



Research article

Eugenia sapoensis Jongkind from Liberia and *Eugenia breterleri* Jongkind from Gabon, two new forest species (Myrtales: Myrtaceae)

Carel C.H. JONGKIND

Botanic Garden Meise, Nieuwelaan 38, 1860 Meise, Belgium

Email: carel.jongkind@kpnmail.nl

Abstract. Two new forest species, *Eugenia sapoensis* sp. nov. and *Eugenia breterleri* sp. nov., from Liberia and Gabon respectively, are described and illustrated here. Both are shrubs with comparatively large red fruits. They resemble each other, but *E. breterleri* differs from *E. sapoensis* in having twigs with conspicuously peeling bark, 6–8 pairs of main lateral nerves, versus 4–6 pairs, and fruits with a peduncle of 3–5 mm rather than 1–2 mm long. *Eugenia breterleri* grows up to 3 m high while *E. sapoensis* does not grow higher than 1.4 m.

Key words. *Eugenia*, Myrtaceae, Africa, Liberia, Gabon

Jongkind C.C.H. 2015. *Eugenia sapoensis* Jongkind from Liberia and *Eugenia breterleri* Jongkind from Gabon, two new forest species (Myrtales: Myrtaceae). *European Journal of Taxonomy* 113: 1–9. <http://dx.doi.org/10.5852/ejt.2015.113>

Introduction

Eugenia is a genus of about 1000 species (WCSP 2014) but it is with *ca.* 60 species not very species rich in Africa (van der Merwe *et al.* 2005), and even less so in the forests of the Guineo-Congolian Region (*sensu* White 1979). Including the new species, there are ten *Eugenia* species currently recognized for Liberia and the same number for Gabon. Only one species, *Eugenia gabonensis* Amshoff, is known from both countries.

The Myrtaceae flora publications for different parts of the Guineo-Congolian Region, like the *Flore du Gabon*, are at least 46 years old. Herbaria house large collections of *Eugenia* specimens from this Region that can not be identified to species with the existing floras. Furthermore, there are many unresolved taxonomic and nomenclatural issues within the genus (Verdcourt 1999). These facts show that new studies of *Eugenia* of the Guineo-Congolian Region are urgently needed. Preparing the still missing Myrtaceae part of the *Flore du Cameroun* could be a good start. Recently, several phylogenetic studies on *Eugenia* have been published (e.g. van der Merwe *et al.* 2005, Mazine *et al.* 2014) to clarify the relationship between the clades, regrettably they did not include any of the species that occur in forests of Central and West Africa in their research.

During recent fieldwork a small *Eugenia* shrub with large pinkish red fruits was collected in the forest near the Sapo National Park in Liberia. It is named here *Eugenia sapoensis* sp. nov. Most *Eugenia* species in this region have smaller fruits that are often very dark reddish or dark purplish at maturity

as in the case of *Eugenia calophylloides* DC. (Fig. 1). Most species are larger too, up to medium-sized understory trees, and are flowering and fruiting much more profusely. The new species could not be keyed out with the *Flora of West tropical Africa* (Heine 1963) or with the *Flore du Gabon* (Amshoff 1966). The closest other species from the Guinea-Congolian Region seems to be *E. kameruniana* Engl. from Cameroon. This species is also a small forest shrub with large bright red fruits, but has leaves about 1.5–2 times the size of those of the new species and a narrow cordate, not attenuate, leafbase. No comparable *Eugenia* species is known from Liberia and neighbouring countries. Searching through the herbaria a *Eugenia* shrub from the forest of south-western Gabon with comparable fruits and general leaf shape was found. This shrub still differs from *E. sapoensis* sp. nov. in having more main lateral nerves and twigs with conspicuously peeling bark. It is also larger than its Liberian relative and the peduncle of the fruit is longer. It is named here *E. breteleri* sp. nov. The flowers of this new species are not yet known, but the calyx lobes still present on the fruits suggest that the flowers are likely to be small like in *E. sapoensis* sp. nov.

Considering the large geographical gap and the differences observed between the two new species, it is more likely that they are the result of parallel evolution and not necessarily closely related. Most *Eugenia* species in the tropical African forest seem to be restricted to a relatively small area.

In several publications the taxonomical importance of the seed and embryo of African *Eugenia* species was shown (van Wyk 1980, van Wyk & Botha 1984). No differences could be found on this point between our new species. Both new species, and *Eugenia kameruniana* Engl., should, based on their seed and embryo, be placed in *Eugenia* “Group X” as described by Van Wyk & Botha. This supports the statement that this group has a wide distribution in sub-Saharan Africa (van der Merwe *et al.* 2005)

All material cited here for the two new species was collected after the floras for these countries were published.



Fig. 1. *Eugenia calophylloides* DC. Branchlet with leaves and fruits. From *Jongkind 8311*. Photographed by the author.

Table 1. Main differences between *Eugenia sapoensis* sp. nov., *Eugenia breтели* sp. nov. and *E. kameruniana*.

	<i>E. sapoensis</i>	<i>E. breтели</i>	<i>E. kameruniana</i>
Leaf length	7–12 cm	5.5–10 cm	12–17 cm
Base of leaf	attenuate	attenuate	narrowly cordate
Pairs of main laterals	4–6	6–8	6–10
Bark of twigs	smooth	conspicuously peeling	conspicuously peeling
Petal length	2 mm	-	6 mm

Materials and Methods

Normal practices of herbarium taxonomy have been applied to study the available herbarium material from BR, K, P, and WAG. *E. sapoensis* sp. nov. has recently been studied in the field on several occasions. Preliminary assessments of the IUCN Red List categories of threat were performed using the IUCN criteria and the RBG Kew website <http://geocat.kew.org>.

Results

Eugenia shrubs from the forests of Liberia and Gabon, that could not be identified with the existing floras, are described as two new species endemic to Liberia and Gabon, respectively. They can be easily separated from the already known species from these countries by their relatively big red fruits and small leaves (Table 1).

Class Equisetopsida C.Agardh (Agardh *et al.* 1825)
 Subclass Magnoliidae Novák ex Takht. (Takhtajan 1967)
 Superorder Rosanae Takht. (Takhtajan 1967)
 Order Myrtales Juss. ex Bercht. & J.Presl (Berchtold & Presl 1820)
 Family Myrtaceae Juss (Jussieu 1789), nom. cons.
 Genus *Eugenia* L. (Linnaeus 1753)

Eugenia sapoensis Jongkind sp. nov.
urn:lsid:ipni.org:names:77144646-1

Figs 2, 3

Diagnosis

A shrublet related to *E. kameruniana* Engl., but with smaller (7–12 cm) leaves with an attenuate and not cordate leaf base.

Etymology

This species is named after the Sapo National Park, the oldest national park in Liberia.

Type

LIBERIA. Sino County, ca. 50 km east of Greenville, fl. fr. 14 Mar. 2014, *Jongkind, Mulbah, Harris, Charleson & Forkpah 12439* (holo-: BR; iso-: K, WAG).

Description

Branching shrublet about 0.8–1.4 meter high. Twigs smooth, glabrous, brown, often shiny. Leaves opposite, entire, glabrous, petiolate; petiole < 3 mm long; lamina papery, with many translucent secretory cavities, 7–12 cm long and 2.3–5.5 cm wide, apex long acuminate, base attenuate, 4–6 pairs of

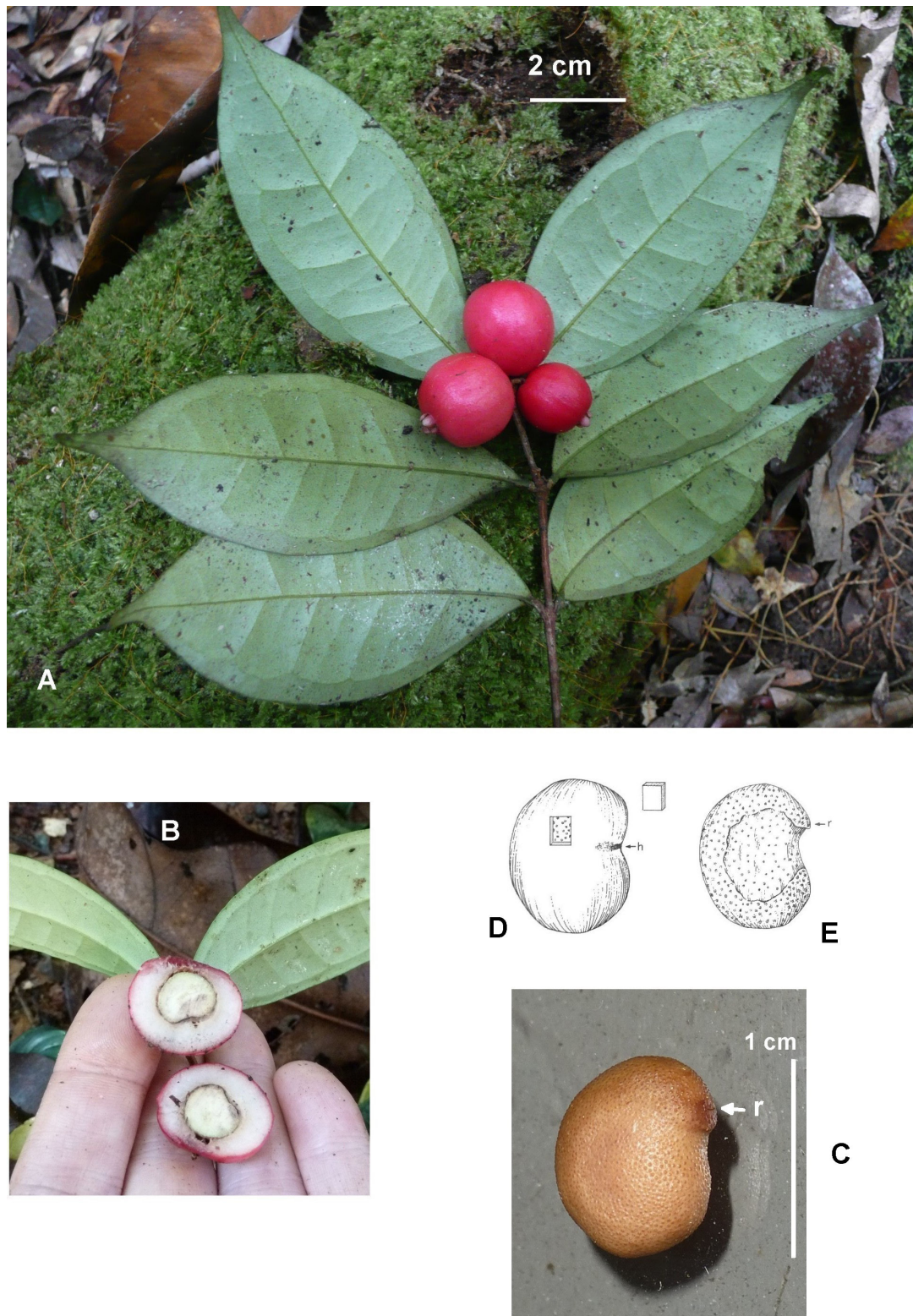


Fig. 2. A–C. *Eugenia sapoensis* sp. nov. A. Branchlet with fruit. B. Cross section of the fruit and single large seed. C. Lateral view of embryo (r = radicular protuberance). D–E. Morphology of the seed of *Eugenia* “Group X” as described by van Wyk (1980). D. Seed with part of the thin testa removed showing the surface of the embryo beneath (h = hilum). E. Lateral view of embryo (r = radicular protuberance). A–C from *Jongkind 9351*; D & E from van Wyk & Botha (1984: 66). Photographed by the author.

main lateral nerves meeting in a conspicuous sub-marginal nerve, looping 2.5–6 mm from the margin, midrib impressed above. Inflorescences strongly reduced, axilar and terminal, with 1 or 2 flowers, bracts tiny, early caducous. Flowers inconspicuous, glabrous, green and whitish; peduncle *ca.* 1 mm long, green; calyx lobes and petals *ca.* 2 × 2 mm, both 4 in number; stamens *ca.* 20, 1–1.5 mm long; anthers *ca.* 0.5 mm long; style not seen. Fruit single or with two together, subglobose, 1.2–2 cm in diameter, glabrous, green to bright pinkish red, surface dotted with many secretory cavities, 1- or (rarely) 2-seeded; pulp sweet, whitish; seed subglobose to kidney-shaped, very pale, with a slight dip in the surface near the hilum, testa smooth and thin but very strong; cotyledon kidney-shaped, fused for the larger part, covered with many secretory cavities; peduncle 1–2 mm long; calyx lobes *ca.* 2 mm long and wide, rounded, glabrous, not or hardly larger than in flower but more coriaceous. Seedling with the first 3–4 pairs of leaves only a few mm long.

Distribution and habitat

Undergrowth of evergreen lowland forest; 40–165 m altitude. Only known from the Sino River basin in Liberia.

Additional specimens examined

LIBERIA. Sino County. close to the Sino River, 90–100 m alt., 10 Mar. 2009, *Jongkind, Bilivogui & Dorbor 8925* (K, WAG); not far from the west bank of the Sino River, 90–100 m alt., fr. 1 Febr. 2010, *Jongkind, Bilivogui & Dorbor 9351* (K, MO, WAG); in the South of Sapo National Park, fr., 22 Nov. 2010, *Jongkind, Bilivogui & Daniels 9820* (K, WAG); near Nidwè River, fr., 25 Nov. 2010, *Jongkind, Bilivogui & Daniels 9860* (K, WAG); west of Greenville, not far from the sea, fr., 20 Sept. 2013, *Jongkind, de Wet & Sambolah 12089* (BR); east of Greenville-Zwedru road, fr., 24 Sept. 2013, *Jongkind, de Wet & Sambolah 12128* (BR); east of Greenville-Zwedru road, 26 Sept. 2013, *Jongkind, de Wet & Sambolah 12159B* (BR).

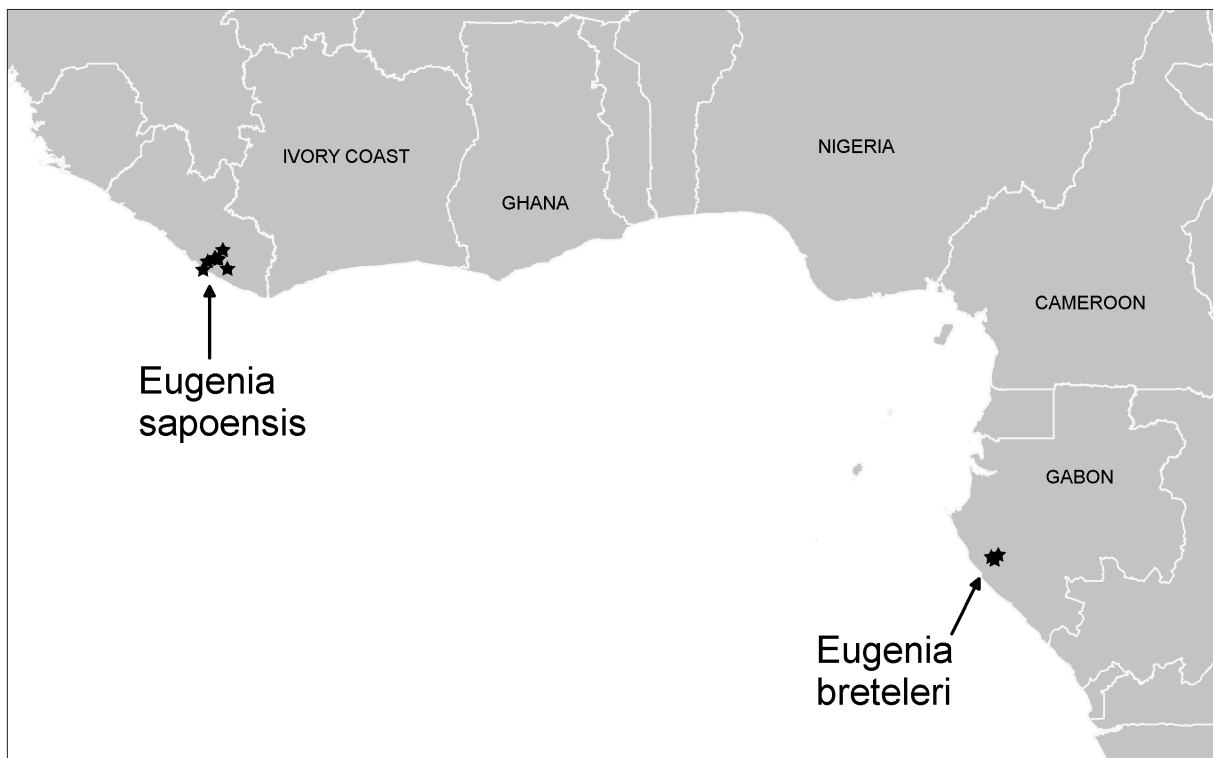


Fig. 3. Distribution map of *Eugenia sapoensis* sp. nov. and *Eugenia breteleri* sp. nov.

Conservation status

The “Extent of Occurrence” (EOO) is 1,858 km² and the “Area of Occupancy” (AOO) is 32 km², both count as “Endangered”. Only one of the specimens was collected in the National Park. I have walked long distances within the EOO area often without finding one single plant of this species, it is really not common. Considering all the economical development planned in this part of Liberia, “Endangered” is the appropriate status.

Comment

The 2 tiny mature flowers collected seem to be lacking a style and could be male flowers, but they are too few to ascertain whether this is not caused by insects or other damage. It is still too early to tell if this species shows the cryptic dioecy seen in many other African species in *Eugenia* (van der Merve *et al.* 2005: 22).

Eugenia breteleri Jongkind sp. nov.

urn:lsid:ipni.org:names:77144645-1

Figs 3, 4

Diagnosis

A shrublet related to *E. sapoensis* Jongkind, but larger, twigs with conspicuously peeling bark, leaves with 6–8 pairs of main lateral nerves and fruits with a longer (3–5 mm) peduncle.

Etymology

Named after F.J. Breteler who was responsible for the organisation of the two expeditions that led to the discovery of the new species.

Type

GABON. Between Rabi-Kounga and Yeno, fr., 15 May 1992, *Breteler, Jongkind, Nzabi & Wieringa 11457* (holo-: WAG; iso-: LBV).

Description

Shrublet 1.3–3 meter high, glabrous. Twigs with bark conspicuously peeling in thin strips. Leaves opposite or tri-verticillate, entire, petiolate; petiole 1.5–5 mm long; lamina papery, drying slightly reddish, glabrous, 5.5–10 cm long and 2–4.5 cm wide, apex long acuminate, base attenuate, with 6–8 pairs of main lateral nerves with several smaller, parallel ones in between, meeting in a conspicuous sub-marginal nerve up to 4 mm from the margin, midrib impressed above. Inflorescences strongly reduced, axillar or terminal, with up to five flower buds, bracts filamentous, *ca.* 1.5 mm long, early caducous, immature flower buds almost glabrous with a few hairs on the edge of the calyx. Fruits single, glabrous, 10–25 mm in diameter, 1-seeded, surface with many secretory cavities; seed sub-globose; embryo kidney-shaped, cotyledons fused for the larger part, covered with many secretory cavities; peduncle 3–5 mm long; 4 calyx lobes 1–1.5 mm long, longer than wide, rounded, glabrous.

Distribution and habitat

Undergrowth of evergreen lowland forest in the Rabi-Kounga area in south-west Gabon.

Note

On the label of *Breteler 10319* the flowers are described as white when open, but on the specimens only small flower buds are found.

Additional specimens examined

GABON. Rabi-Kounga, fl.bud, 2 Nov. 1991, *Breteler; Jongkind & Schoenmaker*10319 (BR, K, LBV, MO, P, WAG); Between Rabi-Kounga and Yeno, fr., 20 May 1992, *Breteler; Jongkind, Nzabi & Wieringa* 11546 (LBV, WAG).

Conservation status

Based on the only 3 specimens the “Extent of Occurrence” (EOO) is 95 km² and the “Area of Occupancy” (AOO) is 12 km², the first counts as “Critically endangered” (CR) and the second as “Endangered”

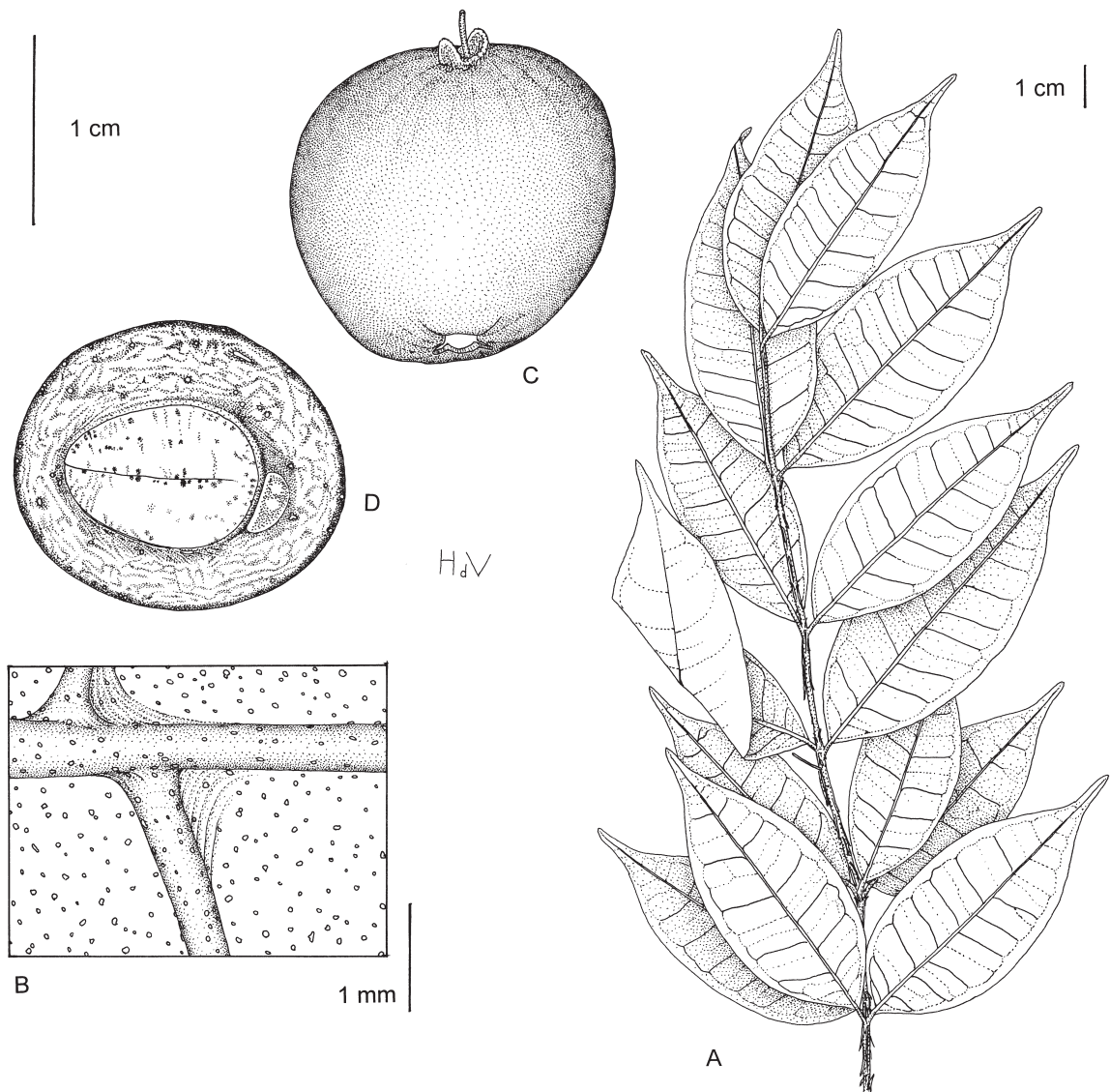


Fig. 4. *Eugenia breteleri* sp. nov. **A.** Branch with leaves. **B.** Detail of leaf from below showing secretory cavities. **C.** Fruit (from pickled specimen) with style and part of the calyx still present. **D.** Cross section of fruit and single seed. A & B from *Breteler* 11457, C & D from *Breteler* 11546. Drawing by Hans de Vries.

(EN). I expect that in this case the limited number of specimens might for a large part show the lack of botanical exploration in this, still densely forested, part of Gabon. For the moment “Vulnerable” (VU) could be more appropriate.

Discussion

Eugenia sapoensis sp. nov. and *E. breteleri* sp. nov. can be easily separated from all other earlier described species from the forest area where they are found. With the large geographical gap between the two new species, it is more likely that they are the result of parallel evolution and not necessarily closely related. Most *Eugenia* species in the tropical African forest seem to be restricted to a relatively small area.

There are still more undescribed *Eugenia* species in these forests, and also already in herbaria, but these are closer to earlier described species and more difficult to delimitate. A problem is that a lot of the known species are still incompletely known, especially those from Cameroon. For some species the fruits, and for others the flowers have not yet been collected. Due to this lack of material, it is momentarily impossible to create a practical key to the Guineo-Congolian *Eugenia* species. This key can only be prepared after the older *Eugenia* names available for this floristic Region have found their place as synonyms or as more clearly delimited species.

Acknowledgements

The expeditions that made it possible to collect *E. sapoensis* in and around the Sapo National Park were funded by Fauna and Flora International. The author wishes to thank the staff of the Liberian office of FFI for their help in making the expeditions successful. The author is also grateful to Hans de Vries for the line drawing.

References

- Agardh C.A., Holmberg L.P. & Lundstrom P.M. 1825. *Classes Plantarum*. Literis Berlingianis, Lundae [Lund].
- Amshoff G.J.H. 1966. Myrtaceae. In: Aubréville A. (ed.) *Flore du Gabon*, part 11: 3–33. Muséum national d’Histoire naturelle, Paris.
- Berchtold B.V. von & Presl J.S. 1820. *O přirozenosti rostlin, aneb rostlinár, obsahující: gedanj on žiwobyť rostlinném pro sebe a z ohledu giných žiwoků, podle stawu nyněgssjbo znánj; k rozssjřenj přirodnictwj; w potaženj na užitečnost w rolnictwj, hospodářstw, řemestech, uměnj i obchodu a w wztahowánj obzwlásstnjm na lékařstw*. Enders, Prague.
- Heine H. 1963. Myrtaceae. In: Hepper F.N. (ed.) *Flora of West Tropical Africa*, 2 edition, part 1, 1: 235–241. Crown agents for oversea governments and administrations, London.
- Jussieu A.L. de 1789. *Genera Plantarum*: 322.
- Linnaeus C. von 1753. *Species Plantarum* 1: 470–471.
- Mazine F.F., Souza, V.C., Sobral M., Forest F. & Lucas E. 2014. A preliminary phylogenetic analysis of *Eugenia* (Myrtaceae: Myrteae), with a focus on Neotropical species. *Kew Bulletin* 69: 9497. <http://dx.doi.org/10.1007/s12225-014-9497-x>
- Takhtajan A.L. 1967. *Sistema i fi logeniia tsvetkovykh rastenii (Systema et Phylogenia Magnoliophytorum)*. Soviet Science Press, Leningrad & Nauka, Moscow.
- Van der Merwe M.M., van Wyk A.E. & Botha A.M. 2005. Molecular phylogenetic analysis of *Eugenia* L. (Myrtaceae), with emphasis on southern African taxa. *Plant Systematics and Evolution* 251: 21–34. <http://dx.doi.org/10.1007/s00606-004-0160-0>

Verdcourt B. 1999. The genus *Eugenia* in East Africa. *Kew Bulletin* 54: 41–62. <http://dx.doi.org/10.2307/4111022>

Van Wyk A.E. 1980. A note on the seed morphology of the genus *Eugenia* L. (Myrtaceae) in southern Africa. *Journal of South African Botany* 46: 115–119.

Van Wyk A.E. & Botha R. 1984. The genus *Eugenia* (Myrtaceae) in southern Africa: ontogeny and taxonomic value of the seed. *South African Journal of Botany* 3: 63–80.

White F. 1979. The Guineo-Congolian Region and its relationships to other phytochoria. *Bulletin van de Nationale Plantentuin van België* 49: 11–55. <http://dx.doi.org/10.2307/3667815>

WCSP 2014. *World checklist of selected plant families*[online]. Available from <http://www.theplantlist.org/browse/A/Myrtaceae/Eugenia/#statistics> [accessed 24 Jul. 2014].

Manuscript received: 31 July 2014

Manuscript accepted: 24 December 2014

Published on: 23 February 2015

Topic editor: Thomas Janssen

Desk editor: Natacha Beau

Printed versions of all papers are also deposited in the libraries of the institutes that are members of the *EJT* consortium: Muséum national d’Histoire naturelle, Paris, France; Botanic Garden Meise, Belgium; Royal Museum for Central Africa, Tervuren, Belgium; Natural History Museum, London, United Kingdom; Royal Belgian Institute of Natural Sciences, Brussels, Belgium; Natural history Museum of Denmark, Copenhagen, Denmark.