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STEPHAN ITTENBACH & WOLFRAM LOBIN

Notes on the genus *Amorphophallus (Araceae)* – 6. Six new species and two new subspecies from Africa

Abstract

Ittenbach, S. & Lobin, W.: Notes on the genus *Amorphophallus (Araceae)* – 6. Six new species and two new subspecies from Africa. – Willdenowia 27: 147–160. 1997. – ISSN 0511–9618.

While preparing a revision of the African species of *Amorphophallus* some new taxa have been recognized. *A. barthlottii* (Ivory Coast and Liberia), *A. canaliculatus* (Gabon), *A. hetterscheidii* (Gabon, Zaire and Central African Republic), *A. impressus* (Tanzania and Malawi), *A. margretae* (Zaire), *A. richardsiae* (Zambia), *A. abyssinicus* subsp. *akeassii* (Ivory Coast, Ghana and Nigeria), and *A calabaricus* subsp. *mayoi* (Zaire, Uganda and Kenya) are described as new to science.

The genus *Amorphophallus* Blume ex Decne. comprises nearly 170 species distributed from Africa and Madagascar across India and SE Asia to Australia (Hetterscheid & Ittenbach 1996). Currently the genus is revised in an international project initiated by W. L. A. Hetterscheid (Hilversum, The Netherlands), who works about the Asian species. Most recently the first author completed a revision of the African species (Ittenbach 1997). The six new species and two new subspecies recognized from Africa are published in this sixth instalment in the series of taxonomic notes on *Amorphophallus*. The fifth instalment is Hetterscheid & al. (1994).

The distribution of the new taxa is shown in Fig. 1.

Amorphophallus barthlottii Ittenb. & Lobin, **sp. nova** – Fig. 2.
Holotypus: Ivory Coast, Tai, Regenwald entlang Hana, 100 m, 9.3.1977, *Barthlott 77–443* (FR! [inflo.])
[= *Amorphophallus staudtii* sensu Barthlott & Bogner in Aroideana 4(4): 109. 1981, non (Engl.) N.E. Br.].

Differt ab *Amorphophallo staudtii* spatha vasiforme, margine spathae cortinam solum per partes cingens et in laminam triangularem terminans; facies interior spathae basim cum emergentiis brevioribus (<1 mm longis) laxe distributis. Pars staminata inflorescentiae cylindrica. Ab *A. johnsonii* differt inflorescentia valde minore.

Tuber globose or subglobose, 2–4 × 1.5–3 cm, surface whitish, probably not developing offsets. Leaf unknown. Cataphylls 3, 4–13 cm long, membranous, whitish to green with a touch of pink, the inner one longer than the peduncle. Inflorescence short-peduncled, appearing before the

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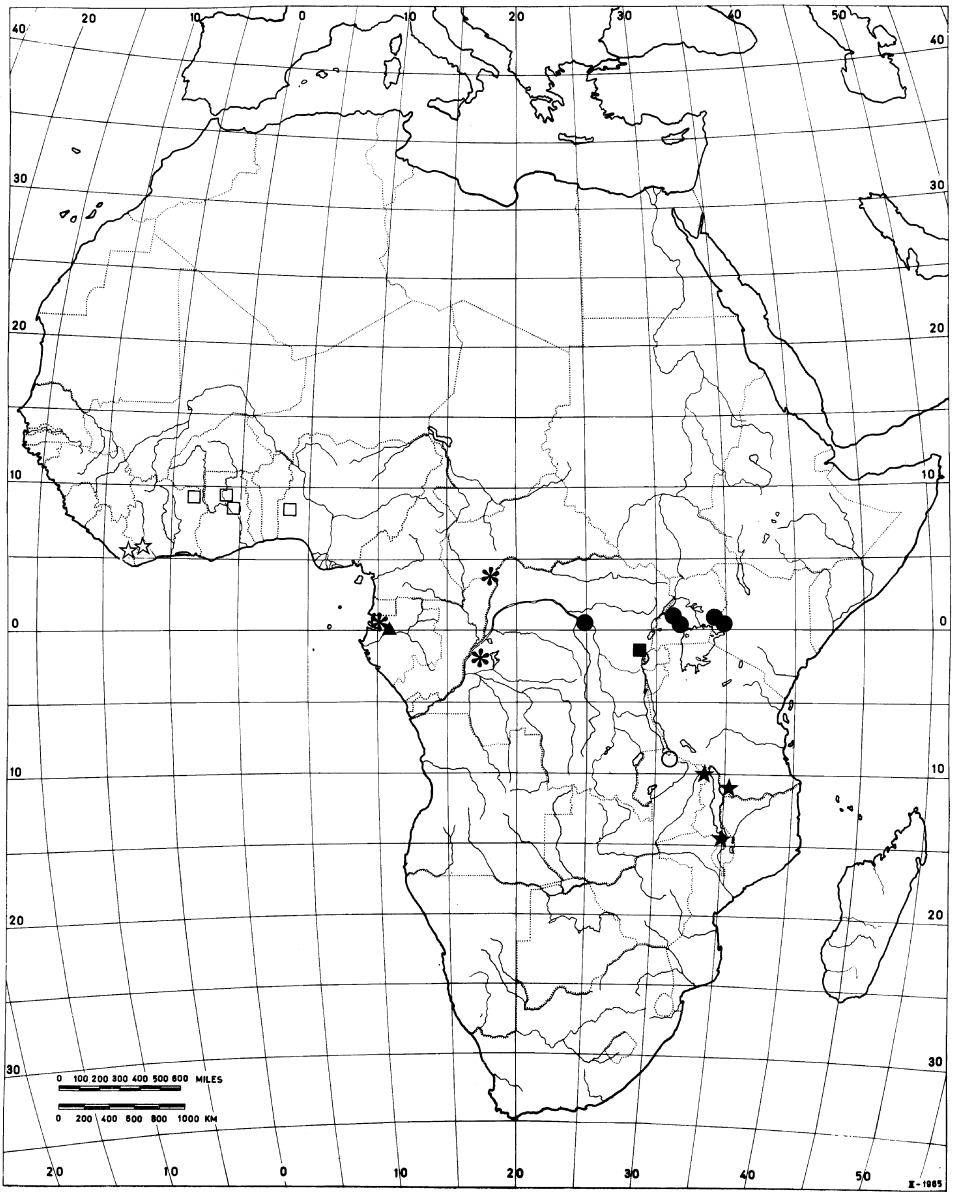

Fig. 1. Distribution of the new African taxa of *Amorphophallus* – *A. abyssinicus* subsp. *akeassii* (❑), *A. barthlottii* (☆), *A. calabaricus* subsp. *mayoi* (●), *A. canaliculatus* (▲), *A. hetterscheidii* (✻), *A. impressus* (★), *A. margretae* (■), *A. richardsiae* (○).

leaf; peduncle 5–9 cm long, half of it subterranean, 1.5–3 mm in diameter, smooth. Spathe erect, forming a conical bag 7–9 cm long and 3.5–4 cm in diameter, tube and limb separated by a shallow constriction; tube oblong-triangular in lateral view, 3.5–5.5 × 2.5–3.5 cm, cross section shape circular, outside whitish to dirty pinkish or greenish, inside purple to purplish brown, with very short (0.4–0.9 mm) loosely dispersed hairlike emergences, surface between

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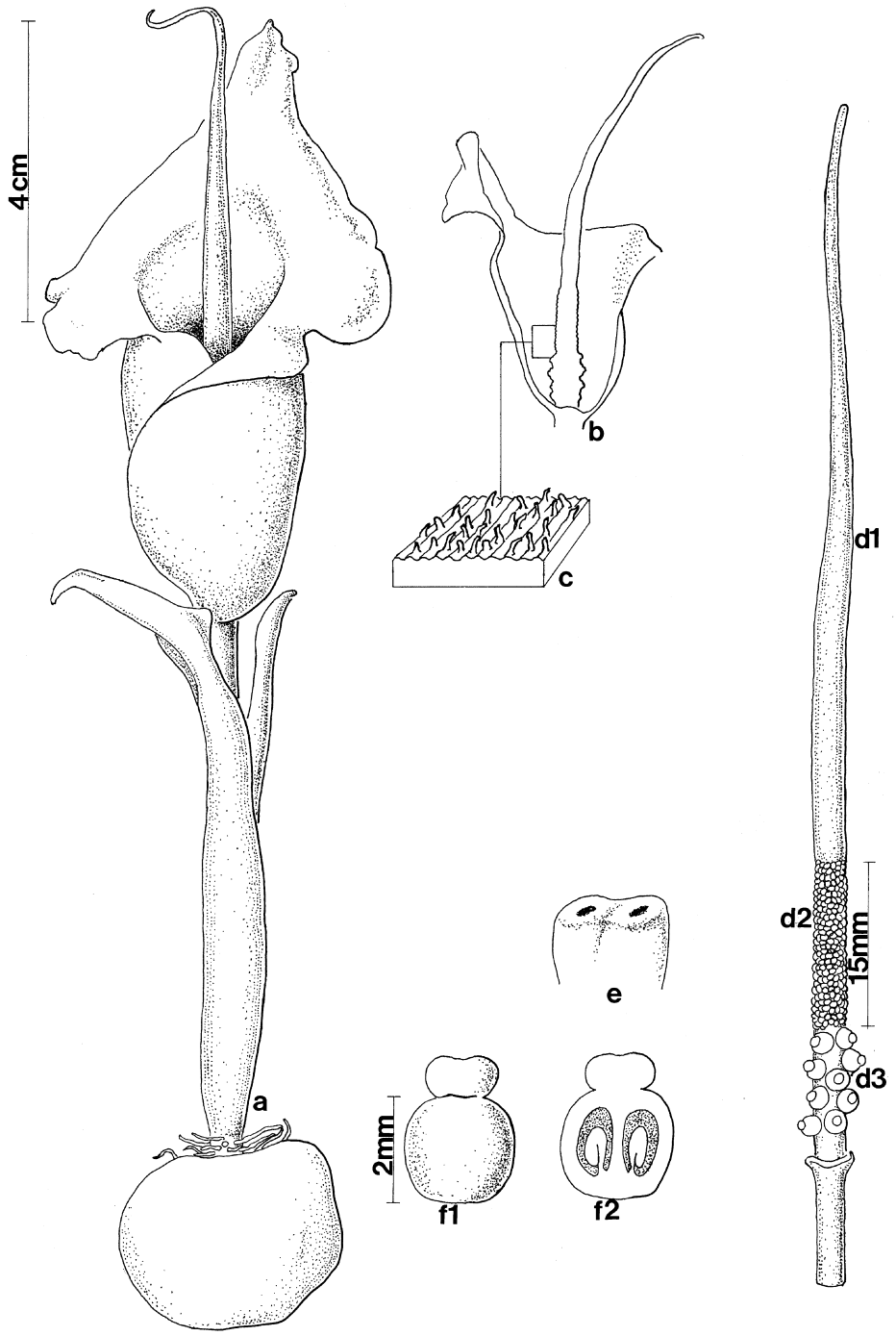

Fig. 2. *Amorphophallus barthlottii* Ittenb. & Lobin – a: habitus, b: inflorescence with open spathe, c: base inside of the spathe, d: spadix (d1: appendix, d2: staminate zone, d3: pistillate zone), e: anthers, f: pistillate flowers (f1: lateral view, f2: longitudinal section). – Drawings after the type, by S. Ittenbach.

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emergences rough to papillose, unicoloured dark purple, veins somewhat raised; limb erect, 3–4 cm long, triangular-acute, inside and outside whitish to dirty pinkish, margin smooth to undulate and flushed with purple. Spadix stipitate for 1–3 mm, 8–13 cm long, slightly longer than spathe (1 : 0.7–0.9); pistillate zone cylindrical, 1–1.5 cm long, 4–5 mm in diameter, flowers congested or slightly distant; staminate zone cylindrical, 1.3–2 mm long, 2.5–3.5 mm in diameter, flowers congested; appendix elongate-conical, acute, 5–9 cm long, base without constriction, equal in diameter to the staminate zone, surface rough to rugulose; ratio of pistillate to staminate zone length 0.7–0.8 : 1; staminodes absent; without sterile zone between staminate and pistillate zone. Staminate flowers 1–1.5 mm long, with 2–4 stamens; filaments only 0.5 mm long, free; anthers free, elongate to ovoid; thecae ovoid, yellow, each with one apical circular pore. Pistillate flowers 3–3.5 mm long; ovaries globose to ovoid, 2 mm long and wide, green or greenish white, bilocular; stigma sessile, slightly 2-lobed, 1.5–2 mm in diameter, 1 mm long, circular in cross section. Infructescence unknown. Pollen globular, inaperturate, c. 50 µm in diameter, exine smooth (psilate).

Eponymy: The species is dedicated to the German botanist Prof. Dr Wilhelm Barthlott (Bonn), who has been concerned with the flora of the Ivory Coast since 1976 and collected the type specimen in 1977.

Distribution: E Liberia, Ivory Coast (Tai Nationalpark and borderland) (Fig. 1).

Note: *Amorphophallus barthlottii* is one of the smallest species in the genus and certainly the smallest of the African species. It was erroneously identified as *A. staudtii* (Engl.) N.E. Br. by Barthlott & Bogner (1981). *A. barthlottii* belongs to a group of species with a limited distribution in the very humid part of Liberia and the Ivory Coast. It has to be placed into the large African section with hairlike emergences at the base of the spathe tube, and is similar to *A. johnsonii*, *A. calabaricus, A. zenkeri* and *A. staudtii*.

Additional specimens seen
Ivory Coast: Regenwald zwischen Troya und dem Fluß Cavally, c. 32 km SSO vom Tai, auf der Straße Tai-Tabou, 8.3.1962, *De Wilde 3562* (WAG).
Liberia: Sinoe Country, Jaurozon, 15.3.1948, *Baldwin Jr. 11474* (K).

Amorphophallus canaliculatus Ittenb., Hett. & Lobin, **sp. nova** – Fig. 3.
Holotypus: Cult. [from *J.J. Bos, F.M. van der Laan & T. Nzabi 10548*, Gabon, 0°50′N, 11°55′E, 75 km ouest Societé Exploitation Forestier, Acumea Hang, 10.7.1985], *W. L. A. Hetterscheid H.AM 014-T* (L! [spirit coll.]).

Differt ab omnibus speciebus generis *Amorphophalli* cum emergentiis piliformibus et inflorescentia brevi pedunculata appendici valde canaliculata et rugosa. Ab *A. stuhlmannii* subsp. *congoensi* aheno cortina spathae asymmetrico et ovali late laminato et stigmate non recurvo et non conico differt.

Tuber subglobose, brown, 12 × 8 cm, no offset development. Leaf to 0.6–1 m long; petiole 40–70 × 1.5–2.5 cm, dark purplish brown with blackish-purplish spots, smooth; lamina to 50–60 cm in diameter, rhachises winged distal from the first leaflets; terminal leaflets elongate-oval, 9–12 × 3 cm, attenuate into a 1.5 cm long tip. Cataphylls 2, membranous, the inner twice as long as and the outer half as long as the peduncle, inside whitish pink, outside purple with small, brown to blackish spots. Inflorescence short-peduncled, developing before the leaf, c. 70–75 cm long, somewhat succulent; peduncle 4–10 cm long and 2 cm in diameter, brownish to purple with few small dark green to blackish spots, smooth. Spathe urceolate, 20–30 cm long, separated by a constriction in a wide, asymmetrical, ovoid tube and a spreading, triangular, limb; left side of the spathe overlapping with widely arched edge; tube 8.5–12 × 9–12 cm, in cross section asymmetrically oval to slightly depressed-circular, outside greyish green with a

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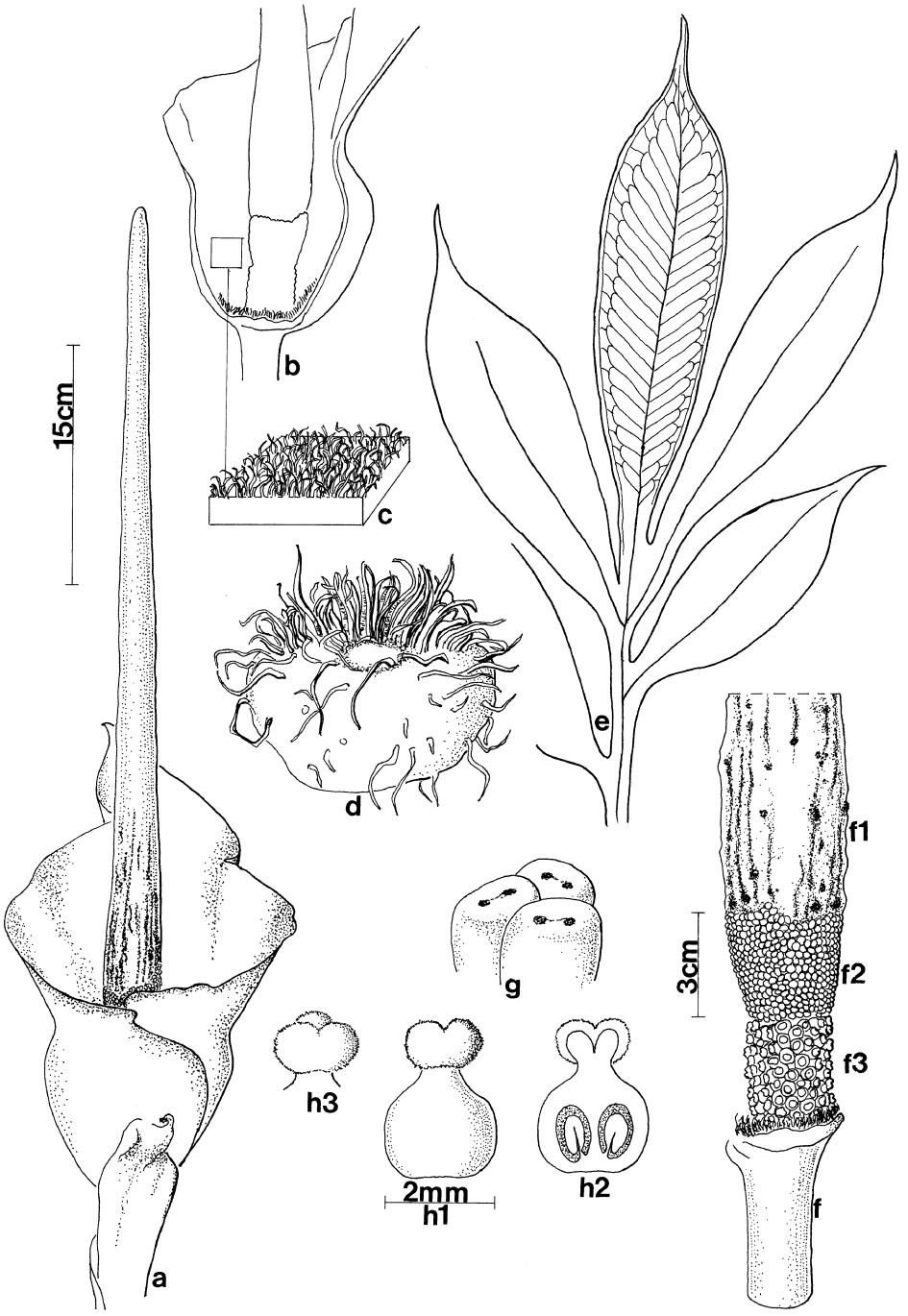

Fig. 3. *Amorphophallus canaliculatus* Ittenb., Hett. & Lobin – a: habitus, b: inflorescence with open spathe, c: base inside of the spathe, d: tuber, e: leaf, f: spadix (f1: basal portion of appendix, f2: staminate zone, f3: pistillate zone), g: antheres, h: pistillate flowers (h1: lateral view, h2: longitudinal section, h3: stigma). – Drawings after the type, by S. Ittenbach.

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purple flush, with dark brown to dark green scattered spots and purple veins, inside basally purple, upwards changing to creamy or whitish green, the lower half densely covered with 2–4 mm long, dark purple hairlike emergences; limb spreading at an angle of c. 120° from the tube, 10–18 cm long, broad-triangular-acute, slightly recurved, outside brownish green and purple, inside glossy dark purple, margin undulate and purple. Spadix sessile, 60–70 cm long, more than twice as long as spathe; pistillate zone cylindrical, 3.5 × 2.5 cm, flowers congested; staminate zone obconical, 3.2 × 2.5–3.2 cm, flowers densely congested; appendix c. 56 cm long, 3.2 cm in diameter at the base, long-clavate, above the staminate zone slightly constricted, lower third with elongate, irregular, deep grooves, base creamy with irregular purple stripes, upwards becoming evenly pinkish, basally with antherlike staminodes higher up passing over into irregular warts and grooves; ratio of pistillate to staminate zone length 1 : 1; without a sterile zone between the pistillate and staminate zone. Pistillate flowers 4 mm long; ovaries ovoid-globose to cubic, (1–)2(–3)-locular, 2.5–3 × 2 mm, with one basal to slightly lateral, elongate, anatrop ovule; stigma subsessile, oval in both cross and lateral section, slightly 2(–3)-lobed, 1 × 2 mm, lobes cylindrical, tapering to a roundish tip, light green to creamy; style very short, 0.2–0.6 mm long, dark green. Staminate flowers 1.7–2 × 2 mm, creamy to light brown; anthers ovoid to elongate, free, or rarely pairwise unilaterally connate; filaments only 0.2–0.5 mm long but rather wide, sometimes connate to a roundish or irregular, flat columna; pores circular with reddish brown edges, one apical pore per theca; connective with two parallel short grooves, each with an apical brownish to purplish spot. Infructescence unknown. Pollen globular, inaperturate, exine smooth (psilate).

Etymology: The epithet refers to the irregular and deep grooves of the spadix appendix.

Distribution: NW Gabon, only known from one site (Fig. 1).

Note: *Amorphophallus canaliculatus* belongs also to the large African section with hairlike emergences at the base of the spathe tube, but differs from all other African species with short peduncles in the strongly grooved appendix base. *A. canaliculatus* is most similar to *A. zenkeri.*

Additional specimen seen
GABON: 0° 50′N, 11°55′E, 75 km ouest Societé Exploitation Forestier, Acumea Hang, 10.7.1985, *JJ. Bos, F.M. van der Laan & T. Nzabi 10548* (WAG).

Amorphophallus hetterscheidii Ittenb. & Lobin, **sp. nova –** Fig. 4.
Holotypus: Cult. [from *Van der Maesen & de Wilde s.n.*, Gabon, Sibang Forest, outside Libréville, 20.1.1993], *W. L. A. Hetterscheid H.AM 266-T* (L! [spirit coll.]).

Differt ab *Amorphophallo angolense* ahenum cortinam ovale lamina pauce lobata; pars staminata inflorescentiae cylindrica et distincte sub constrictionem spathae; spadix unilateraliter subnutans, appendix basim non constricta, constrictio spathae indistinctior. Ab *A. calabarico* differt presentia styli.

Tuber depressed-globose, 5–10 × 1.5–6 cm, brownish, upper half producing short, rhizomatous offsets. Leaf to c. 100 cm long; petiole to 60 cm long, 1.5 cm in diameter, pale green with numerous confluent blackish brown spots, often with a dark metallic green shimmer; lamina 60–100 cm in diameter, very strongly pinnate, rhachises narrowly winged; terminal leaflets elliptical to elongate-elliptical, 5–20 × 1–6 cm, acuminate, margin undulate, upper face green and somewhat glossy, lower face dull green and glossy. Cataphylls 3, the longest 20–30 cm long, reddish to pinkish, with elongate, irregular dark brown spots. Inflorescence to 60–90 cm long, developing alongside the young leaf, long-peduncled, much longer than cataphylls; peduncle 30–50 cm long, 1–1.5 cm in diameter, coloured as petiole; spathe erect, 12–30 cm long, somewhat overlapping with a rectilinear purple edge, separated by a slight constriction in a elongate-ovoid tube and a short-triangular limb; tube 6–15 × 5–7 cm, outside bright green or

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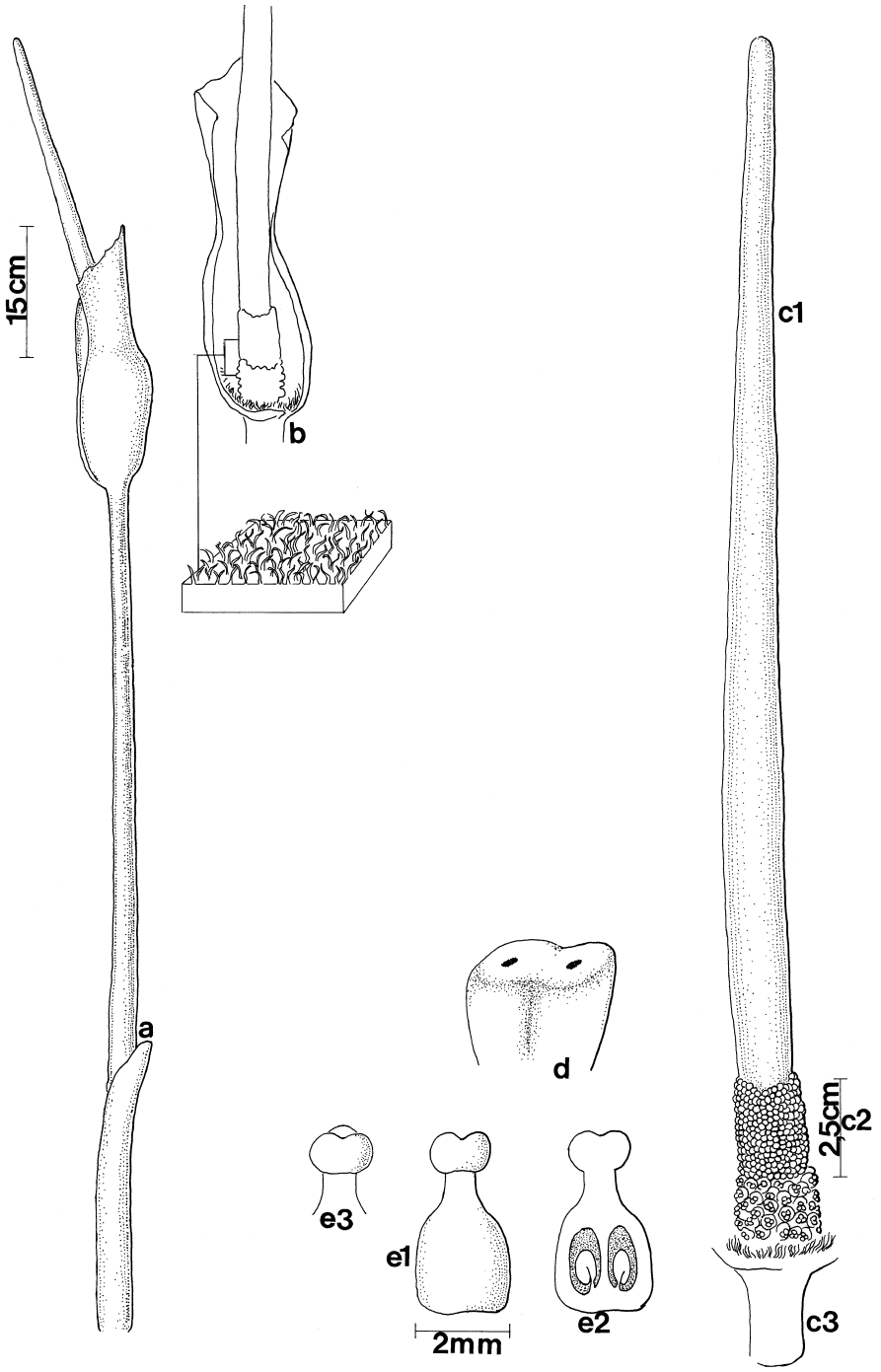

Fig. 4. *Amorphophallus hetterscheidii* Ittenb. & Lobin – a: habitus, b: Inflorescence with open spathe, c: spadix (c1: appendix, c2: pistillate and staminate zone, c3: peduncle), d: anther, e: pistillate flower (e1: lateral view, e2: longitudinal section, e3: stigma). – Drawings after the type, by S. Ittenbach.

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creamy, basal part with large, confluent dark green spots, inside bright green to creamy with numerous small, dark violet to blackish punctation and basally densely covered with whitish to pale pinkish, 2–3 mm long hairlike emergences upwards reduced to minute warts, otherwise epidermis papillose; limb 6.5–15 × 4–10 cm, outside bright green, to the margins grading into purple, margins smooth and dark purple. Spadix sessile, 25–40 cm long, longer than spathe, emerging excentrically from the opening of the spathe; pistillate zone cylindrical, 2–4 × 1.7–2 cm, flowers densely congested; staminate zone ± cylindrical, 2–3 × 1.5–2.2 cm, flowers very densely congested; either without or with an up to 1 mm long sterile zone between the pistillate and staminate zone; appendix 23–35 cm long, 1–2 cm in diameter at the base, cylindrical to conical, with rounded apex, above the staminate zone not constricted, red-brown, rough to velvetlike, covered with very short elongate warts; ratio of pistillate to staminate zone length 1–1.3 : 1. Pistillate flowers 4–5 mm long; ovaries elongate-ovoid to cubic, 2.5–3 × 2 mm, 2(–3)-locular, dark green; style 0.5–1.2 × 1 mm; stigma 1–1.2 × 1–1.5 mm, ± oval in cross section, depressed-circular in lateral section, with 2(–3) small, roundish to cylindrical humps, papillose, brown. Staminate flowers 2.5 × 1.5 mm long; anthers ovoid, yellowish orange; connective with two small grooves and numerous small dark violet to blackish spots, therefore appearing dark violet; filaments only 0.5–0.8 mm long but rather wide, free; pores oval, one apical pore per theca. Infructescence unknown. Pollen inaperturate, exine smooth (psilate).

Eponymy: The species is dedicated to W. L. A. Hetterscheid, for his invaluable work about the taxonomy, geography and ecology of the Asian species of *Amorphophallus*.

Distribution: From W Zaire to Gabon and northwards to the outermost southwest of the Central African Republic (Fig. 1).

Note: *Amorphophallus hetterscheidii* is not rare in the Sibang Forest of Gabon (Maesen & de Wilde in sched.). As *A. barthlottii* and *A. johnsonii* the species belongs to the large African section with hairlike emergences at the base of the spathe tube. *A. hetterscheidii* is most similar to *A. bequaertii, A. calabaricus* and *A. angolensis*, differing from the last species by the ovoid spathe tube, a less distinctly lobed stigma, the appendix base not being constricted and the base of the spadix being straight (versus shallowly sigmoid).

Additional specimens seen
Central African Republic: Région de Mbaiki, Station Centrale de Boukoko, 25.5.1948, *Le Testu 929* (BM).
Gabon: Sibang Forest, outside Libréville, 20.1.1993, *Van der Maesen & de Wilde s.n.*(L).
Zaire: Grande Depréssion Centrale, Leverville, *H. Vanderyst 6284* (BR); Kikval, 11.1920, *H. Vanderyst 8496* (BR).

Amorphophallus impressus Ittenb., **sp. nova** – Fig. 5.
Holotypus: Tanzania, Songea District, S of Lumecha bridge, 22.5.1956, *Milne-Redhead & Taylor 9998* (K!).

Differt ab *Amorphophallo goetzei* aheno cortina spathae impresso, orbiculato cum margine laminae horizontaliter distante. Pars staminata inflorescentiae supra constrictionem spathae prominens. Ab *A. eichleri* emergentiis linguiformibus facie interioris basalis spathae et spadici distincte majori differt.

Tuber unknown. Leaf solitary, c. 120 cm long; petiole c. 100 cm long, c. 2.5 cm in diameter at the base, green with purple spots; lamina green, c. 100 cm in diameter, rhachises with broad-triangular to oval wings, terminal leaflets elongate-oval, 4–10 × 1–3 cm, acuminate, margin slightly undulate or dentate. Cataphylls 2(–4), the outer one 10–14 cm long, the innermost 25–30 cm long, longer than spathe and peduncle together, whitish to pink and with greenish to brownish oval to roundish spots. Inflorescence sessile, appearing before the leaf, short-pedun-

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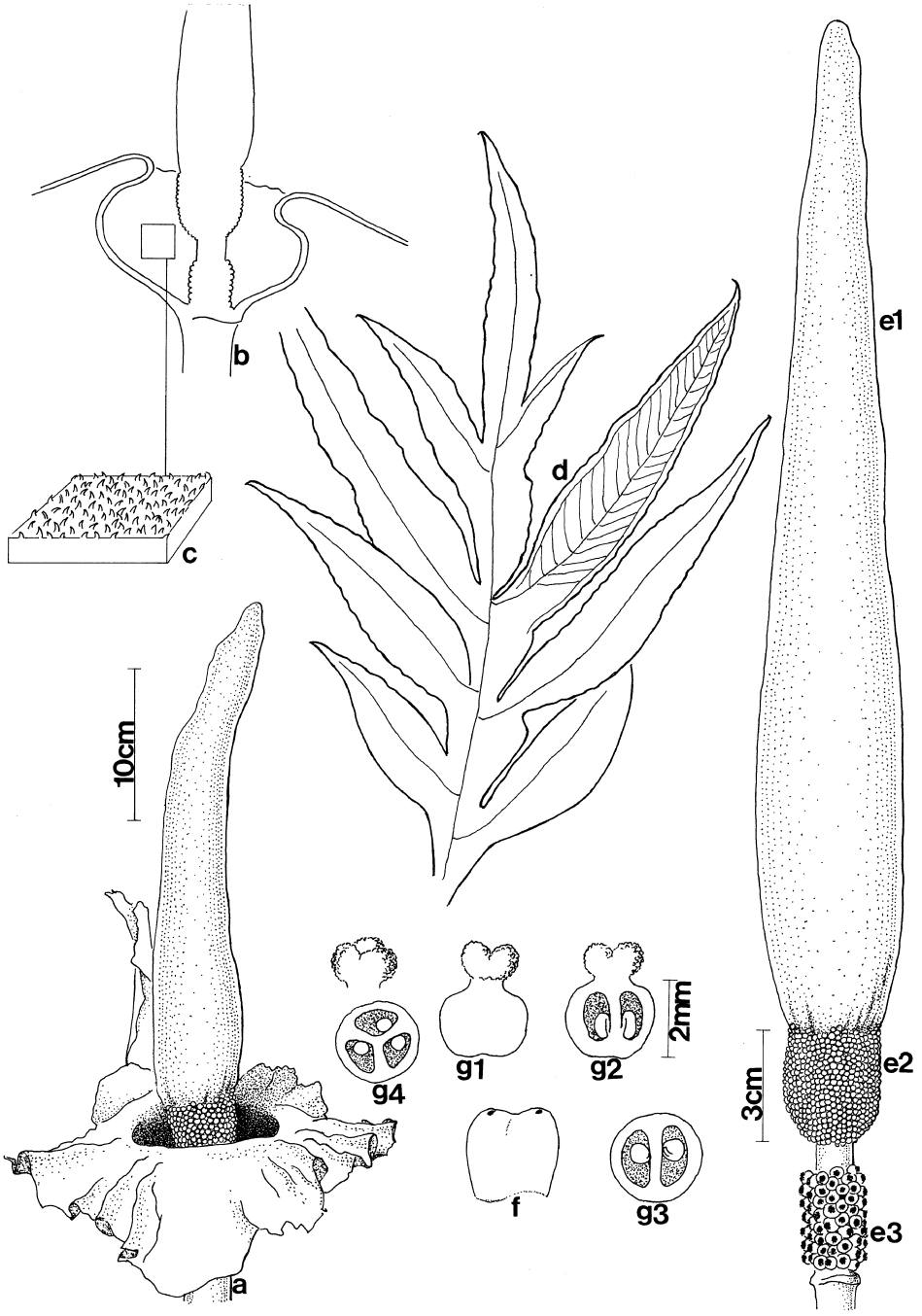

Fig. 5: *Amorphophallus impressus* Ittenb. – a: habitus, b: inflorescence with open spathe, c: base inside of the spathe, d: leaf, e: spadix (e1: appendix, e2: staminate zone, e3: pistillate zone), f: anthers, g: pistillate flower (g1: lateral view, g2: longitudinal section, g3-4: cross sections and stigma showing variation). – Drawings after the type, by S. Ittenbach.

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cled, c. 50–70 cm long; peduncle 5–10 cm long, 1–1.5 cm in diameter, smooth, brown-green with or without green or olive spots, to the spathe grading into purple. Spathe 12–25 cm long, separated by a strong constriction in a depressed, urceolate tube and a rimshaped to elongate-triangular limb; tube 3.5–10 × 4–9 cm, outside creamy to flesh-coloured, the lower part greyish brownish to green, with dark green veins and small green to brown spots; inside pinkish, purple to reddish brown, lower part with small, tongue-shaped colourless or purple or reddish brown emergences of 0.3–1 × 0.5 mm higher up reduced in size and causing the inside surface to be rough; limb strongly undulate, on the side of the longest cataphyll 4–6 cm long, on the other side elongate-triangular and 6–15 cm long, outside dark green to brownish purple, with thick purple veins, inside pink to purple, margin maroon. Spadix sessile or stipitate for 1–6 mm, 18–40 cm long, longer than spathe; pistillate zone cylindrical, 1–3 × 0.8–1.2 cm, flowers congested or somewhat distant; staminate zone obconical to ovoid, narrowed at base, 1.5–4 × 1–3 cm, flowers congested; sterile zone between pistillate and staminate zone 1–10 mm long; appendix 20–35 cm long, thick-conical to slightly clavate, above the staminate zone slightly constricted, 2–4 cm in diameter at the base, dark purple, verruculose; staminodes absent; ratio of pistillate to staminate zone length 0.4–0.6 : 1. Pistillate flowers 2–4 mm long; ovaries globose-ovoid, 1.5–2 × 1.5–2 mm, yellowish green or bright green, (1–)2(–3)-locular, stigma sessile, 1–2 × 1–2 mm, dark yellow, papillose, with 2(–3) small roundish humps or rarely roundish and smooth. Staminate flowers 0.9–1.6 × 1–1.9 mm, with 2–5 stamens; filaments absent or only 0.1–0.2 mm long; anthers free, elongate-ovoid to cubic, creamy to yellowish orange; connective with two small grooves, brown; pores elongate-oval, one apical to subapical pore per theca (rarely two pores per theca). Infructescence unknown. Pollen inaperturate, exine smooth (psilate).

Etymology: The epithet refers to the strongly depressed tube of the spathe.

Distribution: S Tanzania and Malawi (Fig. 1).

Note: *Amorphophallus impressus* has been collected several times but not recognized as new (see Mayo 1985, under *A. goetzei*). The species is most similar to *A. lewallei* and *A. eichleri.*

Additional specimens seen
TANZANIA: R. Mikwanga, 18.5.1956, *Milne-Redhead & Taylor 10355* (K); Cult. in Kew Gardens (K [leaf & inflo.]).
MALAWI: Lake Malawi, Zomba, Monkey Bay, 22.12.1983, *Gasner 244* (K [spirit coll.]); Nyasaland (Njassaland), Karenga (Karanga), 22.12.1952. *J. Willamsen 133* (BM).

Amorphophallus margretae Ittenb., **sp. nova**
Holotypus: Zaire, Prov. Kivu, Terr. Kalehe, km 110 route Kavumu-Walikale, réserve IRSAC à Irangi, riv. Fulonko, 6.12.1956, *A. R.Christiaensen 1918* (BR!).

Differt ab *Amorphophallo gallaensi* spadice spatham pauce superexstante, stylo valde breviore (max. 1 mm longo) et absentia columnae tabuliformis.

Tuber irregular-globose to ovoid, 6–7 × 2.5–5.5 cm, laterally producing cylindrical and conical offsets of 1–1.2 × 0.5–0.6 cm. Leaf unknown. Cataphylls 3, the inner one c. 9–10 × 1.5–2 cm, the outer ones much shorter, dark with darker veins. Inflorescence erect, appearing before the leaf, c. 80 cm long, long-peduncled; peduncle smooth, 50–52 × 0.6–1 cm, with small roundish spots; spathe 24 cm long, either without a constriction or separated by a shallow constriction in a cylindrical tube and an erect, rimshaped to elongate-triangular limb; tube 8.5–9 × 3.5–4 cm, outside purple; inside basally smooth, with shallowly elevated dark veins; limb 14.5–15 × 6–7 cm, purple, margin undulate. Spadix sessile, c. 28–30 cm long, somewhat longer than spathe; pistillate zone cylindrical, 3 × 1.5 cm, flowers distant; staminate zone cylindrical, 7–8 × 0.6–1 cm, flowers distant; appendix conical, 16–17 cm long, 0.6–2 cm in diameter, smooth and velvetlike, above the staminate zone with a shallow constriction; staminodes absent; without a

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sterile zone between the pistillate and staminate zone; ration of pistillate to staminate zone length 0.4–0.5 : 1. Pistillate flowers 5–6 mm long; ovaries elongate-ovoid, 3–4.5 × 2–3 mm, unilocular; style slender, 0.6–1 mm long and very thin, slightly curved, darker than ovary; stigma 0.5–0.8 × 0.5–0.6 mm, facing sideways, unlobed and head-shaped or with two roundish humps. Staminate flowers 0.7–1 × 0.8–1.1 mm, with 3–4 stamens; anthers free, globose to cubic with rounded edges, 0.7–0.1 × 0.6–1 mm; connective with two small grooves, darker than thecae; filaments only 0.1–0.3 mm long, free or sometimes basally connate but not forming a columna; pores circular, one apical pore per theca. Infructescence and pollen unknown.

Eponymy: The first author dedicates this species to his mother Margret Ittenbach, née Patzwald.

Distribution: W Zaire, only known from the type collection (Fig. 1).

Note: *Amorphophallus margretae* belongs to the same E African section as *A. gallaensis*.

Amorphophallus richardsiae Ittenb., **sp. nova**
Holotypus: Zambia, Kalambo Falls, 15.11.1960, *H. M. Richards 13579* (K!).

Differt ab *Amorphophallo swynnertonii* pollinibus striatis, appendici spathae longiore, ovario 2–3-loculato, stigmate 2–3-gibberoso et relatione partis pistillatae et staminatae inflorescentiae (0.35–0.4 ad 1).

Tuber and leaf unknown. Cataphylls 2(?), the inner 2.3–13.5 × 2–6 cm, the outer 7 × 1.2 cm, broad-oval, creamy with a pink flush and brownish elongate-oval spots. Inflorescence to 40 cm long, long-peduncled, appearing before the leaf; peduncle 12–15 cm long, greenish with numerous small confluent, elongate to oval, dark green to brown spots. Spathe erect, 16–24 cm long, separated by a distinct constriction in an asymmetrical oval to triangular tube and a wide, triangular to oval limb; tube 5–8 × 4–6 cm, outside brownish green at the base, higher up becoming green, veins brownish to bright purple and densely covered with round dark greenish and brownish spots; inside at the base purple, with strongly raised veins, these crowded with warts and flag-shaped emergences, therefore veins frequently appearing as uneven or evenly high ridges; constriction inside with a 1–2 cm wide, greyish green waxy band; limb 10–17 cm long, upwards oblique, outside dirty green with violet veins, inside brown purple, margins undulate. Spadix sessile, 21–27 cm long, equal to or up to 6 cm longer than spathe; pistillate zone cylindrical, 1.2–2.5 × 1.2–1.5 cm, flowers congested; staminate zone cylindrical to slightly ovoid, 3.2–6 × 1–1.5 cm, flowers congested; appendix 14–20 cm long, elongate-conical to cylindrical, above the staminate zone slightly constricted and with grooves, purple; staminodes absent; without a sterile zone between the pistillate and staminate zone; ratio of pistillate to staminate zone length 0.35–0.4 : 1. Pistillate flowers 2.5–3.5 mm long; ovaries ± ovoid, 2–2.5 × 1.5–2 mm, 2–3-locular, dark yellowish; stigma sessile, shallowly 2–3-lobed, roundish flat in lateral section, circular to oval in cross section, 1–2 × 1–1.5 mm, brown to black. Staminate flowers 1–1.5 mm long; anthers cubic, free, 0.5 × 0.7 mm, bright brown; filaments 0.7–1 × 0.7–1 mm, free; connective slightly grooved and with dark strips; pores circular, one apical pore per theca. Infructescence unknown. Pollen inaperturate, exine striate.

Eponymy: The species is dedicated to H. M. Richards, who made rich plant collections in SE Africa.

Distribution: Borderland of Zambia and Tanzania, from Mbala to the Kalambo waterfalls (Fig. 1).

Note: *Amorphophallus richardsiae* is most similar to *A. swynnertonii*, which actually is not conspecific with *A. abyssinicus*.

Additional specimens seen
Zambia: Cult. in Kew Gardens, flowering 28.12.1962 & 4.4.1964, No. 764/60 & 714/64 (K);

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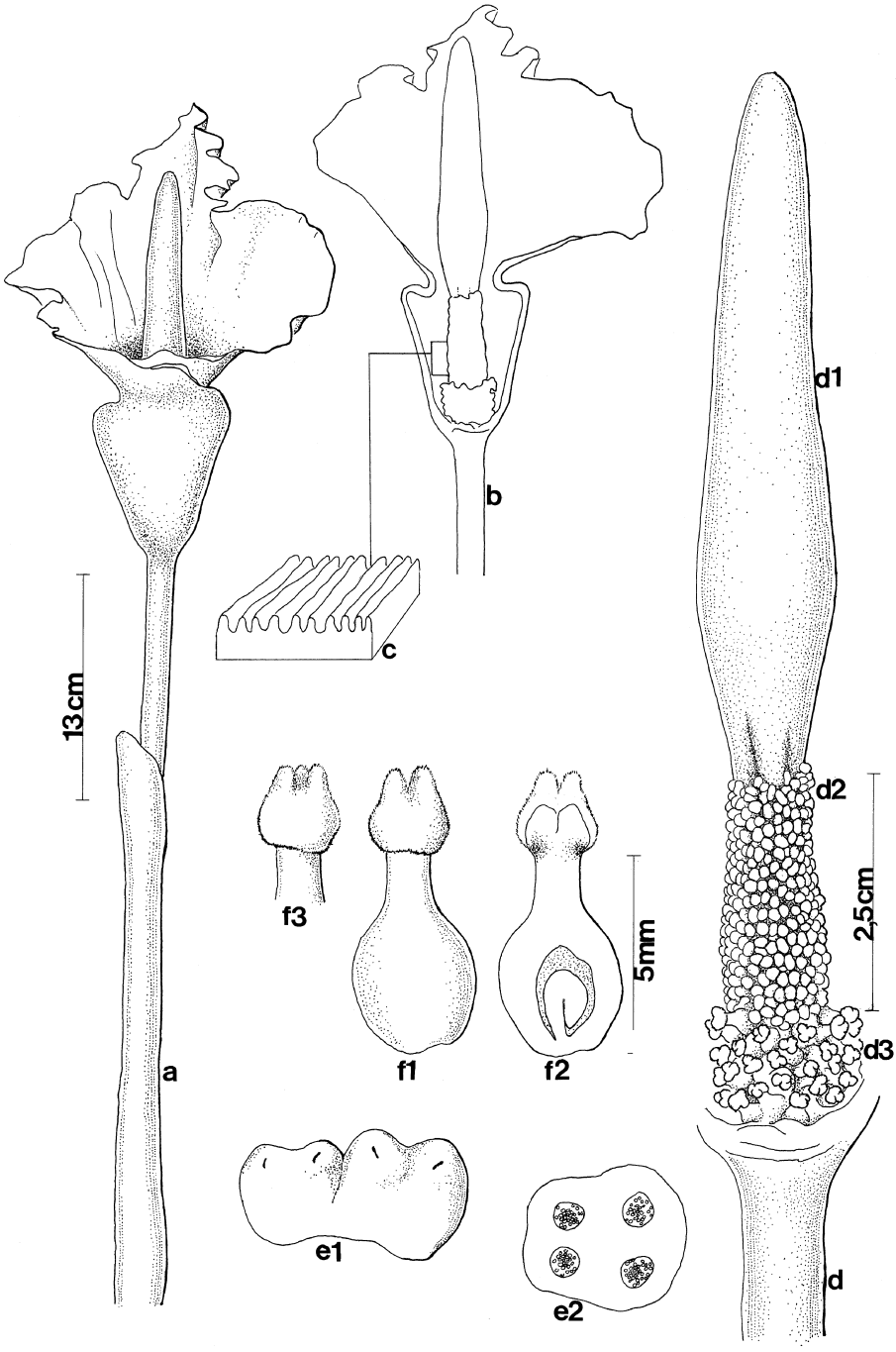

Fig. 6. *Amorphophallus abyssinicus* subsp. *akeassii* Ittenb. – a: habitus, b: inflorescence with open spathe, c: base inside of the spathe, d: spadix (d1: appendix, d2: staminate zone, d3: pistillate zone), e: anther (e1 lateral view, e2: cross section), f: pistillate flower (f1: lateral view, f2: longitudinal section, f3: stigma). – Drawings after a plant cultivated in the Bot. Gard. Bonn (No. 00045), by S. Ittenbach.

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Dhulumiti, 1.11.1954, *H.M. Richards 2134* (K [inflo.]); Abercorn (Mbala), 14.11.1959, *H.M. Richards 11777* (K [inflo.]); between Abercorn (Mbala) & Kalambo Falls, 2.11.1952, *R.G. Robertson 207* (K [inflo.]).

Amorphophallus abyssinicus (A. Rich.) N.E. Br. subsp. ***akeassii*** Ittenb., **subsp. nova** – Fig. 6.
Holotypus: Ivory Coast, Comoé Nationalpark, 20.5.1990, *S. Porembski 661* (B; isotypus: BONN).

Differt a subsp. *abyssinico* et subsp. *unyikae* ovario uniloculato (pseudomonomero) et stylo 0.5–1.5 mm longo.

Pistillate flowers 6 mm long; ovaries unilocular (pseudomonomeric), 4 × 3 mm; style 0.5–1.5 mm long; stigma distinctly 2(–3)-lobed, 1 × 2 mm.

Eponymy: The species is dedicated to the W African botanist Aké Assi, who did invaluable research in W Africa.

Distribution: Ivory Coast to W Nigeria (Fig. 1).

Note: This subspecies is distributed at the western limit of *A. abyssinicus*.

Additional specimens seen
Ivory Coast: Sangouani, 20.4.1972, *Aké Assi 11744* (K); cult. in Bot. Gard. Bonn (No. 00045) from the type collection (BONN [spirit coll.]).
Ghana: Keta Krachi, 3 km N, 12.4.1953, *J. K. Morton GC 9102* (BM); Pongo Tamale, 16.4.1947, *P. J. O. Bally 142* (K).
Nigeria: Sardauna Prov., between Gashka and Serti, near Gashka, 27.3.1970, *J. B. Hall 1595* (K).

Amorphophallus calabaricus N. E. Br. subsp. ***mayoi*** Ittenb., **subsp. nova**
Holotypus: Uganda, Kampala (Mengo District), Kajansi Forest Reserve, 16 km on Entebbe road, 5.1938, *Chandler 2433* (K!).

Differt a subsp. *calabarico* spadici breviore in relationem ad spatham (usque ad 1.5 longitudinis spathae), relatione partis pistillatae et staminatae inflorescentiae (0.7–1.1 ad 1) et parte staminata (sub)cylindrica.

Tuber depressed-globose, 4 cm in diameter. Leaf c. 80–125 cm long; petiole 60–100 cm long, densely covered with confluent spots; lamina 0.8–1.2 m in diameter; rhachises narrowly winged distal from the higher order leaflets; terminal leaflets oval to elliptical, slightly asymmetrical, 6–25 × 2–8 cm, shortly acuminate (1 × 0.1–0.2 cm), margins smooth. Cataphylls 3(?), oval to elongate, c. 20 cm long. Inflorescence 50–80 cm long, long-peduncled; peduncle 20–63 cm long, 0.8–1.2 cm in diameter, spotted. Spathe erect, 10–20 cm long, separated by a very shallow constriction in a conical tube and a triangular, erect limb; right side of the spathe overlapping with a widely arched edge; tube 5–7 × 3–4 cm, inside basally with loosely disposed, 1–3(–4) mm long, elongate hairlike emergences higher up reduced to small papillae; limb 5–13 cm long, purple to brownish; margins smooth or slightly undulate, outside and inside brownish to purple. Spadix sessile, 15–30 cm long, c. 1.5 times as long as the spathe; pistillate zone cylindrical to cubic, 2–2.5 × 0.5–1.3 cm, flowers congested or somewhat distant; staminate zone cylindrical to obconical, 1.5–2.8 × 0.5–1.5 cm, flowers congested; sterile zone between pistillate and staminate zone 0–2 mm long; appendix elongate-conical, 10–25 cm long, 1–3 cm in diameter at the base, purple, smooth, above the staminate zone not or slightly constricted; ratio of pistillate to staminate zone length 0.7–1.3 : 1. Pistillate flowers 2–3 mm long; ovaries 1–2 × 1–1.5 mm, bilocular, globose to ovoid; stigma sessile, slightly bilobed or rarely unlobed, 1–1.5 × 1–1.5 mm, narrower or equal to the ovaries in diameter, circular in cross section, globose to slightly

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tapering, lobes globose or slightly conical. Staminate flowers 1–1.5 × 1–1.5 cm; anthers free, ovoid to cubic, dark orange; filaments 0–0.4 mm long; pores oval, one apical pore per theca; connective with thin grooves. Infructescence cylindrical, 7 × 2.5–3 cm; peduncle 50–80 cm long, 0.5–1.5 cm in diameter; berries orange, 0.6–0.8 × 0.7 cm, globose to ovoid, two-seeded; seeds globose to flat-ovoid, 6 × 4 mm. Pollen inaperturate, exine smooth (psilate).

Eponymy: The subspecies is dedicated to the English botanist S. J. Mayo, who revised the *Araceae* of tropical E Africa.

Distribution: NW Zaire, Uganda and W Kenya (Fig. 1).

Note: Subsp. *mayoi* is both morphologically and geographically separate from subsp. *calabaricus,* which is distributed only in Nigeria and W Cameroon. *A. calabaricus* is most similar to *A. hetterscheidii* and *A. bequaertii.*

Additional specimens seen
UGANDA: Bunyoro District (Homia), Bundongo Forest, 28.6.1972, *Synnott 1080* (K). Mbale District, 10 km N of Busia, Oruchor Hill, 4.5.1951, *G. H. Wood 257* (K [inflo.]). Kampala (Mengo District), Kajansi Forest Reserve, 16 km on Entebbe road, 5.1938 & 3.1939, *Chandler 2433* (K [inflo., leaf & infruct.]).
KENYA: N Kavirondo (Nyanza) District, 34°50′–55′E, 0°13′–17′N, Kakamega Forest, 12.4.1973, *O.J. Hansen 921* (EA, K) [inflo. & leaf]; Kakamega Forest, 34°52′E, 0°14′N, 17.4.1965, *J. B. Gillett 16685* (EA [inflo.]).
ZAIRE: A 8 km à l Ouest du village de Yakome, route Yangambi-Gazi, 9.5.1940, *R. Germain 340* (BR [leaf]); Yangambi [cult. from original collection *Germain 340*], 4.1949, *R. Germain 4768* (BR [inflo.])

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