

ON PHYLLOBOTRYON MUELL. ARG. (FLACOURTIACEAE)

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SUMMARY

The correct form of the name of the genus is discussed. The author gives information on the pseudo-epiphyllous inflorescences of *Phyllobotryon spathulatum* Muell. Arg. and reviews the characters and status of two aberrant forms in Cameroun. A key is given and a description and figure are added.

1. INTRODUCTION

As LETOUZEY, HALLÉ & CUSSET (1969) have started examination of the tribe *Phyllobotryae*, it seems opportune to add some information that has become available since, and to discuss their conclusions.

At the time of publication of the paper referred to, I was working in the Republic of Cameroun and had the opportunity to investigate some of the taxa discussed in situ. The present paper deals with the genus *Phyllobotryon*, more in particular with *P. spathulatum* Muell. Arg., and intends to be complementary to the work of LETOUZEY et al., although a different opinion on some minor aspects is reached.

2. THE NAME OF THE GENUS

When MUELLER of Aargau produced his protologue of the genus in *Flora* (1864) he used the Greek form *Phyllobotryon* and his type species was consequently named *Phyllobotryon spathulatum* Muell. Arg. Two years later, when treating this taxon in DE CANDOLLE's *Prodromus* (1866), he adopted the name *Phyllobotryum*, for the genus as well as for the combination. In a later publication (1875) he used both forms, Greek and Latin, in the same paragraph indicating in my opinion a certain indifference towards a stable orthography. Later authors followed the Latin form of the *Prodromus* rather than the Greek form of the protologue, with the exception of DURAND & SCHINZ (1898) who adopted *Phyllobotriion*.

The limited number of publications, the comparative rarity of the plants concerned, and the absence of economic importance renders any claim towards conserving the younger Latin form over the original Greek form void under the current Code. I therefore oppose the suggestion of LETOUZEY et al. (l.c.: 517) to consider *Phyllobotryum* for conservation. *Index Nominum Genericorum* has the original orthography *Phyllobotryon* and as later variants *Phyllobotryum* and *Phyllobotriion*. HUTCHINSON (1967) followed this view.

3. THE PSEUDO-EPIPHYLLOUS INFLORESCENCE

The most striking feature of the genus *Phyllobotryon* is the presence of flowers on the midrib of the leaf. As far as *P. spathulatum* is concerned I agree with the opinion of LETOUZEY et al. (l.c.: 516) that this results from fusion of the main axis of the inflorescence with the midrib of the supporting leaf. Conclusive evidence might be obtained by anatomical investigation, but close scrutiny of herbarium material with the aid of a hand-lens already reveals the presence of two superposed sets of apparently conductive tissue in the cross-section of the midrib.

The variability in the distance between the axil and the places where the branches of the inflorescence are produced was adequately treated by LETOUZEY et al. (l.c.: 521). A comparison of the available herbarium material at BR, K, P, and WAG from the entire range of distribution of *P. spathulatum* fully endorses the field observations by HALLÉ in Gabon. There is, however variable the distribution of inflorescence branches or glomerules may be, one common character which has not been sufficiently stressed before: the fused inflorescence is invariably distinctly shorter than the midrib of the supporting leaf, and the topmost glomerule (or tip of the inflorescence axis?) is always inserted distinctly below the leaftip and not on the "Vorläuferspitze" (disregarding the aberrant form discussed later).

4. OTHER CHARACTERS

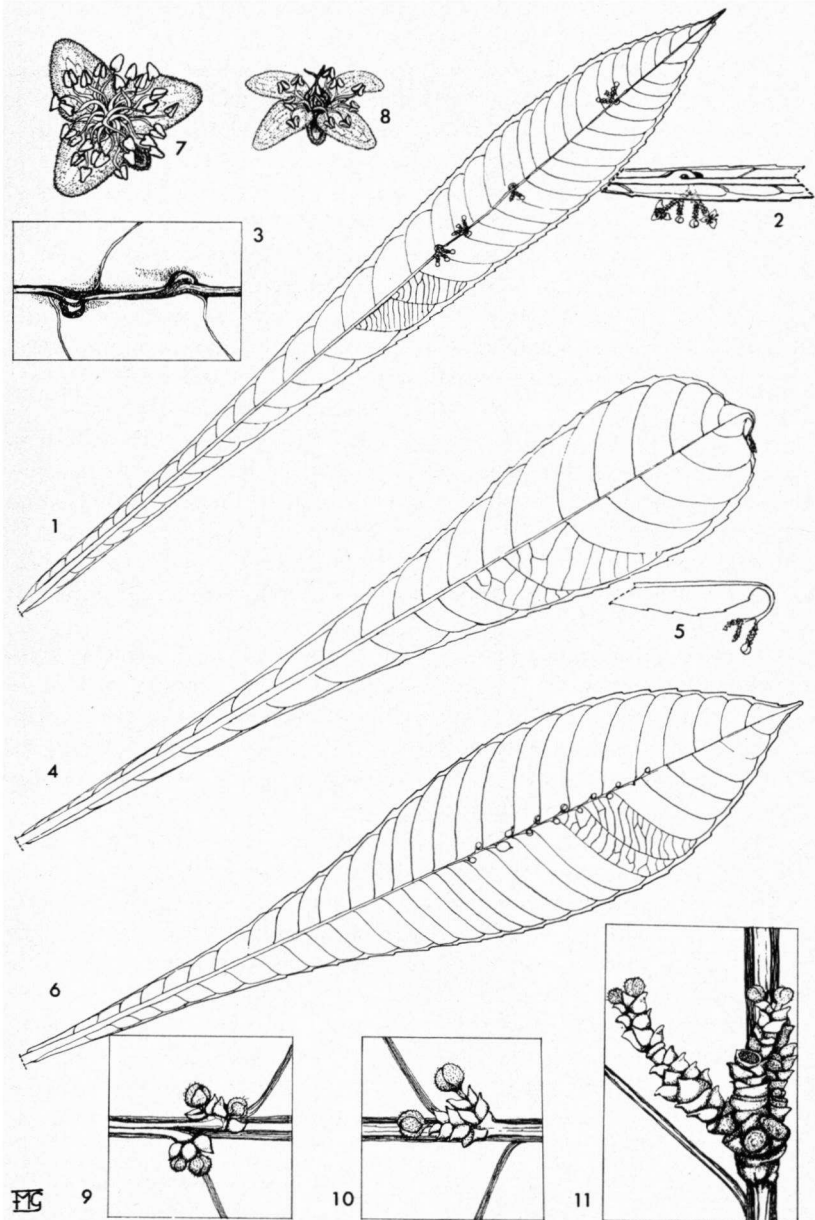
The available material of *P. spathulatum* shows that a number of characters are variable. The majority of these characters do not seem to have any diagnostical value; leaf dimensions, sizes of peduncle branches and pedicels, stipules, and indumentum fall within this category. Male flowers are more commonly produced than bisexual flowers, but neither presence nor numbers of either have diagnostical meaning. There is a marked variability in the shape of the anthers: from widely sagittate (thecae divergent at the base) to narrowly oblong (parallel thecae), but intermediates are often found. Moreover, all forms may be present in a single flower.

The ovaries and fruits seem to be less variable and differences, however slight, may prove to be of more diagnostical value (see next paragraph). I fully support the conclusion of LETOUZEY et al. (l.c.: 535) concerning the synonymy in *P. spathulatum*.

5. THE ABERRANT FORMS

LETOUZEY et al. (l.c.: 522 & 526) report the presence of two aberrant forms in Cameroun, within the area of *P. spathulatum*. Both seem to be distinct but very closely related taxa and have been collected in two little investigated localities of the littoral forest (after LETOUZEY 1968).

One of these forms has only been collected once: Letouzey 9390 from the Kienke River basin, 30 km ESE of Kribi. It has distal inflorescences hidden



Phyllobotryon "perforans": 1. leaf lamina from below, $\times 1/5$; 2. detail with inflorescence, lateral; 3. detail from above showing two perforations (*Bos 6333*) – *Phyllobotryon "verecundum"*: 4. leaf lamina from above, $\times 1/5$; 5. detail with inflorescence, lateral (*Letouzey 9390*) – *Phyllobotryon spathulatum* Muell. Arg.: 6. leaf lamina from above, $\times 1/6$ (*Le Testu 2175*); 7. male flower, $\times 2$ (*Letouzey 9426*); 8. bisexual flower, $\times 2$ (*Hallé & Villiers 4539*); 9–11. 3 successive stages in the development of the inflorescence (*Letouzey 9426*; *Hallé 760*; *Villiers 239*).

below the leaftip as Letouzey aptly observes; I will refer to this form as "*verecundum*".

The view that *verecundum* should be considered as the most advanced stage of *P. spathulatum* seems justified and the theory about its derivation may be sound. The fact remains that *verecundum* is distinguished by having inflorescence branches in the ultimate portion of the leaf only, without any trace of glomerules situated lower on midrib or petiole. This is contrary to the mode of distribution of glomerules in *P. spathulatum* (see 3). The fact that the leaf tip bearing the inflorescence in *verecundum* is strongly reflexed, is not seen in *P. spathulatum* and may be significant. Lastly the fruits of *verecundum* are not smooth but strongly pustulate, while *P. spathulatum* fruits are generally smooth to, occasionally, somewhat pustulate. This last character may be unimportant but nevertheless tends to support a separate status of *verecundum*.

The second aberrant form is even more peculiar. Here the distribution of glomerules and the fusion of inflorescence and midrib follows the pattern of *P. spathulatum*, but flowers are produced only after the branch of the inflorescence has pierced the lamina of the leaf completely. In this way flowers and fruits are produced below the lamina of the leaf and are invisible from above. CUSSET (in LETOUZEY et al. l.c.: 527) clearly demonstrates the purely mechanical character of this perforation of the lamina by the inflorescence branches. It seems appropriate to refer to this form as "*perforans*".

The consecutive inflorescence branches pierce the lamina on alternate sides of the midrib, and the latter seems to bend each time to the point of penetration, resulting in a more or less zig-zag rather than straight course of the midrib. Another supporting character is to be found in the fruits that are covered by a dense curly indumentum, whereas the fruits of *P. spathulatum* are usually glabrous or have at most some caducous hairs.

Three collections have been made of *perforans*: Letouzey 4181, near Bella, 45 km NE of Kribi, and Bos 6333 & 7089, both from the vicinity of Bivouba, 60 km N of Kribi, in the Lokoundje River basin. As at the time of collection my attention to aberrant forms in *Phyllobotryon* had been drawn by Letouzey in a personal communication, I have taken special note of the fact that on the collecting locality of Bos 6333 & 7089 all individual plants were, without exception, "*perforans*". In passing *perforans* may be believed to be sterile *P. spathulatum*, as they resemble each other strikingly and flowers and fruits of the former are only visible when the leaves are lifted. Letouzey's personal field observations similarly indicate the occurrence of a pure population of *verecundum* on the locality of Letouzey 9390.

While I was stationed at Kribi it struck me that there seemed to be certain differences in floristics between the Lokoundje River basin and the Kienke River basin, although the watershed between both basins is not clearly recognized in the field. So far *perforans* has been collected in the Lokoundje River basin only, while *verecundum* was found in the Kienke River basin. In this region a number of endemic species with a very limited distribution exist, while many more species reach the limit of their distribution here.

6. TAXONOMIC CONSEQUENCES

It appears that within the area of the somewhat variable *P. spathulatum* there exist in restricted localities homogenous populations of very similar plants, differing, however, by few but undeniably distinct characters. LETOUZEY et al. (l.c.: 524) seem to suggest that these aberrant forms should be treated as mere ecological variants of *P. spathulatum*. The differential characters, however, indicate a genetic cause rather than a phenetic one. In my opinion it is quite possible that one is witnessing the very act of speciation.

The taxonomic status of *perforans* and *verecundum* then becomes rather arbitrary. Valid arguments may be produced for a specific or infraspecific level. However, at the moment I do not deem it wise to give either *perforans* or *verecundum* an official status under the rules of the International Code of Botanical Nomenclature, and I purposely avoid doing so for the following reasons: material available is still very limited and incomplete. Some information on the cytology and additional data on their distribution are needed for a well-founded conclusion. A future monographer of *Phyllobotryae* or *Phyllobotryon* probably will be in a better position to decide upon the status of *perforans* and *verecundum*. I prefer to draw attention to the problem by these notes and add a key and an amended description of *P. spathulatum*.

Inflorescence branches or glomerules situated along the midrib from the axil upwards, exclusive of the leaf tip, the latter continuing the lamina in the same direction.

Flowers and fruits produced above the lamina by inflorescence branches or glomerules not piercing the lamina; midrib straight and fruits at most sparsely hairy **P. spathulatum** Muell. Arg.
 Flowers and fruits produced below the lamina by inflorescence branches piercing the lamina from above, flowering part of the midrib more or less zigzag, fruits densely hairy **P. "perforans"**
 Inflorescence branches or glomerules situated exclusively on the apical part of the midrib, the leaf tip sharply recurved **P. "verecundum"**

Phyllobotryon spathulatum Muell. Arg., Flora 47:534. 1864.

Phyllobotryum spathulatum Muell. Arg., in De Candolle, Prodr. 15, 2:1231. 1866; Letouzey et al., Adansonia 9, 4:535. 1969. Type: Mann 1737, Gabon (K holotype, isotype: P).

Phyllobotryum soyauxianum Baill., Bull. Mens. Soc. Linn. Paris 1:287. 1881; Hutch. & Dalz., Fl. W. Trop. Afr. 1, 1:163. 1927; Keay, Ib. 2nd ed. 1, 1:191. 1954. Type: Soyaux 32, Gabon (P holotype, isotypes: B †, K)¹.

Phyllobotryum zenkeri Gilg, Bot. Jahrb. 40:500. 1908. Syntypes: Zenker 1744 & 3245, Dinklage 1330 and Staudt 865, Cameroun (originals destroyed

¹ LETOUZEY et al. (l.c.: 535) indicate the specimen destroyed at B as holotype. As this taxon was described and published in Paris by BAILLON it is unlikely that BAILLON used the Berlin material rather than the specimen at P. The remark by LETOUZEY et al. (l.c.: 518) concerning "isotypes Soyaux 32 de l'herbier de Berlin" supports this view.

in B; isotypes: Zenker 1744, K; Zenker 3245, BR, P, Z; Dinklage 1330, HBG, P, WAG; Staudt 865, BR, K, P).

Phyllobotryum basiflorum Gilg (sphalm. *P. breviflorum*), in Mildbraed, Wiss. Ergebn. Zweite Deutsche Zentr.-Afr. Exped. 1910–11, 2:97. 1922 (nom. nud., specimen Mildbraed 6006, B†, HBG).

Erect treelet to 5 m tall, usually unbranched, rarely bifurcate. Trunk dark brown, rarely reddish at the top, glabrous. Stipules pale green, pale reddish when young, glabrous or minutely appressed-hairy outside, glabrous inside, ciliate, 10–30 × 2.5–10 mm. Leaves crowded at the apex; young flush leaves may be reddish. Petioles up to 3(–4) cm long, usually about 15 × 5–8(–10) mm, rather swollen. Lamina coriaceous, glabrous, pale to dark green with paler midrib above, pale green with the midrib rarely reddish below, narrowly obovate (spathulate) to 100 cm long and 5–16(–18.5) cm wide at about a third to a quarter below the apex; acuminate to rounded at the apex, cuneate or rounded at the base with often the lower portion of the lamina with parallel margins. Margins towards the leaf-apex progressively dentate or obscurely so, mainly in the upper part of the lamina; teeth mucro pectinate, dark brown and up to about 1 mm long. Secondary veins prominent on both sides (0.5–)1–4(–6) cm apart, at a wide angle to the midrib, straight to curved upwards and near the margin more or less abruptly curved distally, parallel to the leaf edge and linking up with the next, sometimes obscurely so. Tertiary veins usually perpendicular to the midrib and the secondary veins, usually reticulate but sometimes parallel and anastomosing at the apex only. Peduncle and axis of the inflorescence completely fused with the midrib of the supporting leaf, rarely both elements distinct in colour, occasionally the apex adnate or free for up to 5 mm in comparatively young leaves. Distal part of the midrib above the inflorescence usually less stout and prominent than the proximal fused part. Flowers arranged in glomerules or on short, free, lateral branches. Glomerules proximally rather distant but distally progressively less spaced and crowded towards the apex of the inflorescence axis. Lowermost glomerule (1–)10–70(–78) cm above the axil, number of glomerules variable 2–15(–20), uppermost glomerule (3.5–)5–29 cm below the leaf tip. Glomerules nearly sessile, some developing 2–6 branches up to 12 mm long, with minute, broadly triangular bracts, these up to 0.5 × 1 mm, glabrous, minutely ciliate and persistent. Inflorescence andromonoecious, male and bisexual flowers may be present in the same glomerule; flowers 3- or rarely 4-merous, sessile to shortly pedicellate; pedicels up to 3 mm long, pale, sparsely and minutely pubescent. Flower buds dark red, pubescent. Perianth usually pink with a white base, or the calyx white and the corolla pink to tinged purple-red. Sepals imbricate in bud, (2–)4 mm long and up to 4 mm wide, suborbicular to oblong, convex, glabrous inside, usually ciliate, minutely puberulous outside. Petals imbricate in bud, (5–)6–7(–8) × 4–5 mm, rather oblong-ovate, rounded or apiculate, densely and minutely puberulous to pubescent, sometimes glabrescent inside. Stamens numerous, less so in bisexual flowers. Filaments white, slender, filiform, (2–)3(–5) mm long. Anthers creamy,

about 1 mm long, basifixed, oblong to triangular and broadly sagittate at the base (due to the basally inflated connective), latero-trorse. Thecae parallel to widely divergent at the base, dehiscent by longitudinal slits. Pistil absent in male flowers; ovary shiny, crimson to dark red, globose or ovoid, (2-)2.5(-4) × (1.5-)2(-3) mm, gradually narrowed into the style or not, glabrous or sparsely and minutely pubescent, usually smooth, but sometimes strongly ruminately grooved and wrinkled, unilocular with 4 parietal placentae, each with numerous ovules. Style apical, stout, 1.5(-3) × 0.5 mm, with (2-)3(-4) branches, the latter up to 2 mm long and curved outwards, abruptly spreading or occasionally reflexed, alternating with the placentae. Fruit shiny, crimson to dark red-brown, or whitish with red sutures and top; globose to ovoid, (5-)10-15(-25) × (7-)10(-20) mm, usually completely glabrous, less often glabrescent, usually smooth but occasionally obscurely pustulate, often only when young (some dried specimens have strongly furrowed and grooved fruits); more or less irregularly dehiscent by (2-)3-4 more or less triangular valves. Style and calyx persistent or not. Seeds comparatively few in number (2-10), markedly arillate (?creamy), about 5 × 3 × 4 mm, testa pale brown when dry, or silvery and densely brown tuberculate. Embryo straight, embedded in copious endosperm, capped by a brown hypostase.

SELECTED HERBARIUM SPECIMENS

NIGERIA: Eket, Calabar, *Onochie* FHI 33160 (WAG).

CAMEROON: Kumba, *Binuyo & Daramola* FHI 35177 (P); *Ngalame* FHI 23398 (P); *Staudt* 865 (iso-syntype of *P. zenkeri* Gilg: P); - Yabassi, km 21 S, *Leeuwenberg* 6402 (WAG); - Masok, 10 km W, *Leeuwenberg* 5276 (WAG); - Kribi, km 15 ESE, *Bos* 3044 (WAG); *Bos* 3319 (WAG); km 8 ESE, *Bos* 3767 (WAG); *Bos* 3768 (WAG); km 18 ENE, *Bos* 3873 (WAG); km 27 ESE, *Bos* 6458 (WAG); km 20 ENE, *Bos* 6592 (WAG); *Bos* 6593 (WAG); Gr. Batanga, *Dinklage* 1330 (iso-syntypes of *P. zenkeri* Gilg: P, WAG); ± 50 km SE, *Letouzey* 563 (P); *Letouzey* 4056 (P, WAG); km 36 ESE, *Letouzey* 9426 (P, WAG); - Bipindi, *Zenker* 3245 (iso-syntype of *P. zenkeri* Gilg: P); *Zenker* 3634 (P); *Zenker s.n.* (P); Mimfia, *Zenker* 369 (P, WAG).

GABON: without loc., *Hallé* 760 (P); - Mts. Cristal, *Hallé & Villiers* 4507 (BR, P); *idem* 4539 (P); *idem* 4872 (P); *idem* 5406 (P); *Mann* 1737 (K holotype, isotype: P); - Forêt de la Mondah, *Villiers* 239 (P); - Ngounié reg., *Le Testu* 2175 (P, WAG); Ikobé valley, *Le Testu* 2239 (P, WAG); - Sibange, *Soyaux* 32 (P holotype of *P. soyauxianum* Baill.).

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