0000014951862]); same locality as preceding, 20 May 1939, fr., *J. Louis 16781bis* (BR[BR0000014952067]); same locality as preceding, 27 May 1947, *J. Léonard 1244* (BR[BR0000014951787]); same locality as preceding, 27 Apr. 1943, sterile, *J. Louis 16780* (BR[BR0000014952012]); same locality as preceding, 2 Sep. 1952, sterile, *C. Donis 3896* (BR[BR0000014951848]); same locality as preceding, 27 Apr. 1939, female fl., fr., *J. Louis 16781* (BR[BR0000014952050], WAG[WAG.1564438] web); Territoire Isangi, Yangambi, à 8,4 km au N de fleuve, plateau de la Luweo, au-delà des têtes de source de la Lusambila, abatages-extensions-*Elaeis*, 0°45′N, 24°28′E, 30 May 1937, fr., *J. Louis 4010*, (BR[BR0000013262778, BR0000016005389]); Yangambi, forêt de la Lusambila, 0°46′N, 24°28′E, 10 May 1947, female fl., *J. Léonard 1156* (BR[BR0000016005273], WAG[WAG.1564249]web); Territoire Isangi, Yangambi, plateau de l'Isalowe, 0°46′N, 24°30′E, 470 m, male fl., 17 Jan. 1938, *J. Louis 7527* (B[B 10 0366494], BR[BR0000014951923, BR0000014951930, BR0000014951947], C[18/2014 40], FHO[00018541], P04706898); same locality as preceding, 21 Apr. 1939, male fl., *J. Louis 14606* (BR[BR0000014951893, BR0000014951909, BR0000014951916], MO[MO-2653554]); same locality as preceding, 21 Apr. 1939, male fl., *J. Louis 14608*, (WAG[WAG.1564429] web); Yangambi, arboretum forestière, 0°46′N, 24°27′E, 13 Jun. 1963, fr., *D. Bolema 1072* (BR[BR0000014951831], WAG[WAG.1564437]web); Yangambi, réserve forestière de l'INEAC, 0°47′N, 24°31′E, sterile, *G. Gilbert 9296* (BR[BR0000014951817]); same locality as preceding, fr., *G. Gilbert 9593* (BR[BR0000014951794]); same locality as preceding, sterile, *G. Gilbert 9211* (BR[BR0000014951800]).

Taxonomic notes – *Drypetes morocarpa* belongs to the species group of *D. ituriensis* and *D. urophylla* and the herbarium material of this new species has been frequently identified as one of them. This group is characterized by male flowers with a characteristic cup-like, central nectariferous disk surrounded by few, usually four stamens, female flowers with two-celled ovaries and two-branched short styles with flabellate stigmas. These two closely related species to *D. morocarpa* were classified by Pax & Hoffmann (1922) in two different sections, *D. urophylla* in *D.* sect. *Oligandrae* Pax & K.Hoffm. and *D. ituriensis* in *D.* sect. *Stenogynium* Pax & K.Hoffm. In our opinion both species belong to the same group as *D. morocarpa*, and therefore all of them should be classified in the same section. Our team is currently working on the typification and amendment of the sections of *Drypetes* and, until this is complete, we judge it prudent, for the moment, to leave aside the sectional classification of these species.

Drypetes urophylla and *D. ituriensis* are two species of forest trees from Cameroon, the Central African Republic and the north and east of the Democratic Republic of the Congo and their distribution area overlaps with that of *D. morocarpa* in the Yangambi region. All of them share similar reproductive organs and the values of the quantitative morphological characters generally overlap and do not offer diagnostic value. This particularly applies to the characters related to inflorescences and flowers. Nevertheless, the sepals of *D. morocarpa* tend to be more or less hairy across the external surface, while in *D. ituriensis* and some specimens of *D. urophylla* the hairiness is usually more concentrated in the centre of the sepal, which is glabrescent towards the margin.

The foliage of these species offers good characters to assist in their identification. *Drypetes ituriensis* has usually shorter and narrower leaf blades than those of *D. urophylla* and *D. morocarpa*, and they are often clearly crenulate to toothed along the margin of the upper half (sometimes also along the margin of the lower half), whereas the leaf margin of the aforementioned species is habitually entire, sometimes obscurely crenulate in the upper half, and often distinctively undulate in the upper part. The measurements of the leaves of *D. urophylla* and *D. morocarpa* widely overlap, however the leaves of *D. morocarpa* are well recognized in most cases due to their dark tinge, a blackish coloration shared with petiols (though petioles of *D. urophylla* are also often blackish) and young branches (not dark in *D. ituriensis*). Two basal lateral nerves that run parallel to the leaf margin for a certain distance are a good character to distinguish *D. ituriensis*, in most of cases, in which they are quite obvious above and beneath (they are much less marked and shorter in *D. urophylla* and *D. morocarpa*, and often run further from the margin). The stipules observed in *D. morocarpa* are quite different from those of the other two species, they are orbicular, reach 2.8 × 2.2 mm, and must fall very soon, because they are rarely observed even in the youngest shoots. In *D. ituriensis* and *D. urophylla* the stipules reach 4.7 × 1.5 mm and are narrowly elliptic to oblong, sometimes somewhat triangular,

and they appear to persist a little longer, because they are observed more often on herbarium specimens.

The fruit of *D. morocarpa* is said to be hard, with a woody texture, and is very distinctive due to its abundant protuberances, which give it a peculiar appearance and allows to distinguish them easily from the fruit of the other two species, which apparently are somewhat fleshy when ripe and their surface can be irregular, but never tuberculate. Additionally, the fruit of *D. morocarpa* and *D. urophylla* are usually solitary and are 14–20 mm long, while that of *D. ituriensis* can occur in groups of 2–3 per axil and rarely surpasses 10 mm in length. Another character to consider is the occasional presence of spines on the trunk of *D. ituriensis*, reported for neither *D. urophylla,* except very rarely and never for *D. morocarpa*.

As we have stated, these three species occur in the Yangambi region and they probably occupy similar forest types there (but it is not possible to determine this with certainty because the information registered on the collection labels is not always precise enough). In that area of the province of Tshopo there are specimens of *D. urophylla* that share characters with *D. morocarpa* and present problems when determining if they belong to one or to the other another species. For example, *J. Louis 2459* has branches and leaves that resemble the appearance of *D. morocarpa*, but the fruit surface, though quite irregular, is not clearly tuberculate. This is also the case in *J. Léonard 1503* and *J. Louis 4367*, the latter classified in *D. morocarpa* due to its stipules.

CONCLUSION

As with many tropical plants, there is a lack of information on the biology of *Drypetes morocarpa*, including its distribution, which we expect to be much wider. We hope that this article in which we publish this species discovered by Léonard so many years ago and then almost forgotten, will serve to promote its future study.

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