Four new species of Culcasia and Stylochaeton (Araceae) from tropical Africa

Author: Bogner, Josef

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JOSEF BOGNER[1]

Four new species of *Culcasia* and *Stylochaeton (Araceae)* from tropical Africa

Abstract

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Two species of *Culcasia, C. brevipetiolata* from Gabon and *C. linearifolia* from Gabon and Cameroon, and two new species of *Stylochaeton, S. pilosus* from Sierra Leone and *S. malaissei* from DR Congo, are described as new to science and illustrated. *C. brevipetiolata* is characterised by short petioles and leaf blades with a rounded base, *C. linearifolia* by linear leaf blades, *S. pilosus* by ± rounded, abaxially hairy leaf blades and hairy petioles, and *S. malaissei* by leaf blades with a cuneate base.

Additional key words: aroids, taxonomy, Cameroon, DR Congo, Gabon, Sierra Leone

In the course of a revision of the aroid genus *Stylochaeton* Lepr., I found two undescribed species of that genus from Sierra Leone and from Shaba (formerly Katanga), DR Congo, during my visit to the herbarium of the Nationale Plantentuin in Meise (BR), Belgium, among the material preserved, and two undescribed species of *Culcasia* P. Beauv. in a loan of African aroids from the Herbarium Vadense in Wageningen (WAG), Netherlands. The relevant literature consulted includes Engler (1905), (1920), Andrews (1956), Hepper (1968), Knecht (1983), Mayo (1985), Ntépé-Nyamè (1988), Malaisse & Bamps (1994), Ittenbach & Thulin (1995), Mayo & al. (1997), Riedl (1997), Lecron & Malaisse (1999) and Govaerts & Frodin (2002). These new discoveries are described here.

Culcasia brevipetiolata Bogner, **sp. nov.**
Holotypus: Gabon, Wolem-Ntem, Cristal Mountains, Tschimbélé plantation, alt. c. 500 m, 0°37'N, 10°24'E, climbing herb, about 1 m high, climbing on dead tree trunk, leaves thin leathery, spathe pale green-yellow, fruits orange-red, 3.5.1990 (flowering and fruiting), *J. J. Wieringa 829* (WAG). – Fig. 1–2.

Planta scandens, glabra; internodia longa; petioli relative breves (1.8–2.6 cm longi), vagina longa (1.8–2 cm longa) et lata (0.4–0.5 cm lata); lamina foliorum ovata, basi rotundata et apice cuspidata; ovaria depresse globulata, stigma sessile; flos masculinus 3–4 staminibus instructus. Aliae species scandentes petiolis brevibus instructae a specie nova laminis foliorum rotundatis (*Culcasia rotundifolia*), laminis foliorum anguste ellipticis (*C. lanceolata*), laminis foliorum late ovatis (*C. parviflora*), internodiis hirsutis petiolis hirsutis laminis subtus hirsutis (*C. loukandensis*) differunt.

Plant climbing, about 1 m long (according to the collector's notes, but probably several metres long). *Stem* with long internodes, these 5–6 cm long and 2–3 mm in diam., a little thicker below the petioles. *Leaves* many on the shoot; *petiole* short, 1.8–2.6 cm long, including a sheath of 1.6–2 × 0.4–0.5 cm sometimes with short hairs in upper part, flattened, apex ± round, petiole above the sheath only 3–4 mm long and canaliculate with sharp margins, 1.5–1.8 mm in diam. *Leaf blade* ovate, oblique, thinly leathery (after the collector's notes), 7–8 × 4–5 cm, base

1 Botanischer Garten München-Nymphenburg, Menzinger Str. 61–65, 80368 München, Germany & Botanische Staatssammlung München (M), Menzinger Str. 67, 80368 München, Germany.

Fig. 1. *Culcasia brevipetiolata* – holotype *Wieringa 829* at WAG; insert bottom left: shoot apex with inflorescence (covered by label). – Photograph by F. Höck.

rounded to subcordate, apex acute to shortly cuspidate; *venation* reticulate, midvein strong, primary lateral veins 3–5(–6) on each side, running towards the apex, second order veins thinner and reticulated, third order veins much thinner and somewhat inconspicuous. *Cataphylls* c. 1 × 0.5 cm, apex acute. *Peduncle* 1.3–1.5 cm long and 1.5–1.8 mm in diam. *Spathe* not constricted, ± boat-shaped, pale green-yellow (after the collector's notes), 1.2–1.5 cm long, apex acute. *Spadix* c. 1 cm long and c. 3 mm in diam.; female zone 3–4 mm long and c. 4 mm in diam., female flowers 8–9 in two spiral rows; male zone 6–7 mm long and 3–4 mm in diam. *Flowers* unisexual; *male flowers* 1.6–2 mm in diam. (viewed from above), consisting of 3–4 stamens; *female flowers* 1.8–2 mm in diam. (viewed from above), ovary depressed-globose, 1.6–2 mm in diam., stigma sessile, 1.2–1.4 mm in diam., slightly lobed, dark coloured. *Berry* depressed-globose, 8–10 mm in diam., orange-red (after the collector's notes), with persistent stigma remnant.

Distribution. — This species is only known from the type collection made in NW Gabon.

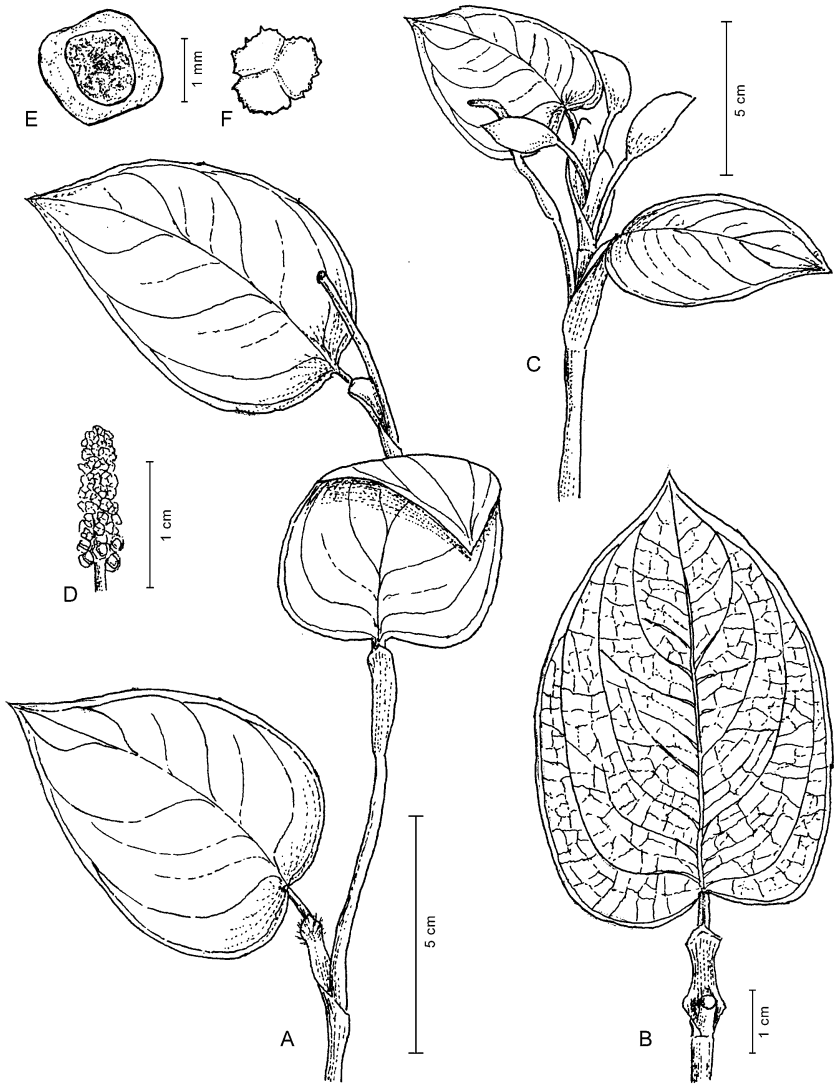

Fig. 2. *Culcasia brevipetiolata* – A: part of a climbing plant; B: leaf blade; C: apex of shoot with three inflorescences; D: spadix; E: female flower seen from above; F: male flower with three stamens seen from above. – All from *Wieringa 829* (WAG); drawing by K. Schuster.

Relationship. — *Culcasia brevipetiolata* is characterised by ovate leaf blades and relatively short petioles. Most species of *Culcasia* have long petioles, only the following climbing species also have short petioles but they differ in their leaf blades: *C. rotundifolia* Bogner has round leaf blades, *C. lanceolata* Engl. narrowly elliptic leaf blades, *C. parviflora* N. E. Br. broadly ovate leaf blades and *C. loukandensis* Pellegr. has abaxially hairy leaf blades and also hairy petioles and internodes.

Culcasia linearifolia Bogner, **sp. nov.**

Holotypus: Gabon, 1.5 km SSE of Tschimbélé, primary forest, alt. c. 600 m, 0°36'N, 10°24'E, herb 30 cm high, leaves thin leathery, fruits orange, 7.5.1990 (fruiting), *J. J. Wieringa 848* (WAG). – Fig. 3–4.

Planta terrestris non scandens, erecta, radicibus rigidis; petioli breves (2–2.5 cm longi), vagina apice acuta; lamina foliorum linearis interdum subobliqua, 16–24 cm longa et 1.8–3 cm lata, basi cuneata, apice acuta; baccae depresse globulatae; semina ovoidea vel ellipsoidea, testa scabra. *Culcasia linearifolia* differt a speciebus ceteris generis lamina foliorum lineari.

Plant terrestrial, stem upright, 12–18 cm long and 0.3–0.4 cm in diam., with several very strong, straight, wire-like roots orientated downwards, 10–15 cm long and c. 2 mm in diam., divided after reaching the forest floor into ± horizontally oriented roots of second order c. 1 mm in diam., and further thinner third order roots. *Internodes* 2–3 cm long. *Leaves* several, 7–8; *petiole* 2–3 cm long and 1.2–1.5 mm in diam., above the sheath 0.5–1(–1.4) cm long, sheath 2–2.5 × 3–3.5 mm, ending in a free, acute apex of 3–4 mm length; *leaf blade* very narrowly oblong to linear, sometimes slightly oblique, leathery, dull dark green above and much paler green underneath (after the collector's notes), (14–)16–24 × (1.2–)1.8–3 cm, base cuneate, apex acute and often slightly curved; *venation*

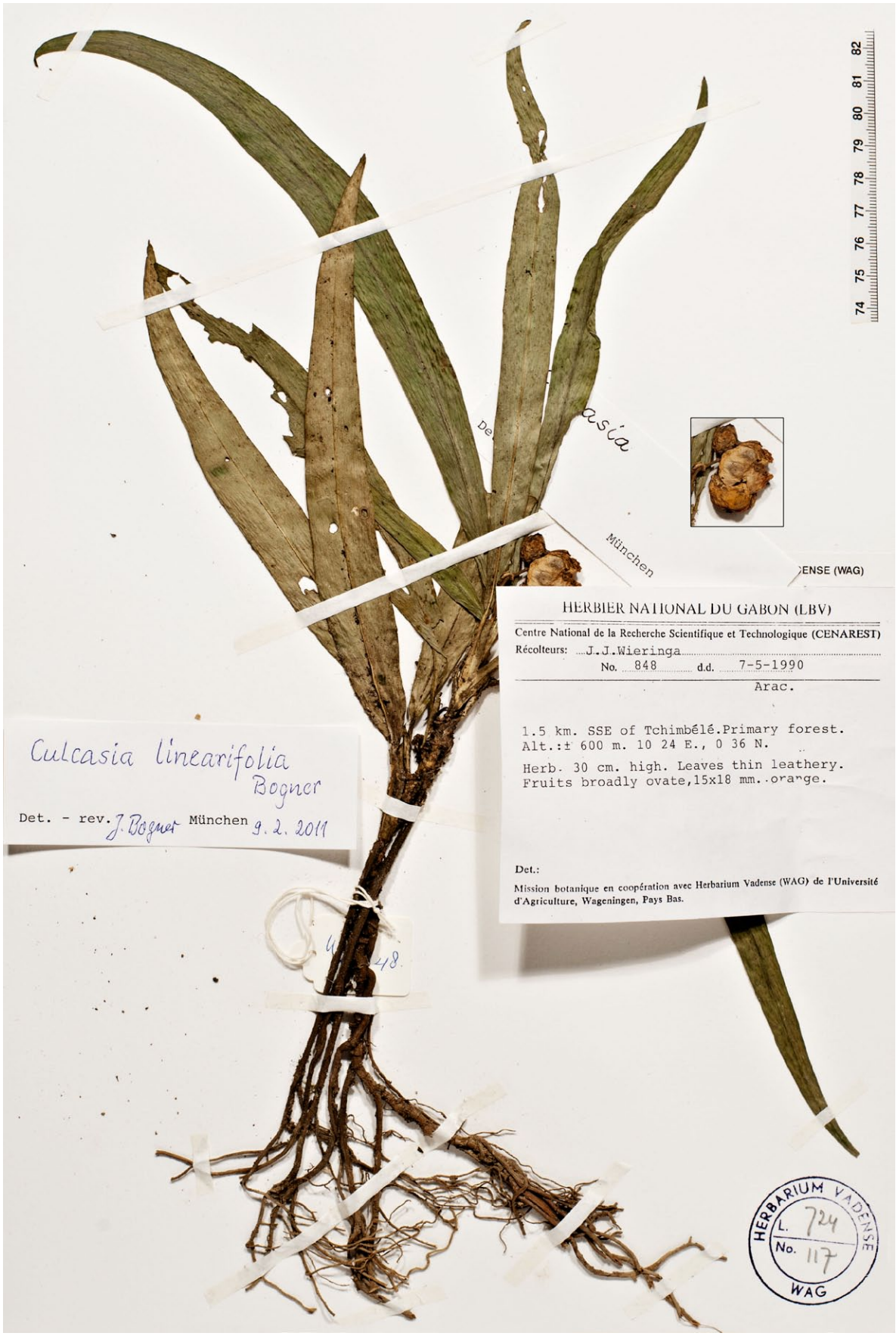

Fig. 3. *Culcasia linearifolia* – holotype *Wieringa 848* at WAG; insert: infructescence (partly covered by label). – Photograph by F. Höck.

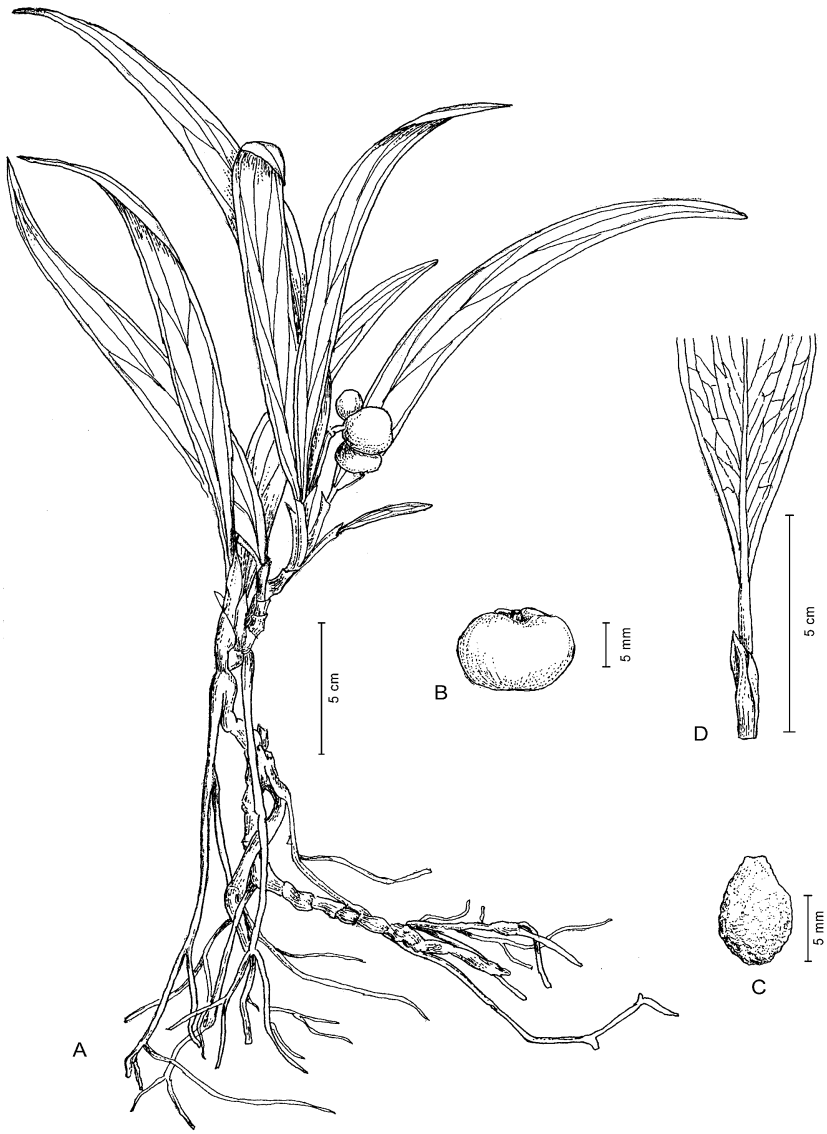

Fig. 4. *Culcasia linearifolia* – A: whole plant; B: berry; C: seed; D: petiole and base of leaf blade (somewhat wider than in the holotype). – A–C from *Wieringa 848* (WAG), D from *J. J. de Wilde & al. 10051* (WAG); drawing by K. Schuster.

reticulate, midvein strong, primary lateral veins 3–4 on each side and running towards the apex, second order veins thinner, reticulate, third order veins very thin and inconspicuous. *Inflorescence* unknown. *Infructescence* ± flat with only a few fruits, without any spathe remnants; *peduncle* c. 3 cm long and 1–1.2(–1.5) mm in diam.; *berries* few, only 2–4, globose to depressed-globose, orange, 0.8–1.2 cm in diam., with persistent stigma remnant of c. 1.5 mm in diam., stigma sessile; *seeds* 1–3 in each berry, ellipsoid to ovoid, 6–7 mm long and c. 5 mm in diam., testa scabrous and dark coloured.

Further specimens seen. — Gabon: Cristal Mountains, about 3 km along the road from Tschimbélé to Kinguélé, alt. c. 550 m, herb growing on forest floor in old secondary forest, fruits orange, globose, flattened above, 13 ×16 mm, leaves thick leathery, dull dark green above, beneath dull, much paler green, 14.12.1989 (fruiting), *J. J. de Wilde & al. 10051* (WAG).

Cameroon: Colline Ongogo près Mbanga, km 81 route Kribi–Nkolbewa, prés sous-préfecture Akom, fruits, Avril, *Letouzey 9480* (P, YA).

Distribution. — The species is known so far from NW Gabon and SW Cameroon.

Relationship. — *Culcasia linearifolia* is closely related to *C. panduriformis* Engl. & K. Krause, but the latter has panduriform leaf blades, whereas the new species has always linear leaf blades and is the only species in this genus with such a leaf shape. Ntépé-Nyamè (1988: 80, fig 34.1–2, 99, fig. 34.3) has treated and illustrated both species in the "Flore du Cameroun" together as *C. panduriformis,* but fig. 34.3 actually shows the new species *C. linearifolia.* The specimen *J. J. de Wilde & al. 10051* has somewhat broader leaf blades, 19–23 × 3 cm (with a length/width ratio of 7 : 1), the specimen *J. J. Wieringa 848* has narrower leaf blades, 17–22 × 1.5–2 cm (with a length/width ratio of 11 : 1); the specimen *Letouzey 9480* is of the narrow leaf type. In all three specimens the leaf blades are somewhat falcate with slightly curved apices, which is also never the case in *C. panduriformis.*

Stylochaeton pilosus Bogner, **sp. nov.**

Holotypus: Sierra Leone, Njala, 7.1940, *J. C. Deighton 3960* (BR; isotypus: K). – Fig. 5–6.

Lamina foliorum rotunda vel subrotunda (5–7×4–5.5 cm), supra glabra, subtus pilosa, apice cuspidata; spatha basi latior ad apicem versus constanter attenuata non constricta, apertura lateralis rimiformis; perigonium florum feminorum urceolatum, perigonium florum masculorum humile patelliforme. *Stylochaeton zenkeri* differt a *S. pilosus* laminis foliorum ovatis vel ellipticis (7.5–20 × 4–11 cm) totis glabris.

Rhizome creeping, 2.5–3 cm long (and more?) and 3–4 mm in diam. *Leaves* one or two only; *petiole* 8–12(–13) cm long and c. 2 mm in diam., with short

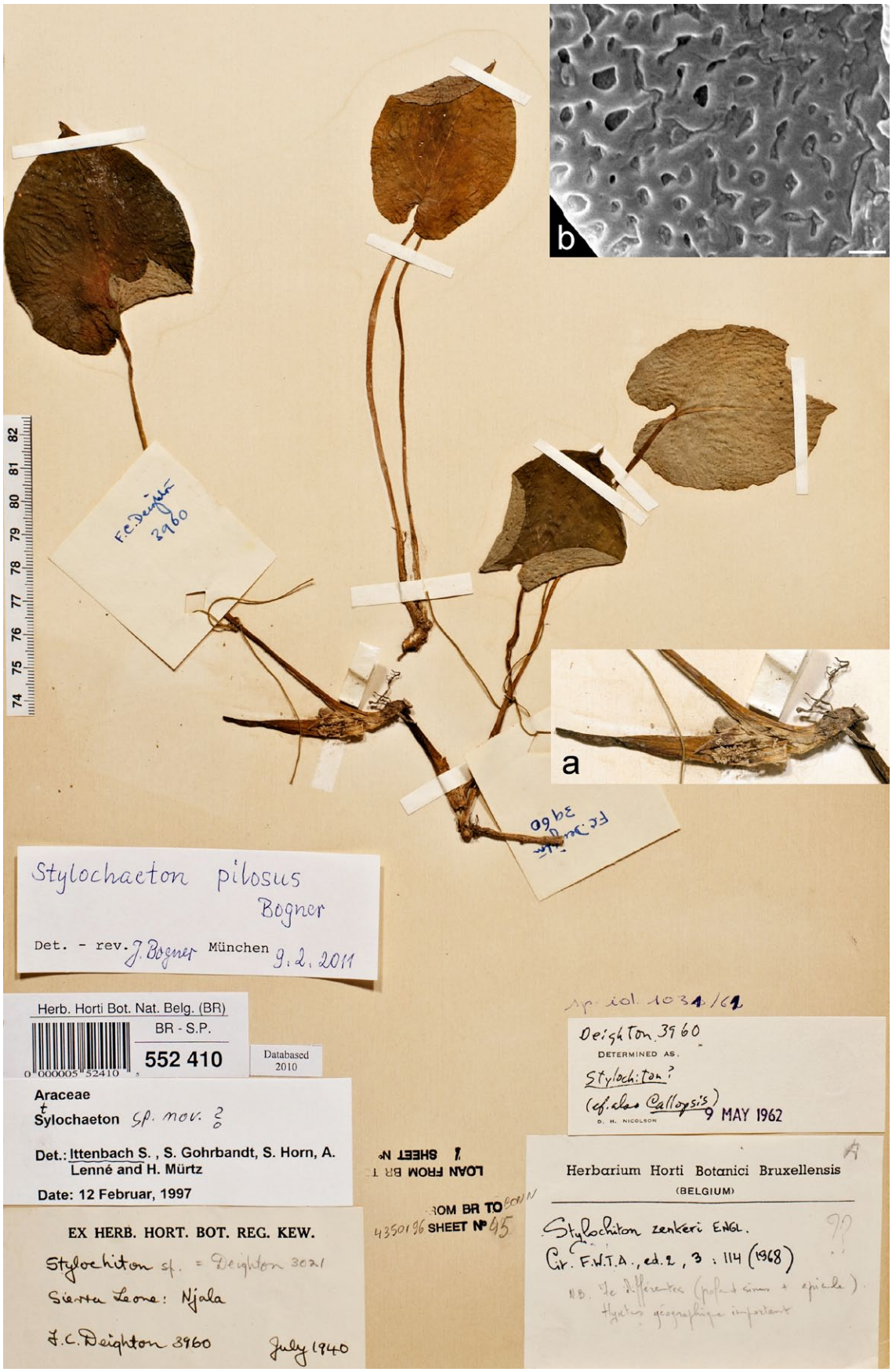

Fig. 5. *Stylochaeton pilosus* – holotype *Deighton 3960* at BR; a: inflorescence enlarged in detail; b: surface of dry pollen, scale bar = 1 µm. – Photographs by F. Höck, SEM micrograph (b) by M. Hesse & S. Ulrich.

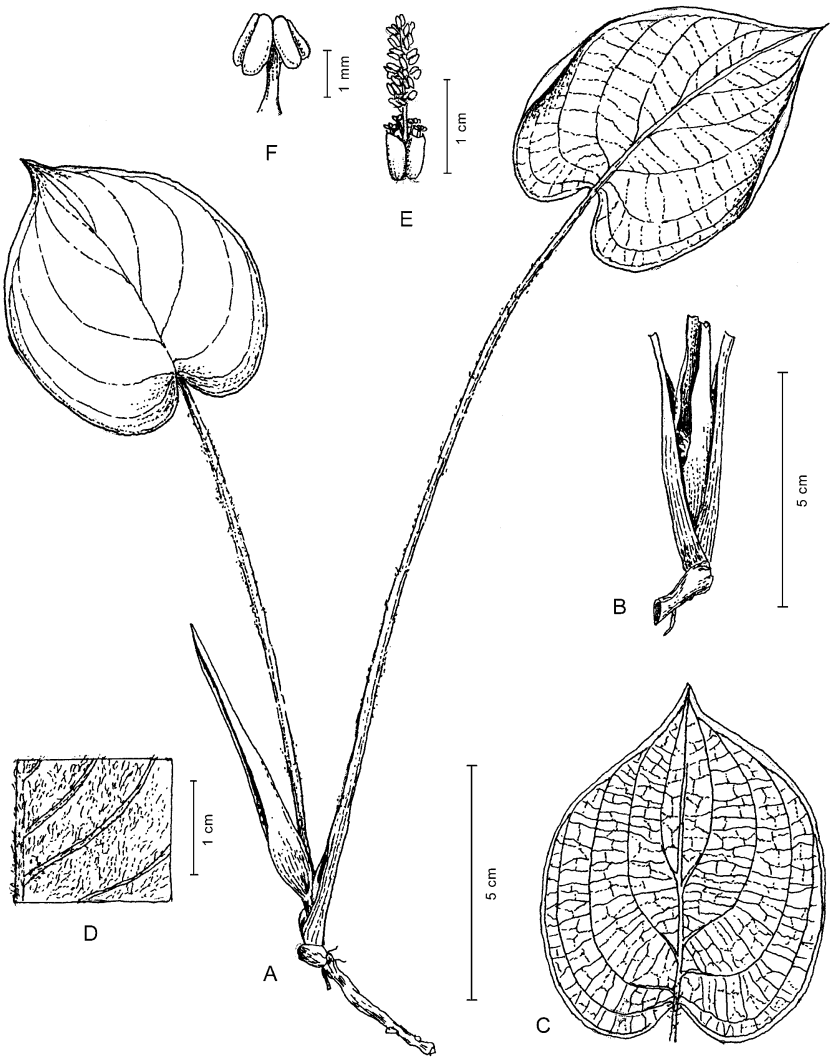

Fig. 6. *Stylochaeton pilosus* – A: whole plant; lower part of plant with a young spathe in the centre; C: leaf blade: D: part of lower side of the leaf blade showing the hairs; E: spadix; F: stamen. – A–F from *Deighton 3960* (BR); drawing by K. Schuster.

hairs, sheath 2–3 cm long; *leaf blade* broadly ovate, green above and greyish green underneath, 5–7(–8) × 4–5.5(–6.5) cm (one leaf blade 10 × 7.5 cm, *Deighton 3960*, K), base cordate, apex shortly cuspidate; *venation* reticulate, midvein strong, primary lateral veins 4–5(–6) on each side and running towards the apex, second order veins thinner and between the primary ones and forming a net together with the third order veins, blade glabrous on upper side but hairy (pilose) underneath, whole lower side covered with hairs but midvein and primary lateral veins more strongly hairy. *Cataphylls* 1.3–2 cm long, membranaceous. *Inflorescence* solitary; peduncle short, c. 1 cm long and c. 1.5 mm in diam.; *spathe* not constricted, 3.8–4.2 cm long, broader at base and c. 5 mm in diam., then narrowing towards the apex and ending in a point, upper part of spathe slightly twisted and opening by a lateral slit; *spadix* c. 1.2 cm long; female zone consisting of only one whorl of 5–6(–7) female flowers, separated from the male zone by a naked axis of c. 2 mm length; male zone cylindric, 6–7 mm long and c. 2 mm in diam., apex rounded, densely covered by male flowers. *Flowers* unisexual; *female flowers* 3.5–4 mm tall, perigone urceolate, c. 3 mm tall and c. 1.5 mm in diam., margin of perigone somewhat thickened and papillose; style and stigma exserted from the perigone; stigma disk-like, c. 0.7 mm in diam., dark coloured; style altogether c. 2 mm long, exserted above the perigone for c. 1.5 mm, c. 0.3 mm in diam.; ovary c. 1 mm in diam.; *male flowers* with a patelliform perigone, stamens c. 1.2 mm long, filament somewhat wider at base, 0.6–0.7 mm long, thecae ellipsoid, c. 0.7 mm long and c. 0.5 mm in diam., opening by a longitudinal slit; *pollen* ellipsoid, inaperturate, c. 40 µm long and 28 µm wide, exine reticulate. *Infructescence* with a peduncle 1.8 cm long, without any remnants of the spathe, one specimen (*Deighton 3960*, K) with two berries only; *berry* ± globular with a broadly acute apex, c. 5 mm in diam.

Further specimen seen. — Sierra Leone: Robat, near Rokup, frequent along path through high bush, 6.8.1935 (flowering and fruiting), *J. C. Deighton 3021* (K).

Distribution. — *Stylochaeton pilosus* is only known from Sierra Leone and two collections made by J. C. Deighton in 1935 and 1940.

Relationship. — *Stylochaeton pilosus* is closely related to *S. zenkeri* Engl.; the latter differs by ovate to elliptic leaf blades with a length/width ratio of (1.8–)2 : 1 (leaf blades 7.5–20 × 4–11 cm) and completely glabrous leaves, whereas *S. pilosus* has ± round leaf blades with a ratio of 1 : 1 to 1.2 : 1 (5–6.5 × 4–5.5 cm) and its petioles and abaxial leaf faces are hairy. Both species flower contemporaneously with the leaves. *S. zenkeri* is evergreen and it seems that also *S. pilosus* has no dormant stage as do most of the other species of this genus.

Stylochaeton malaissei Bogner, **sp. nov.**

Holotypus: [DR Congo, formerly Zaire], Shaba [formerly Katanga], environ Gombela, 13.11.1981 (fruiting), alt. 960 m, sur haute termitière près d'un dembo, *F. Malaisse 12174* (BR). – Fig. 7–8.

Fig. 7. *Stylochaeton malaissei* – holotype *Malaisse 12174* at BR. – Photograph by F. Höck.

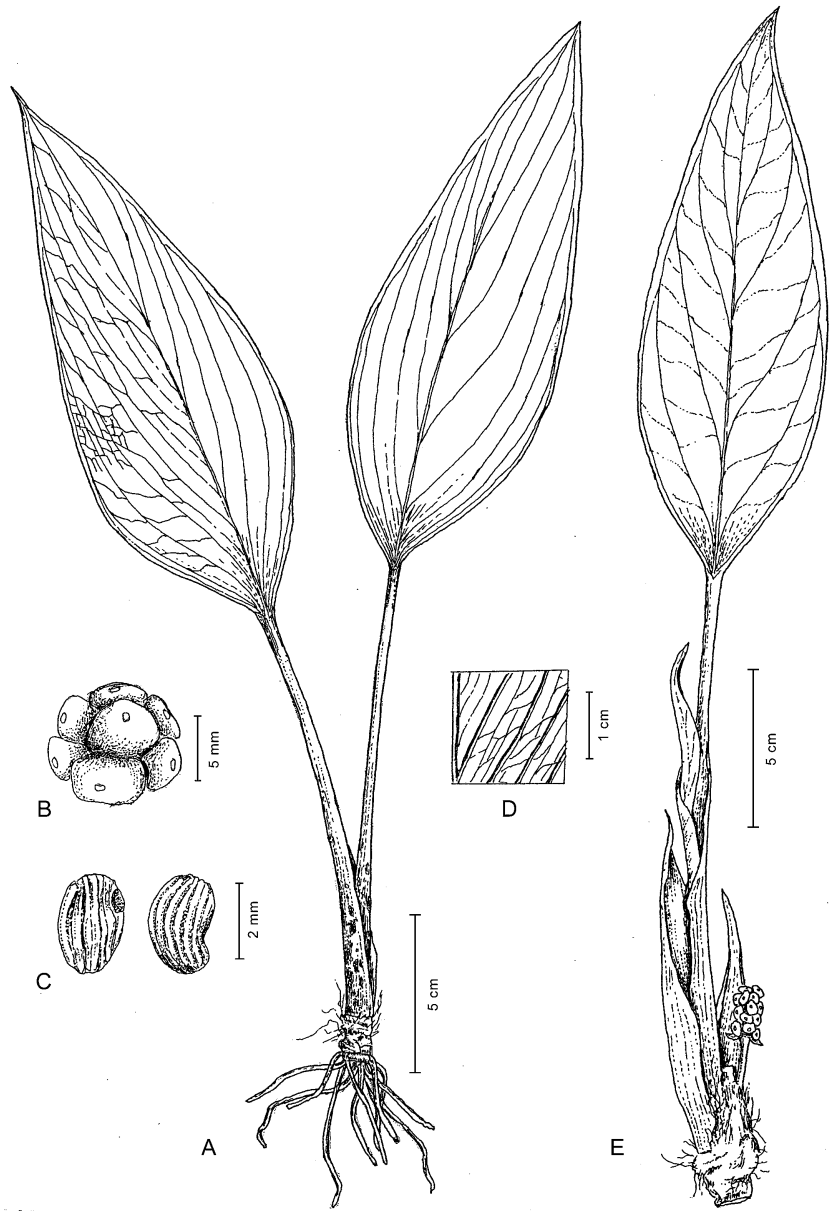

Fig. 8. *Stylochaeton malaissei* – A: whole plant; B: infructescence; C: two seeds; D: part of leaf blade showing venation; E: whole plant with immature infructescence. – A–D from *Bamps & Malaisse 8450* (BR), E from *Malaisse 12174* (BR); drawing by K. Schuster.

Petioli longi in parte inferiore maculati; lamina foliorum lanceolata, basi cuneata, apica acuta; baccae depresse globulatae; semina ellipsoidea, testa costata atrobrunnea, endospermio laete albo, embryone parvo. *Stylochaeton malaissei* differt a *S. shabaensis* laminis foliorum basi cuneatis; in *S. shabaensis* in contrario basi truncatis vel cordatis.

Plant with dormant stage; 40–50 cm tall, with fibrous cataphyll remnants at base. *Rhizome* erect, 2–4 cm long and 1–1.4 cm in diam., with very thick roots (tuberous after the collector's notes). *Leaves* only one to two or three; *petiole* (17–)20–30 cm long, above 3–4 mm in diam. and in basal part (including sheath) 5–10 mm wide, sheath 8–12 cm long with its lower part maculate, upper part of petiole green; *leaf blade* lanceolate, 18–23 × 5–7.5 cm, base cuneate, apex acute; *venation* reticulate, midvein very well-developed, primary lateral veins 6–7 on each side and running towards the apex, second order veins thinner and between the primary ones, forming a ± irregular net, with very thin third order veins between them. *Cataphylls* 5–9.5 cm long, apex acuminate, outside maculate and inside uniformly light coloured (whitish). *Inflorescence* unknown. *Infructescence* ± hypogeous (after the collector's notes), somewhat ellipsoid, c. 1.3 cm long and 0.8 (immature?)–1.4 cm in diam., with three (or two) spiral rows of fruits, without any spathe remnants; *peduncle* short, 2–2.5 cm long and 2–3 mm in diam.; *berries* c. 15 in one infructescence (in one specimen only 10–12); *berry* ± globose to somewhat depressed-globose, white (after the collector's note), 3–4 mm (immature?) or 5–6(–7) mm in diam., with short style and stigma remnant somewhat sunken in the centre, style c. 0.5 mm long, stigma (0.8–)1–1.2(–1.4) mm in diam.; *seed* ellipsoid to ovoid, 2.4–2.6 mm long and c. 1.5 mm in diam., testa costate and dark brown, endosperm copious and pure white, embryo small.

Further specimen seen. — DR Congo: Shaba, Lubudi–Nguba, km 81 (zone Lubudi), 26°27'E, 10°07'S, alt. 1080 m, forêt claire sur latérite, plante à racine tubéreuses, de 50 cm haute, fruits blancs, hypogés, 30.1.1986 (fruiting and sterile), *P. Bamps & F. Malaisse 8450* (BR).

Distribution and ecology. — *Stylochaeton malaissei* is only known from Shaba, formerly Katanga, DR Congo, and from only two collections. One was made in a "dembo", which is a seasonally flooded (during 2 to 5 months) savannah with a particular flora.

Relationship. — *Stylochaeton malaissei* is closely related to *S. shabaensis* Malaisse & Bamps from the same area, but the former differs by leaf blades with a cuneate base, whereas *S. shabaensis* has leaf blades with a truncate to subcordate or cordate base.

Concluding remarks

All four aroid species are described and known to me only from herbarium specimens, therefore no colours are given for their parts, except those taken from the collectors' notes on the label. Not all species are completely known, some being preserved only in flower and others only in fruit.

The *Stylochaeton* species for which new collections are most needed are *S. grandis* N. E. Br. from Ethiopia, of which no leaves are known with certainty, and *S. oligocarpus* Riedl from Ethiopia and Somalia, of which only two fruiting specimens are known. The latter two species are seasonally dormant and flower before the leaves appear, hence inflorescences and leaves never appear together. The only way to obtain complete material is therefore visiting a known locality at two different seasons or by growing living plants and observing them in cultivation, e.g. in botanical gardens.

Stylochaeton kerensis N. E. Br. from southern Sudan (Darfur) and Ethiopia is only a synonym of the widespread *S. hypogaeus* Lepr., which is characterised by hastate leaf blades and distributed in the drier areas south of the Sahara from W Africa to Chad, Sudan and Ethiopia. The species illustrated by Govaerts & Frodin (2002: 497) under the name *S. hypogaeus* and apparently drawn from the holotype of *S. warneckei* Engl. does not represent this species but *S. lancifolius* Kotschy & Peyr., of which *S. warneckei* is a synonym.

Only one *Stylochaeton* species, *S. zenkeri*, is known from Gabon where it is a common evergreen species in the rainforest.

Acknowledgements

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