

Englerodendron libassum (Leguminosae-Detarioideae-Amherstieae), a new Critically Endangered tree species from coastal Liberia

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Background and aims – While searching the banks of a lagoon close to Monrovia for known local endemic plant species, an unknown tree species was discovered. Its unijugate leaves allowed to quickly establish that this legume belongs to *Englerodendron*. This paper formally describes the finding as a new species and assesses its conservation status.

Material and methods – The paper is based on data from fieldwork and morphological investigation of available herbarium material.

Key results – The novelty named here *E. libassum* is one more endemic species from the special coastal vegetation on old beach sand. Only five mature trees were found in a relatively well-known area where not much original forest is left. The species is provisionally assessed as Critically Endangered.

Keywords – Conservation; endemism; tropical forest; Africa.

INTRODUCTION

Five trees of an undescribed tree species have been found on the banks of Kpan Town Lagoon near Monrovia, a lagoon stretching about 2.5 km parallel to the seashore and reaching up to 1 km inland. This lagoon is part of a line of lagoons that were originally surrounded by the special coastal forest on old beach sand. To our knowledge, no publications describing this special type of vegetation exist (see Discussion).

Several endemic species are already known from this forest type, like *Dinklageodoxa scandens* Heine & Sandwith, *Eugenia liberiana* Amshoff, *Fegimanra acuminatissima* Keay, *Habropetalum dawei* (Hutch. & Dalziel) Airy Shaw, and *Trichoscypha laxissima* Breteler. All these endemic species, except for *H. dawei*, have also been found by the first author in the forest next to Kpan Town Lagoon. More widespread tree species, like *Azelia parviflora* (Vahl) Hepper, *Anthostema senegalense* A.Juss., *Berlinia tomentella* Keay, *Chrysobalanus icaco* L., *Crudia senegalensis* Benth., *Haplorhmosia monophylla* (Harms) Harms, and *Maranthes glabra*

(Oliv.) Prance are commonly seen on the banks of the lagoon (fig. 1). The lagoon is usually filled with fresh water, but occasionally the sea breaks through the sand barrier at the entrance. At a few places, Red Mangrove (*Rhizophora* sp.) is growing in the water.

The unijugate leaves of the new species allowed to quickly establish that it belonged to the genus *Englerodendron* and that it was still undescribed. Here, the new species is formally named *Englerodendron libassum* Jongkind & Breteler, adding a new endemic to the flora of Liberia. Its conservation status is provisionally assessed as well.

MATERIAL AND METHODS

This publication is based on field research and on the morphological study of the herbarium material available at BR, K, P, and WAG. Herbarium acronyms follow Thiers (continuously updated). Methods follow normal practice of herbarium taxonomy.

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RESULTS

Englerodendron libassum Jongkind & Breteler, sp. nov.

Figs 2, 3

Diagnosis – This species resembles *E. hallei* (Aubrév.) Estrella & Ojeda by its unijugate leaves but differs by its 2.7 cm long lateral racemes that are at most 1 cm long in *E. hallei*, and by the shape of its leaflets that are not caudate as in *E. hallei* but gradually short acuminate at the apex.

Type – Liberia: Margibi county, forest edge at Kpan Town lagoon, 6°11'N, 10°29'W, 7 Mar. 2020, fr., *Jongkind 14290* (holotype: BR; isotypes: K, P, WAG). [A Liberian institution for deposition of a type is not available at present.]

Description – **Tree** 15 m tall or more. **Branches** gradually pendulous towards the end. Branchlets terete, slightly zigzag near the end, with tiny, scattered, appressed hairs. Stipules triangular, c. 1.5 mm long. **Leaves** glabrous, unijugate with more or less equal, opposite leaflets, gradually decreasing in size to the end of a shoot; petiole 8–23 mm long, terete; petiolules 4–6 mm long, not twisted; lamina 6.5–24 × 2.8–10.5 cm, coriaceous, almost symmetrical, with 4–5 pairs of main lateral nerves; midrib impressed above, midrib and main lateral nerves prominent below, tertiary nervation only conspicuous after drying; base rounded to slightly cordate; apex gradually acuminate. **Inflorescence** mostly seemingly terminal, at least 19 cm long, pendulous, with scattered to dense, short, brown hairs; peduncle c. 5 cm long; lateral, horizontal, racemes up to 2.7 cm long; bracts c. 1 mm long, triangular; pedicel 3–5 mm long; bracteoles 2, valvate, with a dense,

brown indumentum. Open **flowers** not seen; large bud dissected: 4 sepals, the adaxial one wider; 5 petals: 3 large and subequal, 2 smaller and slender; 3 large stamens; 6 staminodes; ovary velutinous. **Pods** thinly woody, dehiscent on the tree, short brown-velutinous, slightly prominently transversely veined, with one to four seeds; seeds flat, c. 2.5–3 cm, almost circular in outline; seed coat brown.

Habitat and distribution – Only known from the forest edge on the banks of a lagoon, changing from fresh water to brackish water occasionally, depending on the presence or absence of a sand barrier blocking the connection with the sea. The local soil consists of old beach sand to at least several meters deep.

Etymology – The epithet refers to the forest of Libassa Ecolodge where the first author could study one of the trees of the new species still in a closed forest edge on the bank of the lagoon.

Additional specimens examined – Liberia, Margibi county, forest edge at Kpan Town lagoon, 21 Apr. 2019, fr., *Jongkind 14094* (BR, G, MA, MO, WAG); *ibid.*, 6 Mar. 2020, fl. bud, *Jongkind 14283* (WAG).

IUCN Conservation assessment (provisional) – *Englerodendron libassum* is at the moment only known from 5 mature trees. Only one tree is inside the private forest reserve of Libassa Ecolodge. While specimens inside a protected area and those outside of it are usually considered to belong to different locations (threat-defined), this is not the case here, since only one tree occurs inside the reserve. A single mature tree does not make a viable population; it might not even be able to produce seeds without other trees. The protected



Figure 1 – Forest on a bank of the Kpan Town Lagoon near Libassa Ecolodge and habitat of *Englerodendron libassum*. Photograph by Carel Jongkind.

area is small and only comprises c. 0.5 km of suitable lagoon bank. Furthermore, the AOO of the five known trees is 4 km². We therefore consider the number of locations, in which *Englerodendron libassum* occurs, to be one.

It is possible that more trees of the species can be found on the banks of lagoons and streams in the area but it is hard to expect more than 50 mature trees. In recent years, the city of Monrovia has quickly expanded and the area where the new species is found is slowly becoming part of the city. Around Monrovia, trees are being cut down on a large scale to produce timber, fuel wood, or charcoal. Most trees on the

banks of the Kpan Town lagoon, and other lagoons nearby, are already gone (C. Jongkind, pers. obs.). Without more research, in Liberia and Sierra Leone, it is impossible to tell how much coastal forest on old beach sand still exists outside this area near Monrovia.

The area around Monrovia, where *E. libassum* is found, is the region that is most extensively explored botanically in Liberia. Already 90 years ago, a book was published describing the forest trees close to Monrovia (Cooper & Record 1931). Since there is no mention of the new tree species in this book, it is likely that it has always been rare.

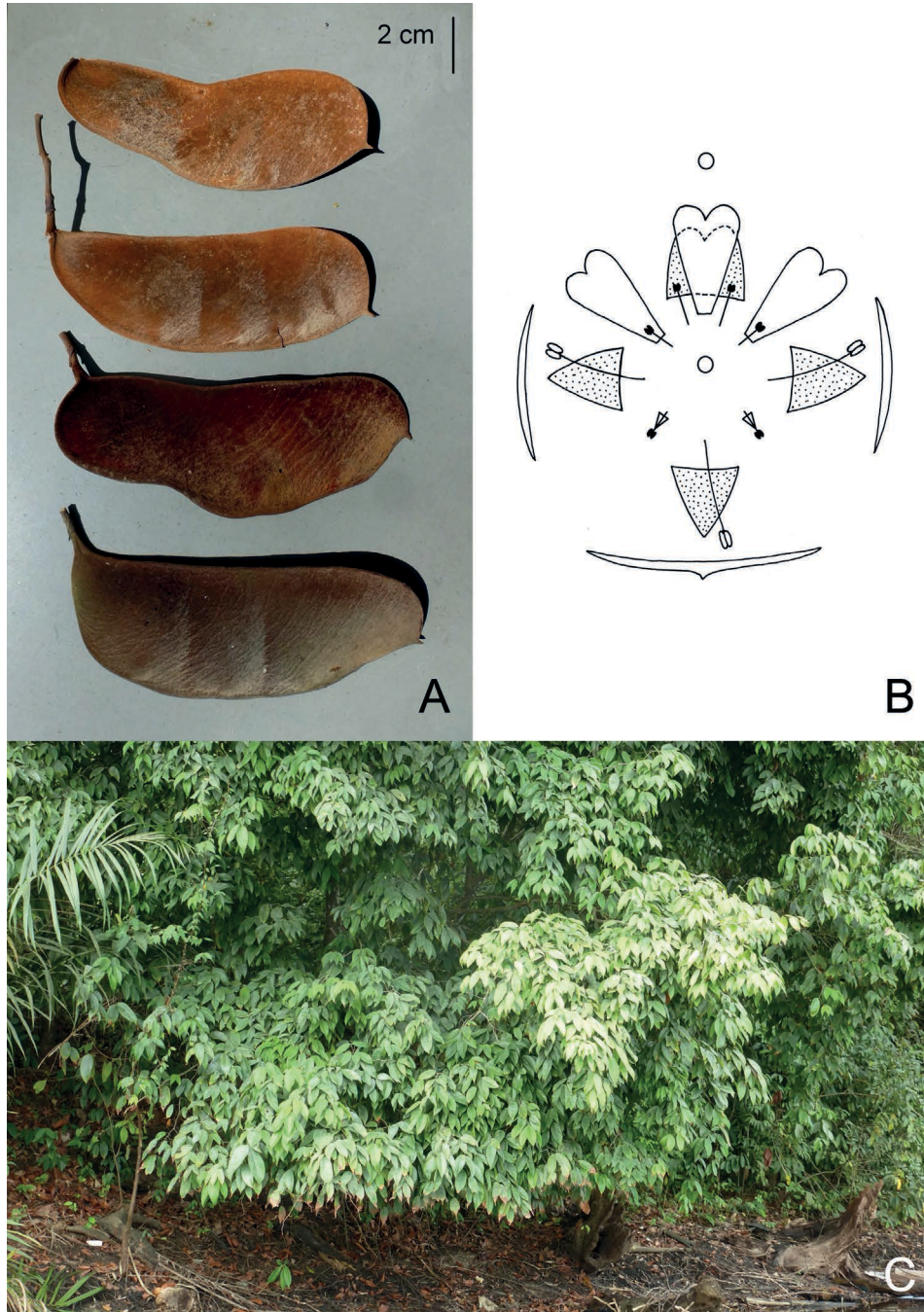


Figure 2 – *Englerodendron libassum*. **A.** Pods, *Jongkind 14094*. **B.** Flower diagram, after *Jongkind 14283*. **C.** Lower part of the tree on the lagoon bank, *Jongkind 14290*. Photographs by Carel Jongkind.

Englerodendron libassum is provisionally assessed as Critically Endangered - CR B2ab(ii,iii,v), D1 (IUCN Standards Petitions Subcommittee 2017), because only one local population with less than 50 mature trees was found and most waterside forest suitable for this tree in the one location is already cut down.

Notes – The change between fresh and brackish water in the lagoon and the depth of the sandy soil are based on personal observations by the first author.

In related species, there is, within species or even individual plants, variation in the number and the position of the petals and staminodes (Breteler 2011). It is not unlikely that

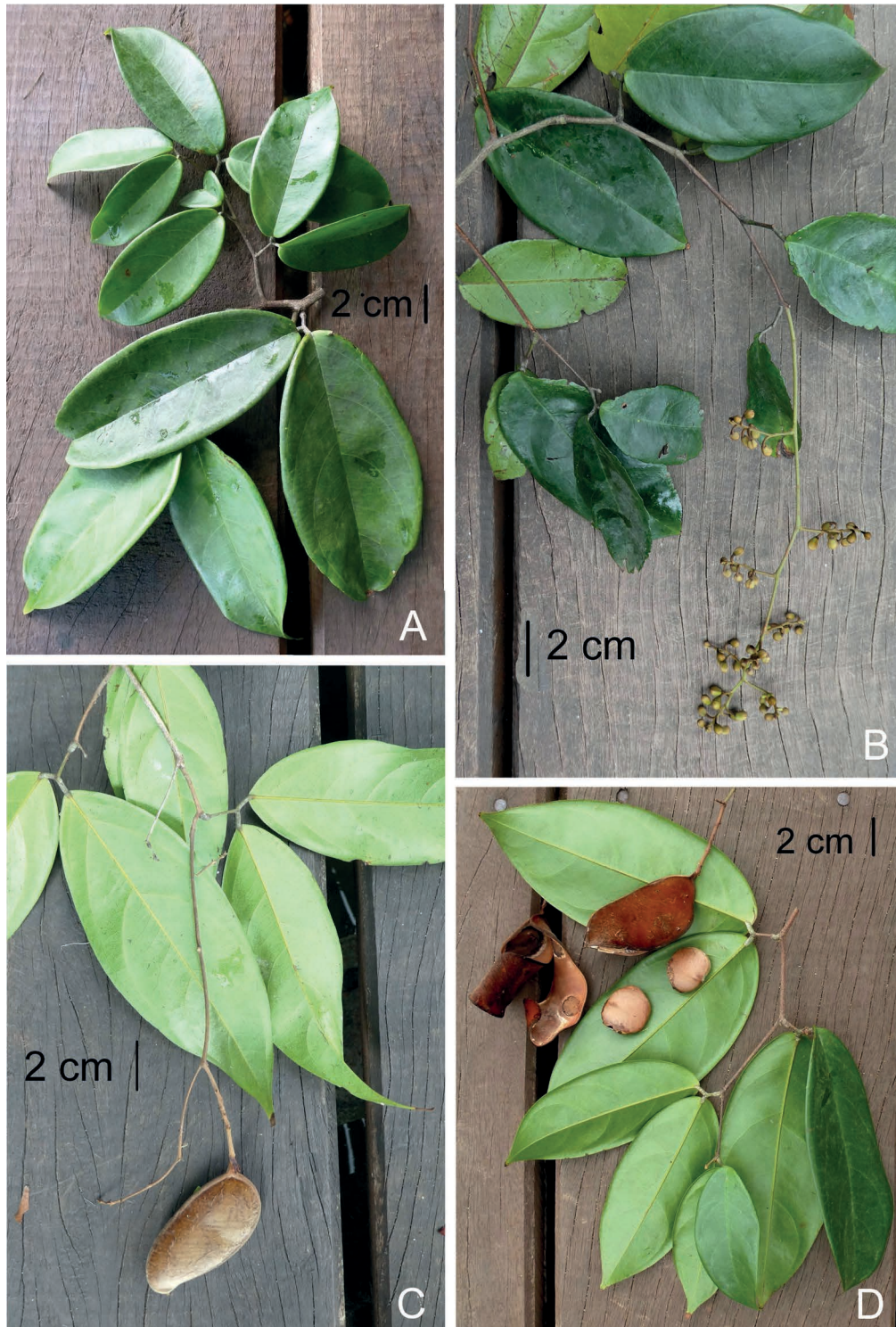


Figure 3 – *Englerodendron libassum*. A. Leaves from above, Jongkind 14094. B. Inflorescence in bud, Jongkind 14283. C. Infructescence with one pod, Jongkind 14290. D. Leaves from below with open pods and seeds, Jongkind 14094. Photographs by Carel Jongkind.

the same will be the case for the new species. More rich-flowering specimens are needed to verify this.

The limited number of fertile branchlets that we have for this species suggests that it might also differ from related species by the, at first sight, mostly terminal inflorescences. The inflorescences are not really terminal but in the axil of a terminal leaf. In part of the related species, the inflorescences are often more clearly axillary.

DISCUSSION

The taxonomic position of the new species

The new species is placed in the genus *Englerodendron* Harms (Leguminosae-Detarioideae-Amherstieae) based on its fruits, flowers, and leaves. The fruits (fig. 2A) are dehiscent on the tree and fit in the variation illustrated in the revision of *Isomacrobium* Aubrév. & Pellegr. (Breteler 2011: 67), a genus recently included in *Englerodendron* (de la Estrella et al. 2019). A flower diagram, made after the dissection of a flower bud of the new species (fig. 2B), shows a match with flower diagrams of other *Englerodendron* spp., like that of *E. explicans* (Baill.) Estrella & Ojeda (Breteler 2011: 69, as *I. explicans* (Baill.) Breteler). In the recent re-evaluation of the tropical African genus, 17 species are included in the genus (de la Estrella et al. 2019). The new species is, next to *E. hallei* (Aubrév.) Estrella & Ojeda from Gabon, the second species with exclusively unijugate leaves.

The coastal forests on old beach sand

Along the tropical Atlantic coast of Africa, there are several long stretches of sandy coastline with lagoons parallel to the beach (Airy Shaw 1951; Boughey 1957). Especially close to the beach, they share a number of characteristic woody species like *Cassipourea barteri* (Hook.f. ex Oliv.) N.E.Br., *Chrysobalanus icaco* L. subsp. *icaco*, *Dalbergia ecastaphylum* Taub., and *Phoenix reclinata* Jacq.. Just behind this beachside vegetation, there is, from Sherbro Island in Sierra Leone to Buchanan in Liberia, the forest on old beach sand that surrounds the lagoons along this stretch of sandy coast, and that harbours several endemic woody species. *Dinklageodoxa scandens*, *Eugenia liberiana*, *Fegimanra acuminatissima*, *Habropetalum dawei*, and *Trichoscypha laxissima* were already known, but now *Englerodendron libassum* can be included as a sixth endemic. There is very little known about this vegetation since no long-term research has been done and plants have been collected on relatively few locations. Looking at the discovery of *E. libassum* in the relatively well-known area close to Monrovia, it is not unlikely that more botanical research in this forest type could reveal additional new species. No information about earlier botanical research on this coastal forest in Sierra Leone and Liberia could be found, only a short vegetation description with the publication of the new combination *Habropetalum dawei* (Hutch. & Dalziel) Airy Shaw (Airy Shaw 1951: 338). Two short communications (Adam 1970a, 1970b) report about

Adam's visits to the Liberian coast at Buchanan and Cape Palmas but they do not mention this forest. It is clear that more research on, and also better protection of, this vegetation is urgently needed. We hope that this publication can contribute to the establishment of conservation programs for these unique coastal forests.

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