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Plagiosiphon intermedium (Leguminosae, Detarioideae), a new tree species from the Ngovayang forest in Cameroon

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Abstract. *Plagiosiphon intermedium* Burgt, Ngansop & Tchiengué, Leguminosae–Detarioideae, is described and illustrated. It is a tree, to 34 m high, with a stem to 66 cm diameter. The leaves have (2 –)3–4(– 5) pairs of opposite leaflets, with the lowest pair often sub-opposite. The flowers are unknown. The fruit is a pod, brown, the valves more or less obovate in outline, 7–9.5 × 3.5–4.5 cm, without visible veins outside, short dense hairy outside. *Plagiosiphon intermedium* occurs in primary rain forest, at 760–870 m elevation. The tree species is endemic to the Ngovayang Massif in the South Region of Cameroon. Three herbarium collections have been made, in an extent of occurrence of only 0.51 km^2. *Plagiosiphon intermedium* is provisionally assessed as Endangered B1(iii,v)+B2(iii,v).

Keywords: Africa, endemic, Fabaceae, Leguminosae, *Plagiosiphon*, endangered.

INTRODUCTION

Plagiosiphon Harms is a genus in the Leguminosae family. The genus was published in 1897, with the species *Plagiosiphon discifer* Harms; followed in 1899 by a more detailed description of the genus and species, (Harms 1897, 1899). In 1951, J. Léonard transferred to *Plagiosiphon* four species from other Detarioideae genera: *P. emarginatus* (Hutch. & Dalziel) J.Léonard; *P. gabonensis* (A.Chev.) J.Léonard; *P. longitubus* (Harms) J.Léonard and *P. multijugus* (Harms) J.Léonard. There exist five accepted species and no synonyms (GBIF 2025; IPNI 2025; POWO 2025). The five accepted species can be distinguished by the key in Léonard 1951: p. 425. The five species of *Plagiosiphon* are rain forest trees and riverine forest trees. *Plagiosiphon emarginatus* occurs in West Africa: Guinea, Sierra Leone, Liberia and Ivory Coast; all five species occur in Central Africa: Cameroon, Equatorial Guinea, Gabon and Congo (Brazzaville).

Plagiosiphon is placed in the Leguminosae subfamily Detarioideae, a subfamily occurring in Cameroon with 42 genera and several hundreds of

species (GBIF 2025), mainly in rain forest habitats. The canopy of African rain forests may be dominated by several Detarioideae tree species in co-dominant stands (Aubréville 1968a; Letouzey 1968). Most of the Detarioideae tree species in Korup National Park in Cameroon, including *Plagiosiphon longitubus*, were recorded to occur in groups ranging in size from 50 m to over 1000 m, depending on the species. Groups usually had circular shapes, caused by ballistic seed dispersal. In a group, trees were always mixed with trees of several other Detarioideae species and many trees and tree species from other families (Burgt et al. 2021). The seeds of most Detarioideae tree species are dispersed to relatively short maximum distances, which makes these species poor re-colonisers of forest after disturbance (Letouzey 1960, 1968). Rain forests rich in Detarioideae trees and tree species are supposed to have not been subject to substantial human and natural impacts in historic or prehistoric times (Burgt et al. 2021).

A collection of twigs with leaves, pods, and seedlings from a tree in the Ngovayang Massif in Cameroon, made in 2017 by two of the co-authors of the present study, was determined by the authors to belong to the genus *Plagiosiphon*. The authors were able to return to the tree in 2019, but the tree, and four more trees of the same species standing nearby, were sterile. The authors have not seen any flowering plants. The authors also could not find an existing flowering herbarium collection of this species. The leaves of the specimens differ from those of the other five species of *Plagiosiphon*. The new species of *Plagiosiphon* is here described.

MATERIALS AND METHODS

Herbarium sheets from the herbaria BR, K, MO, P, WAG, YA were studied. All cited material was seen, as an herbarium specimen and/or as an image. The distribution map was made with Simplemappr (Shorthouse 2010). The morphological terminology follows that of Beentje (2016). A preliminarily IUCN extinction risk category was determined following IUCN criteria (2012, 2024).

RESULTS AND DISCUSSION

The genus *Plagiosiphon* currently contains six species. The genus characteristics are in the flowers (Aubréville 1968b, 1970; Harms 1899; Léonard 1951) and are briefly described in the notes section below. The leaves of *Plagiosiphon* are characterised by the distinctive pustulate lower leaflet surface and the emarginate leaflet apex. The six species can be distinguished by the number of pairs of leaflets, and by the shape of these leaflets. The key in Léonard 1951, page 425, distinguishes five species, while the new species *Plagiosiphon intermedium* has a number of pairs of leaflets, (2 –) 3–4 (– 5) pairs, that is unique in the genus.

Plagiosiphon intermedium Burgt, Ngansop & Tchiengué, **sp. nov.** (Figure 1).

Type: Cameroon, South Region, northeast of Bipinde, north of village Ngovayang II, Ngovayang hills, 3°17'26.6''N, 10°37'1.5''E, 760 m, fr., 10 Oct. 2017, *Burgt, Grall & Ngansop* 2139 (holotype YA, isotypes K001286582, P, WAG). (Figures 1–4).

Diagnosis

Plagiosiphon intermedium morphologically resembles *Plagiosiphon longitubus* (Harms) J.Léonard; a species from Cameroon, Equatorial Guinea, and Gabon. *Plagiosiphon longitubus* has 4–8 pairs of leaflets; *P. intermedium* has (2 –) 3–4 (– 5) pairs of leaflets. In the Leguminosae subfamily Detarioideae, such a difference in leaflet numbers clearly indicates a difference at the species level.

Description

Tree, to 34 m high, stem to 66 cm diameter. Bark smooth, bright brown, lenticels numerous, lighter in colour than the bark. Twigs glabrous, lenticels in the same colour as the twig. Stipules 2–5 mm long, glabrous, base triangular, apex linear, caducous. Leaves alternate, distributed evenly along the twig, internodes 1–5 cm long. Leaves paripinnate, from 5 × 3 cm to 15 × 8 cm, petiole 0.4–1.2 cm long, rachis 3–10 cm long, canaliculate, petiole and rachis glabrous; leaflets in (2–)3–4(–5) pairs, opposite with the lowest pair often sub-opposite, petiolules up to 0.5 mm long or leaflets subsessile, glabrous; leaflets unevenly elliptic or ovate, to rhombic, apex deeply emarginate, the distal side of the apex longer than the proximal side; the proximal pair of leaflets of a leaf is usually the smallest, the distal pair the largest, distal and middle leaflets 3–8 × 1–2.5 cm, proximal leaflets 2–6 × 0.8–2 cm; leaflet blade glabrous on both sides, primary vein prominent and glabrous on both sides, 12–18 pairs of secondary veins, venation prominent above, faint below; 0–4 glands, visible with a hand lens on the lower surface of the leaflet, positioned on the distal half, near the petiolule, between the primary vein and the edge, sometimes present on the lower and middle leaflets, absent on the upper pair of leaflets. Inflo-

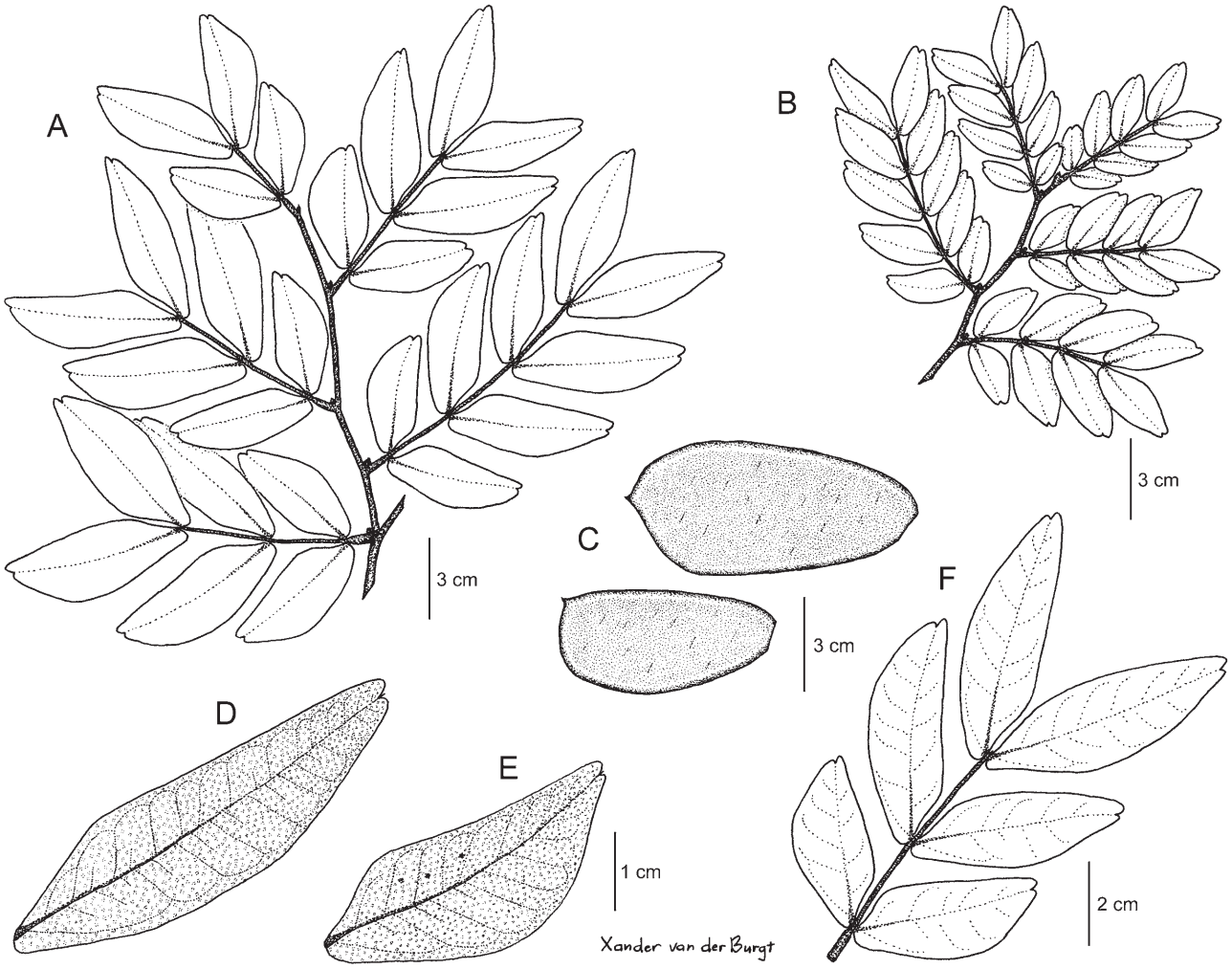


Figure 1. *Plagiosiphon intermedium*. **A.** Branch with large leaves with 2–4 pairs of leaflets. **B.** Branch with small leaves and 4–5 pairs of leaflets, drawn on the same scale as A. **C.** Two pod valves. **D.** Distal leaflet lower side. **E.** Proximal leaflet lower side, with 3 glands. **F.** Leaf with 3 pairs of leaflets. A. from *Burgt* 2387 (K, YA), B. from *Thomas* 3423 (YA), C–F. from *Burgt* 2139 (K, YA). Drawing by Xander van der Burgt.

rescence, flowers, and infructescence unknown. Fruit a pod, woody, dehiscent, brown, valves elliptic to obovate in outline, 7–9.5 × 3.5–4.5 cm, smooth, without visible veins outside, short dense hairy outside, apex acuminate, 2–3 mm long; fruit containing 1–3 seeds; seeds probably ellipsoid, c. 12 cm diameter. Seedling hypocotyl 10–13 cm long, epicotyl 5–8 cm long, first pair of leaves opposite, with 3–4 pairs of leaflets each, leaflets opposite with lowest pair often sub-opposite, leaflets 2–5 × 0.8–1.8 cm.

Etymology

The genus name *Plagiosiphon* is derived from the Greek words "*plagios*" and "*siphon*", and refers to the shape of the receptacle, which has the shape of a tube, "*siphon*", but is oblique, placed at an angle to the symmetric plane, placed sideways, "*plagios*" (Quattrocchi 1999). The species *intermedium* was given that name because of the number of leaflets, which is intermediate between the number of leaflets of *P. discifer* and *P. longitubus*. The other three species of *Plagiosiphon* have a higher number of leaflets. A local name has not been recorded.

Distribution

Plagiosiphon intermedium occurs in Cameroon, South Region, in the Ngovayang Massif (Map 1). The species may also occur on nearby forested hills.

Habitat

Plagiosiphon intermedium occurs in primary rain forest, at 760–870 m altitude.

Figure 2. *Plagiosiphon intermedium*. Stem of a tree 66 cm in diameter at 1.3 m height. From *Burgt* 2139. Another photo of this tree: Murphy et al. 2023, p. 242. Photo by Xander van der Burgt.

Figure 3. *Plagiosiphon intermedium*. Twig with leaves and two pod valves. From *Burgt* 2139. Photo: Xander van der Burgt.

Figure 4. *Plagiosiphon intermedium* seedlings. From *Burgt* 2139. Photo: Xander van der Burgt.

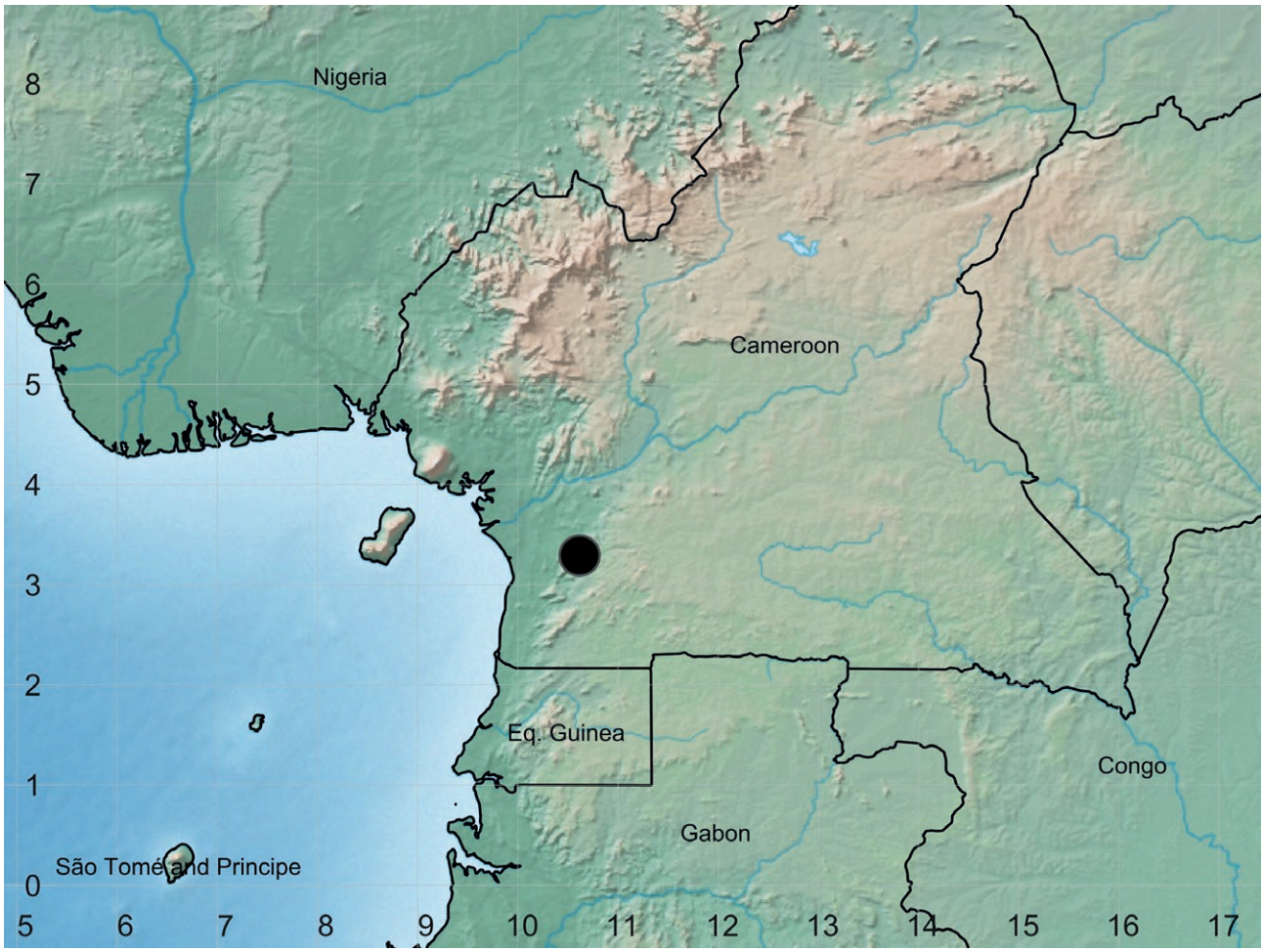
Ecology

Plagiosiphon intermedium was found growing in a group, a characteristic feature of many Detarioideae tree species. This group has a size of at least 400 m × 120 m, and consists of mature trees, saplings and seedlings; mixed with many trees of other species.

Conservation status

The extent of occurrence of *Plagiosiphon intermedium* is 0.51 km^2. This was calculated using the coordinates of the 3 herbarium collections and the 2 observations described on the label of *Burgt* 2387. The area of occupancy of these 5 collections and observations is 8 km^2. The extent of occurrence and area of occupancy should not only include the actually known sites, but also inferred or projected sites (IUCN 2024: p. 53). *Plagiosiphon intermedium* occurs without doubt in more localities in Ngovayang, since on Google Earth there is visible an area of 360 km^2 of potentially suitable forest habitat of over 500 m altitude, within and near the extent of occurrence. It is not detectible whether this is primary forest; parts of it may be secondary forest, where most Detarioideae species occur less abundantly. The actual extent of occurrence may be estimated as more than 100 km^2, but less than 5000 km^2. The actual area of occupancy may be estimated as more than 10 km^2, but less than 500 km^2.

Plagiosiphon intermedium may also occur on nearby forested hills such as the Campo-Ma'an National Park about 50 km to the south, or the Ebo Forest approximately 100 km to the north. Although the level of botanical survey in both areas is far from complete, for this assessment, we assume that *P. intermedium* does not occur there. It is estimated that there are two



Map 1. Distribution of *Plagiosiphon intermedium.*

locations, because the species was found in the forest behind two different villages. Five trees of *Plagiosiphon intermedium* over 12 cm stem diameter, presumably mature trees, were seen during the collecting of *Burgt* 2139 and 2387, in primary forest in a valley bottom and on a steep slope. It is estimated that there exist more than 250 mature trees. Secondary forest was seen at 750 m to the southeast, at 630 m altitude. Because of the presence of secondary forest nearby, where *P. intermedium* may have also occurred, it is likely that there has been decline in quality of habitat and in the number of mature individuals.

The Ngovayang Massif is rich in iron ore, with the highest concentrations of iron located above 750 m (Droissart et al. 2019). Prospection for iron ore may have already caused decline in numbers of mature individuals of *P. intermedium*, and the decline in the future is potentially large. Therefore, *Plagiosiphon intermedium* is here preliminarily assessed as Endangered B1(iii,v)+B2(iii,v).

Notes

The Ngovayang Massif is located in the South Region of Cameroon, and is about 55 km long and 15 km wide. It is covered by lowland and sub-montane rainforest at 100 to 1110 m elevation (Droissart et al. 2019). A dataset of 6116 georeferenced herbarium specimens was compiled; about half of these are from the earliest botanical explorer of the area, the German botanist Georg August Zenker (1855–1922), who collected c. 3000 specimens at "Bipindi" at the southern end of the Ngovayang Massif (Droissart et al. 2019). The Ngovayang Massif represents an Important Plant Area of Cameroon as confirmed by its exceptional plant diversity, by the concentration of many threatened and/or restricted range species as well as by the threat on rare habitats such as the sub-montane vegetation above 750 m elevation (Droissart et al. 2019; Murphy et al. 2023). The Ngovayang forests have some of the highest species'

richness and endemism of all Central African forests (Gonmadje et al. 2011; Droissart et al. 2019). Ngovayang contains about 1500 vascular plant taxa (Droissart et al. 2019). The Ngovayang Massif holds the entire global populations of 16 plant species and one subspecies; in other words, 17 taxa are strict endemics of the massif (Murphy et al. 2023). The Ngovayang Massif represents the third richest plant diversity documented area for Cameroon after Mt Cameroon National Park and the Kupe, Mwanenguba and Bakossi mountains (Droissart et al. 2019; Murphy et al. 2023). Topography, high precipitation and permanence of forest cover during periods of drier climate may help explain this richness (Gonmadje et al. 2011). A particular richness in Leguminosae-Detarioideae likely indicates that the area has remained under forest cover during the past ice ages. The new species *Plagiosiphon intermedium* occurs in the Ngovayang Important Plant Area in Cameroon. These two publications advise increased protection of the vegetation of the Ngovayang Massif, by local communities as well as the Cameroon government.

In addition to *Plagiosiphon intermedium*, *P. longitubus* and *P. multijugus* also occur in Ngovayang (Droissart et al. 2019). *Plagiosiphon discifer* probably occurs there as well, because this species was found in two places very near Ngovayang. Flowers of *Plagiosiphon intermedium* have not yet been collected. The flowers probably have the same structure as those of the other species of *Plagiosiphon* (as described in Aubréville 1968b, 1970; Harms 1899; Léonard 1951). If so, these flowers have 2 bracteoles that do not enclose the flower in bud, a receptacle that is elongated, funnel-shaped to cylindrical in shape and gibbous at the base, 4 sepals, (4 –) 5 petals unequal in size, and (8 –) 10 stamens. The three collections of *Plagiosiphon intermedium* show variation in numbers and sizes of leaflets. *Thomas* 3424 has 4–5 pairs of leaflets of 2–3.5 cm long. *Burgt* 2139 and 2387 have 2–4 pairs of leaflets of 3–8 cm long. *Thomas* 3424 consists of leaves from a windfall branch, presumably these are leaves from the canopy, which were positioned in full sunshine. *Burgt* 2139 and 2387 were collected from the lowest branches of the trees, using a pole pruner; these are leaves adapted to half shade. This may explain the variation in numbers and sizes of leaflets between the three collections.

Additional specimens examined

CAMEROON. South Region, northeast of Bipinde, northwest of village Ngovayang II, Ngovayang hills, 3° 17' 23.3" N, 10° 37' 4.0" E, 770 m, sterile, 14 Dec. 2019, *Burgt, Alvarez & Ngansop* 2387 (B, BR, BRLU, EA, FT, G, K, LISC, MA, MO, P, PRE, S, SCA, WAG, YA); steep hillside on Ngovayang Mountain, above Bibondi village, near Lolodorf. 3° 18' N, 10° 39' E, 500–1000 m, sterile, 9 April 1984, *D.W. Thomas* 3424 (K, MO, YA).

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