

**A TAXONOMIC REVISION OF PSEUDODRACONTIUM
(ARACEAE–AROIDEAE–THOMSONIEAE)**

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SUMMARY

The Indochinese genus *Pseudodracontium* N.E. Br. (Araceae) is revised. Seven species are recognized; a key is given. Four new species from Vietnam and Thailand are described: *P. fallax*, *P. kuznetsovii*, *P. lanceolatum*, and *P. latifolium*. Distributions of all the species are mapped. *Pseudodracontium macrophyllum* Gagnep. ex Serebryanyi is validly published here for the first time. Two taxa are reduced to synonymy: *P. anomalum* N.E. Br. is reduced to *P. lacourii*; *P. flotoi* S.Y. Hu is reduced to *P. harmandii*. Three species (*P. kerrii*, *P. laoticum*, and *P. siamense*) invalidly published by Gagnepain are mentioned under the species to which they actually belong. Ecological and taxonomic notes are provided.

INTRODUCTION

This taxonomic revision of the last remaining satellite genus of *Amorphophallus* Blume ex Decne. – the Indochinese endemic *Pseudodracontium* N.E. Br. – has been in preparation by the author since 1990. Though the genus is comparatively small and both living plants and herbarium material were available for study, the work took longer than expected because of extensive morphological variation in vegetative and floral characters of *P. lacourii*. Without study of extensive living collections (Hortus Botanicus, Leiden, curated by W.L.A. Hettterscheid, Main Botanical Garden of the Russian Academy of Science, Moscow, curated by the author), the results of this revision would have been considerably less satisfactory. Research was carried out in close co-operation with W.L.A. Hettterscheid, whose monographic study of the genus *Amorphophallus* is nearly finished. I would like to emphasize that without his assistance the present revision could hardly have been accomplished. Most living plants from Vietnam were collected by Andrew N. Kuznetsov (Russian-Vietnamese Tropical Research Center, Vietnam) from 1989 to 1993 and by the author in 1989, in the southern provinces. Two remarkable new species of *Amorphophallus* were described from those collections (Hettterscheid & Serebryanyi, 1994). Dr. Kuznetsov's assistance is acknowledged. Important living specimens were collected in Thailand by Dr. J.F. Maxwell (Chiang Mai, Thailand) and Mr. J. Bogner (Munich, Germany). Additional Central Vietnamese specimens were collected by Dr. N. Arnautov (St. Petersburg, Russia).

Almost all extant herbarium material was examined, a total of more than 125 specimens, from A, AAU, BM, C, K, L, LE, M, MHA, P, SGN, SING, US. I am grateful to all herbarium directors and curators who hereby are acknowledged.

A SHORT TAXONOMIC HISTORY

Brown (1882) described *Pseudodracontium* with two species: *P. anomalum* (selected as the lectotype for the genus by Nicolson, 1967) and *P. lacourii*. Brown based the descriptions on herbarium material and attached excellent line drawings to the respective type specimens (both in K). Engler (1898) described *P. harmandii* and later (Engler, 1902) *P. harmandii* var. *schmidtii* and finally produced a taxonomic account for 'Das Pflanzenreich' (Engler, 1911), recognizing three species and one variety. Gagnepain (1942) revised the genus for the Flore Générale de l'Indochine, recognizing six species: *P. anomalum*, *P. lacourii* (with *P. harmandii* a synonym) and four new species, unfortunately all invalidly published because he provided no Latin diagnoses, i.e. *P. kerrii*, *P. laoticum*, *P. macrophyllum*, and *P. siamense*. Hu (1968) revised the genus for the Flora of Thailand, recording three species: *P. lacourii*, *P. harmandii* (var. *schmidtii*) and a new species: *P. flotoi* (see comments on the typification of this species under *P. harmandii*). Ho (1972) in 'An Illustrated Flora of South Vietnam' recorded two species for the region: *P. laoticum* and *P. lacourii*. The present author published preliminary results (Serebryanyi, 1994), recognizing four species: *P. lacourii* (incl. *P. siamense*, *P. anomalum*), *P. harmandii* (incl. *P. flotoi*, *P. laoticum*, *P. kerrii*), *P. fallax*, and *P. macrophyllum*, the last two taxa published in this paper.

SYSTEMATIC POSITION OF THE GENUS

Pseudodracontium belongs to the tribe Thomsonieae Blume and is closely related to *Amorphophallus* Blume ex Decne., the only other genus in this tribe. Grayum (1990) and Bogner & Nicolson (1991) placed the tribe in subfamily Aroideae (see Hettterscheid, 1994a, for a more detailed historical review and taxonomic discussion). Bogner et al. (1985) reduced the tribe to the two genera mentioned above by their proposal to reduce *Thomsonia* Wall. and *Plesmonium* Schott to *Amorphophallus*. This was followed by Bogner & Nicolson (1991) and almost all other aroid students. The tribe Thomsonieae is clearly isolated within Aroideae and its relation to other tribes in the subfamily remains unclear (Hettterscheid, 1994a).

The monophyly of the tribe Thomsonieae is supported by the following characters (Hettterscheid, 1994a):

- all leaf segments upright in bud (found so far only in *Gonatopus* (Hook. f.) Engl. and *Zamioculcas* Schott);
- involute vernation (found so far only in *Cryptocoryne* Fisch. ex Wydl., *Lagenandra* Dalz., and *Anthurium* Schott sect. *Pachyneurium*);
- development of highly compound leaves entirely by marginal incision.

The monophyly of *Pseudodracontium* is supported by the following unique suite of characters:

- ovaries unilocular (but also found in *Amorphophallus*);
- thecae unilocular (not found in *Amorphophallus*);
- long, slender, straight, partly connate filaments (found in only one species of *Amorphophallus*);
- stipitate appendix completely covered with rod-like staminodes (found in two species of *Amorphophallus*);
- anterior main segment of the leaf blade distinctly shorter than the posterior ones (also found in *Amorphophallus* but mainly in young plants).

Though Hetterscheid (1994a, 1994b) mentioned that slender filaments are found in *Amorphophallus angustispathus* Hett. and *Pseudodracontium*-like appendix structures have their equivalents in *A. napalensis* (Wall.) Bogner & Mayo, *A. sumawongii* (Bogner) Bogner & Mayo (papillate staminodes), and *A. corrugatus* N.E. Br. (sulcate staminodes), these similarities may also be considered homoplasies or they may not be structurally similar to the conditions in *Pseudodracontium* (e.g., *A. sumawongii* has truncated staminodes). The only clear unique character of *Pseudodracontium* is the possession of unilocular thecae, a very rare character in Araceae in general. Overall there would seem to be several possibilities of knitting *Pseudodracontium* into the phylogeny of *Amorphophallus* but the possibility of *Pseudodracontium* being the sister genus of *Amorphophallus* cannot be ruled out. A phylogenetic analysis of *Amorphophallus* + *Pseudodracontium* will be carried out by Hetterscheid. Awaiting this, I have maintained *Pseudodracontium* as the second genus of tribe Thomsonieae (as proposed also by Bogner et al., 1985).

There is one species in *Pseudodracontium* – *P. macrophyllum* – that approaches *Amorphophallus* morphologically more than any other species in having a truly depressed-globose tuber with a few irregular basal branches (found in a large number of Indochinese *Amorphophallus* species), the inflorescence emerging before the leaf (found in the majority of *Amorphophallus* species) and the anthers opening by rounded pores (found in many *Amorphophallus* species).

TAXONOMIC TREATMENT

PSEUDODRACONTIUM

Pseudodracontium N.E. Br., J. Bot. 20 (1882) 193, t. 231, f. 2; Engl., Pflanzenr. IV.23C (Heft 48) (1911) 58; Gagnep. in Lecomte, Fl. Gén. Indo-Chine 6 (1942) 1152; Bogner et al., Aroideana 8, 1 (1985) 21. — Lectotype: *P. anomalum* N.E. Br. [= *P. lacourii* (Linden & André) N.E. Br.], designated by Nicolson (1967).

Seasonally dormant herbs, producing 1–3 leaves per shoot. *Tuber* irregularly elongate or almost carrot-like in most species, occasionally napiform in young plants of *P. harmandii* and *P. fallax*, depressed globose in *P. macrophyllum*. *Petiole* long, usually mottled and/or multi-coloured, cataphylls early-deciduous (except *P. macro-*

phyllum, which produces a series of persistent cataphylls). *Leaf blade* trisect, anterior main segment distinctly smaller than posterior ones, often undivided or consisting of a few segments ('leaflets'), posterior main segments pinnatisect or partly bipinnatisect; leaflets of the last order decurrent, sessile or shortly petiolulate, narrowly elliptic to broadly ovate, acute or long acuminate at the apex (*P. latifolium*); primary lateral veins pinnate, forming a pair of collective veins, the outer one submarginal, the inner one 4–13 mm distant from the margin; higher order venation reticulate. *Inflorescence* emerging after the leaf has unfolded or simultaneous, before the leaf only in *P. macrophyllum*. *Peduncle* shorter to longer than petiole, erect, similar in appearance to petiole. *Spathes* erect, cymbiform to strongly fornicate, not constricted, acute to long acuminate, pale green to yellow. *Spadix* shorter than or subequal to spathe; female zone shorter than male, flowers congested; male zone contiguous with female zone, flowers distant; appendix shorter than or subequal to male zone, stipitate or subsessile, ± conic, covered with staminodes, brain-like, papillate-clavate, muricate or intermediate between the first two states to irregularly corrugate, stipe naked or covered with flat scars of reduced male flowers (*P. macrophyllum*); appendix heating up during anthesis, producing an often heavy gaseous smell. *Flowers* unisexual, perigone absent. *Male flowers* (1-) 3-7-anded, filaments rather long, free to connate, thecae subglobose, dehiscent by a short slit or by a pore (*P. macrophyllum*), adjacent slits in partly synandrous flowers often fused to arcuate elongate larger slits, in entirely synandrous flowers all fused into one slit around the entire circumference of the synandrium. *Pollen* inaperturate, ellipsoid to oblong, with 'polar caps' (psilate areas), medium-sized (48–62.6 × 36–38.6 μm), exine narrowly striate. *Female flowers*: ovary ovoid to subglobose or depressed-globose, prismatic in cross section, 1-locular, with a single anatropous ovule, funicle short, placentation basal, stigma on a style or (sub)sessile, discoid to hemispheric. *Berry* ellipsoid or oblong-ellipsoid, nearly quadrangular, dried stigma persistent, 1-seeded. *Seed* ellipsoid to oblong, testa smooth, brown or white; raphe conspicuous; embryo large, ellipsoid, somewhat truncate at both ends; endosperm absent. *Chromosomes*: 2n = 26 observed for *P. lacourii* (Petersen, 1989).

Distribution – In Indochina 7 species.

Etymology – The generic name, meaning 'false *Dracontium*', refers to the tropical American genus *Dracontium* L. (Araceae).

KEY TO THE SPECIES

- 1a. Stigmas sessile or subsessile 2
- b. Stigmas on pronounced styles 4
- 2a. Inflorescence emerging before the leaf or rarely simultaneously; peduncle at least twice as long as the petiole; tuber depressed-globose with a few irregular vertical branches; appendix muricate (with numerous more or less parallel, longitudinal grooves); stigmas very large (to 2 mm diam.), thin, discoid, flat, with a central depression 7. *P. macrophyllum*
- b. Inflorescence emerging after the leaf has developed, tuber strongly elongate; appendix papillate-clavate or brain-like 3

- 3a. Appendix entirely papillate-clavate, stigmas sessile, c. 1 mm diam., thick, discoid to subhemispheric; petiole always exceeding the peduncle **2. P. harmandii**
- b. Appendix brain-like with a few more or less longitudinal deep fissures, the lower part occasionally papillate; stigmas subsessile (styles 0.2–0.5 mm long), hemispheric, up to 0.8 mm diam.; peduncle always exceeding petiole; plants mostly simultaneously bearing two leaves with two inflorescences or one inflorescence and one infructescence **1. P. fallax**
- 4a. Peduncle up to half as long as the petiole, leaflets very broad (largest more than 10 cm wide), long acuminate; appendix deeply and irregularly corrugate **6. P. latifolium**
- b. Peduncle equalling or exceeding petioles; leaflets acute 5
- 5a. Peduncle distinctly longer than the petiole; male flowers very distant; stigmas distinctly broader than styles, c. 1 mm diam. 6
- b. Peduncle more or less equalling petiole; male flowers more or less densely congested; stigmas small, more or less hemispheric, not broader than styles 7
- 6a. Robust plants (peduncle to 85 cm long); petiole to 70 cm long, ground colour chocolate-brown; appendix ivory white with truncated convolutions (surface appearing almost smooth), both appendix and male part of inflorescence distinctly dorso-ventrally compressed; leaflets to 20 × 6.5 cm (length/width ratio to 3.5); spadix to 20 cm long **3. P. kuznetsovii**
- b. Peduncle to 63 cm long; petiole to 50 cm long, ground colour bright green; appendix pale yellowish green, brain-like; leaflets narrowly lanceolate, to 24.5 × 5 cm (length/width ratio to 5); spadix to 8 cm long **5. P. lanceolatum**
- 7a. Plants to 50 cm tall, forming dense stands, leaves and peduncles multi-coloured, blades often variegated; appendix brain-like; stigma nearly punctiform (less than 0.5 mm diam.), never broader than style, subhemispheric **4. P. lacourii**
- b. Plants 70 cm or more tall, always solitary, leaves and peduncles green, blades never variegated; appendix brain-like with a few more or less longitudinal deep fissures, lower part occasionally papillate; stigma hemispheric, to 0.8 mm diam., slightly broader than the indistinct style **1. P. fallax**

1. *Pseudodracontium fallax* Serebryanyi, *spec. nov.* — Fig. 1a, b

Planta viridis, bifoliata, ad 70 cm alta. Pedunculus petiolo paulo longior. Stigma sessile vel subsessile, hemisphericum. Appendix basi papillata, cerebriformis, longitudine fissurata. — Typus: *Serebryanyi 8908* (MHA holo, spirit coll.), Vietnam, Vung Tau-Con Dao Special District, limestone hills c. 10 km E of Vung Tau port, near mount N. Chau Vien, 300 m alt., SE slope, 100 m below the Jesus Christ monument, in thickets, 28 May 1989.

Plants mostly simultaneously bearing two leaves and two inflorescences or an inflorescence and an infructescence. *Tuber* strongly elongate, up to 15 cm long, accessory buds down to 3 cm from the top. *Petiole* 40–55 cm long, surface glossy, ground colour bright pale green with numerous tiny white spots throughout and fewer larger dark green to dark olive spots and stripes in lower half, colour pattern variable in one

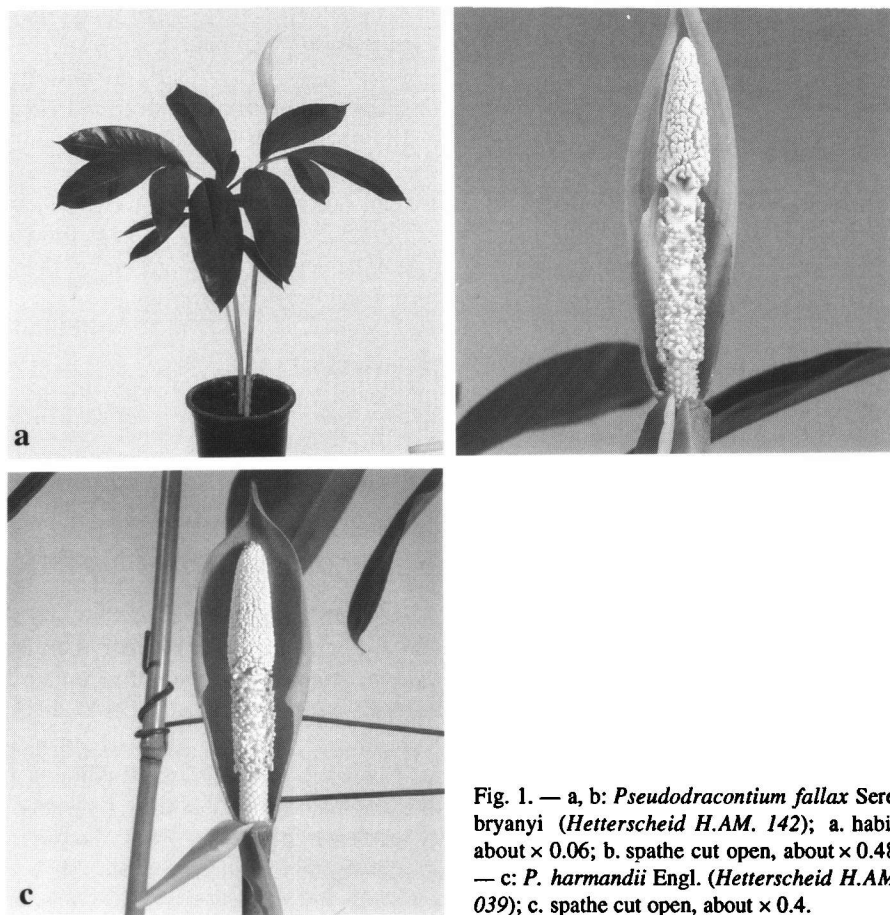


Fig. 1. — a, b: *Pseudodracontium fallax* Serebryanyi (Hetterscheid H.A.M. 142); a. habit, about $\times 0.06$; b. spathe cut open, about $\times 0.48$. — c: *P. harmandii* Engl. (Hetterscheid H.A.M. 039); c. spathe cut open, about $\times 0.4$.

plant in different years; anterior main segment almost always undivided, 20–24 cm long, 6–7 cm broad, petiolule 1 cm, oblong, apex shortly acuminate, leathery; upper surface usually dull pale green, occasionally glossy dark green in plants of the same population, never variegated; main vein impressed, lower surface dull or moderately glossy green, main vein prominent, inner collective vein 4–6 mm distant from the margin; posterior main segments 28–29 cm long, each with 4 to 7 'leaflets', these 9–13 cm long, 6–7 cm broad, broadly to oblong ovate. *Peduncle* 47–52 cm long, to 0.9 cm diam. at the base, very turgid; colour as petiole, with slightly more white spots. *Spathe* cymbiform, slightly fornicate, outside green during female anthesis, slightly paler during male anthesis (usually next day), inside pale green, up to 13 cm long, c. 7 cm diam., 2–3 cm longer than spadix, long acute, base convolute, margins of limb strongly involute, base inside with several warts. *Spadix* 9–11 cm long; female zone cylindrical, 1×0.9 cm, enlarging during fruiting stage up to 4×2 cm; male zone cylindrical, $3.5\text{--}4 \times 1.3$ cm long; appendix stipitate, conic, subacute, brain-like with a few more or less longitudinal deep fissures, the lower part occasionally papil-

late, ivory white, 3.7–4.2 cm long, 1.3 cm diam., stipe up to 0.5 cm long. *Ovaries* depressed, prismatic in cross section, c. 2 mm diam., whitish; stigma sessile or on very short indistinct style (c. 0.2–0.5 mm), hemispheric, 0.5 mm high, to 0.8 mm diam., surface strongly scabrate. *Male flowers* congested, consisting of (3–)4–7 stamens; upper flowers with shortened, irregularly to completely connate filaments; anthers irregularly connate, middle flowers with long, erect, mostly free filaments, occasionally connate with adjacent anthers; lower flowers entirely synandrous with occasionally reduced thecae. *Infructescence* with the dried lower part of spathe remaining; berry dark orange when mature although green berries may contain viable seeds, nearly quadrangular, c. 0.5 cm long, 3 mm thick; seed white, solitary, oblong-ovoid, laterally compressed, 4 × 2.5 mm.

Distribution – South Vietnam (only known from the type locality).

Habitat & Ecology – *Pseudodracontium fallax* is rare on the steep slopes of limestone hills in the vicinity of the Vung Tau port, at 200 m altitude. The vegetation is damaged by fires and cutting and consists of a developing cover of *Bambusa inermis* (5–7 m high), *Bombax* sp. (3–4 m high) and grasses. The soil layer is thin, rich, chernozyom-like. *Pseudodracontium fallax* flowers from May to June and fruits in June and July. In the type locality also *Amorphophallus scaber* Serebryanyi & Hett. and *Pseudodracontium lacourii* are found. Tuberous aroids occur in communities with *Kaempferia angustifolia* Rosc., *K. galanga* L., *K. laotica* Gagnep., and *Tacca leontopetaloides* (L.) Kuntze.

Etymology – The species epithet refers to the deceptive similarity of the spadix of this species to that of other species. This hampers identification when no vegetative material is known.

Note – *Pseudodracontium fallax* resembles *P. lacourii*, though differs in the sessile or subsessile stigmas and the more or less longitudinally deep fissured appendix with the lower part occasionally papillate. However, vegetatively *P. fallax* cannot be confused with *P. lacourii*, being entirely green and bearing simultaneously two leaves and two inflorescences or an inflorescence and an infructescence (see also the notes to *P. latifolium*).

Additional living specimens. VIETNAM. Vung Tau-Con Dao Special District (type locality): 28 May 1989, *Serebryanyi* 8907, cult. MBG and Hort. Bot. Leiden (as *Hetterscheid H.AM.* 166); 28 May 1989, *Serebryanyi* 8909, cult. MBG and Hort. Bot. Leiden (as *Hetterscheid H.AM.* 138 & *H.AM.* 142).

2. *Pseudodracontium harmandii* Engl. — Fig. 1c

Pseudodracontium harmandii Engl., Bot. Jahrb. 25 (1898) 15; Pflanzenr. IV.23C (Heft 48) (1911) 59, f. 23; S.Y. Hu, Dansk Bot. Arkiv 23 (1968) 445. — Type: *Godefroy in Exped. Dr. Harmand's n.* (P holo), Cambodia, Compon Chuang, June 1875

Pseudodracontium harmandii Engl. var. *schmidtii* Engl., Bot. Tidsskrift 24 (1902) 275; Pflanzenr. IV.23C (Heft 48) (1911) 61; S.Y. Hu, Dansk Bot. Arkiv 23 (1968) 445. — Type: *J. Smith s.n.* (C holo, spirit coll.), Thailand, Koh Chang Island, Klong Majum, on rocks in rain forest.

Pseudodracontium flotoi S.Y. Hu, Dansk Bot. Arkiv 23 (1968) 443. — Type: *Floto 7738* (C holo; A iso, 'P. flotonis'), Thailand, Udawn, Poo Krading, 6 Dec. 1966. The paratypes represent *P. macrophyllum* (FoT 9708, AAU) and *P. lacourii* (Larsen, Smitinand & Warncke 1527, AAU) (see notes).

[*Pseudodracontium kerrii* Gagnep. in Lecomte, Fl. Gén. Indo-Chine 6 (1942) 1153, f.110, invalidly published. — Cited specimens: *Kerr 10983*, Thailand, Kaw Kuram, Prachuap, c. 50 m alt., 14 July 1926; *Kerr 21417*, Thailand, Muk Dahan, Nakawn Panom, 1200 m alt., 13 May 1932; *Lakshnakara 908*, Thailand, Ban Maung Ubol, on sandy soil, 12 June 1932; *Poilane s.n.*, Laos, Sebang-phay, near Savannakhet; *Rabil 297*, Thailand, Ampo-kao-kao.]

[*Pseudodracontium laoticum* Gagnep. in Lecomte, Fl. Gén. Indo-Chine 6 (1942) 1154, f.110, invalidly published. — Cited specimens: *Evrard 1199*, Vietnam, Pongour, near Djiring, 24 Aug. 1924; *Kerr 21502*, Laos, Pu-wat, Nakhon-panom.]

Leaf always distinctly taller than inflorescence. *Tuber* shortly or strongly elongate, up to 20 cm long. *Petiole* up to 60–70 cm long, 2 cm diam. at base, ground colour pale green to dirty pale greyish green, entire surface usually with small and large (1–20 mm long), elongate, blackish green spots rarely lacking and numerous small white spots; anterior main segment 26–41 cm long, consisting of 3–5 ‘leaflets’, the largest (terminal) 12–23 × 3–10 cm, oblong, acute-acuminate at the apex, base decurrent on the rachis, leathery, upper surface mid- to dark green, more or less glossy, rarely almost bluish green, decurrent part of the base rarely with a purplish margin; variegation, when present, consisting of white to yellowish white dots or a continuous white stripe on each side of the midrib (upper surface only), rarely lateral veins of the first order and the inner collective vein also white; posterior main segments 35–45 cm long, often dichotomously branched, consisting of up to (8–)9–11 ‘leaflets’, the largest 10–25 × 3–9.5 cm., inner collective vein 6–13 mm distant from the margin of the segment, rachises winged except the lower 3 cm. *Peduncle* 45–57 cm long, c. 1.3 cm at the base, colour like that of petiole but paler, with less numerous spots in the upper half. *Spathe* cymbiform, never fornicate, elliptic to ovate-elliptic, shortly acuminate at the apex, green to yellow (more often of intermediate colour), up to 14–16 cm long, 6–7 cm diam., distinctly (up to 4 cm) longer than the spadix; margins involute, base inside with numerous tiny shallow warts. *Spadix* 10–15 cm long; female zone 1.5–1.8 cm long, c. 1 cm diam., cylindrical; male zone 3.5–7.5 cm long, 1.5–1.8 cm diam., flowers congested in the lower part, distant in the remaining part; appendix stipitate (stipe less than 0.5 cm long) or almost sessile, broadly conic, obtuse, base truncate, 3–5.5 cm long, 1.6 cm diam. at the base, white, papillate-clavate, in the lower part staminodes well separated, on pronounced stalks. *Ovaries* obovoid, slightly depressed, prismatic, very pale whitish green, 1.8–2 mm diam.; stigma sessile, thick-discoïd to subhemispheric, surface densely scabrate, 1–1.2 mm diam. *Male flowers* consisting of (1 or) 3–6 stamens (average 4 or 5); filaments mostly free to the base and straight, in the lower part of the zone occasionally entirely fused in one flower to a column-like stalk; anthers club-shaped to almost globose, free but in the lowermost flowers partly or entirely fused in one flower to form a more or less disc-like synandrium with a deep central depression (this rarely also in the upper part of the male zone). *Infructescence*: berry red, up to 1.5 cm long, 1.3 cm diam.; seed large, ovate, 10–13 mm long, 6–11 mm diam., chalazal end flattened, opposite end with a conical outgrowth, coat pale green with a moderately glossy silvery layer, with more or less rounded or oval, pale reddish brown spots (crowded near chalaza), rhaps distinct, dark brown, broad (seed description by Hetterscheid, 1995, pers. comm., based on *Maxwell 92-683*).

Distribution – Thailand, Laos, Vietnam, Cambodia.

Habitat & Ecology – *Pseudodracontium harmandii* often occurs in open forests or disturbed habitats (e.g., along forest roads and paths, on old termite colonies, near edges of forest). In the Ma Da forest (S Vietnam), *P. harmandii* occurs in small groups in open habitats, e.g. at the edge of the forest with *Lagerstroemia ovalifolia* in the tree layer, among the lax cover formed by *Imperata* sp., *Bambusa* sp. and *Eupatorium odoratum*. Within a 3 × 3 m plot (on laterite) 8 mature and 5 juvenile plants were recorded. Maxwell collected fruiting specimens on Si Chang island (Chonburi Prov., Thailand, Maxwell 92-683, cult. in Hort. Bot. Leiden) on dolomite in exposed to shaded areas; on the label it was stressed that there were numerous plants in the locality. Kuznetsov collected specimens in the Xuen Moc reserve in seashore lowland dry dipterocarp forest on carbonate sands, observing that there were only a few specimens in that population. *Pseudodracontium harmandii* flowers from April to August and fruits from (May–)October to December (Maxwell 92-683, Lichy 120).

Notes – *Pseudodracontium harmandii* is distinguished by an entirely papillate-clavate appendix, sessile, thick-discoid to subhemispheric stigmas, and a green to yellow (mostly yellowish green), broad, never fornicate spathe which is distinctly longer than the spadix. The foliar variegation never resembles that of *P. lacourii*; the latter, when variegated, has white spots all over the surface of the ‘leaflets’.

Engler (1902) separated *P. harmandii* var. *schmidtii* from the typical variety based on the more narrowly laneolate ‘leaflets’ (up to 12 × 4 cm) and the longer (15 cm) spathe. Both characters are of no taxonomic value and var. *schmidtii* is here reduced to the synonymy of *P. harmandii*.

All the material cited with *P. laoticum* and *P. kerrii* completely agree with *P. harmandii*. Gagnepain (1942) reduced *P. harmandii* to *P. lacourii* without any discussion. He also used the shape of tubers as a character in the key to separate *P. kerrii* from *P. laoticum* but this is an example of a collecting artefact. When tubers of *Pseudodracontium* are dug up while in the process of developing a new tuber on top of the old one, the new tuber may become separated when handled carelessly. At this stage it will be subglobose, which may lead one to think that this is the actual tuber shape [Evrard 1199 (P) represents this phenomenon].

Hu (1968) described *P. flotoi* from Thailand, mentioning a longer (5.5 cm) appendix and spathe (14 cm) and the ovule only partially covered by the mantle as specific characters for the species. Neither of these characters are of taxonomic value. The first fit *P. harmandii* (length of the appendix and spathe in this species varies considerably in one plant in different years), the third character is variable even in the type specimen of *P. flotoi*. Hu’s concept of *P. flotoi* seems confused. Whereas the holotype specimen clearly belongs to *P. harmandii*, the paratypes represent *P. macrophyllum* and *P. lacourii*.

The type collection is wrongly cited by Engler (1911) as *Godefroy in Exped. Dr. Harmand ‘144’* but this collection belongs to *Amorphophallus harmandii* Engl.

Additional specimens: THAILAND. Croat 66056, pl. viv. (MO), s. loc.; Gwynne Vaughan 462 (K), Biserat near Talor; Kerr 6809 (K), Klong Majum (‘Klawn Mayom’), Koh Chang island, in rock crevices near stream, 2 April 1923; Kerr 12951 (K), Bangkok, cult., 29 May 1927; Larsen, Larsen & Santisuk 31417 (AAU, M), Phu Khieo, Thung Kra Mang trail, alt. 600–700 m, 4 Aug. 1972; Schmidt 597a (C, spirit.coll.), Koh Chang; Sørensen, Larsen & Hansen 7126 (C), Koh Chang island, Klong Majum, 0–100 m alt., 2 April 1958. — LAOS. Lecomte & Finet 2071 (P), Thu dan

Mot. — CAMBODIA. *Pierre s.n.* (P), on Mt Chereu, April 1870. — VIETNAM. Central: *Arnautov 85437*, Gia Lai-Con Tum Prov., Tay Nguyen plateau, An Khe near Plei Qu, 1985, pl.viv. (cult. at Bot. Gard. Komarov Inst. and at MBG). South: *Chevalier 408* (P), Saigon, 1931; *Kuznetsov s.n.* (living plant cult. at MBG), Xuen Moc Reserve, Binh Chau vicinity, 1990; *Lichy 120* (P), near Dalat, 1000 m alt., 1931; *Pierre s.n.* (P), near Saigon, June 1867; *Poilane 8152* (P), km 26 on road from Nhatrang to Ninh Hoa, 11 Oct. 1923; *Serebryanyi 8961* (living plant cult. at MBG), Dong Nai Prov., Ma Da Forest, 18 June 1989; *Serebryanyi 8962* (MHA, spirit.coll.), Dong Nai Prov., Ma Da Forest, 4 km NW Ba Hau, near Ma Da field station, 30 June 1989; *Serebryanyi 8963* (living plant cult. at MBG), locality as previous.

3. *Pseudodracontium kuznetsovii* Serebryanyi, *spec. nov.* — Fig. 2

Planta robusta, ad 85 cm alta. Pedunculus petiolum valde superans, petiolus et pedunculus badius. Spadix ad 20 cm longus. Pars mascula et appendix dorsiventraliter compressa, flores masculi distantes. Appendix breviter stipitata, cerebriformis, fissuris apice truncatis. — Typus: *Hetterscheid H.AM.165-T* (MHA holo, spirit coll.), 15 July 1992, cult. Hort. Bot. Leiden ex Vietnam, Xuen Moc Reserve, easternmost part of Dong Nai Prov. (orig. coll. *Kuznetsov*, 1991).

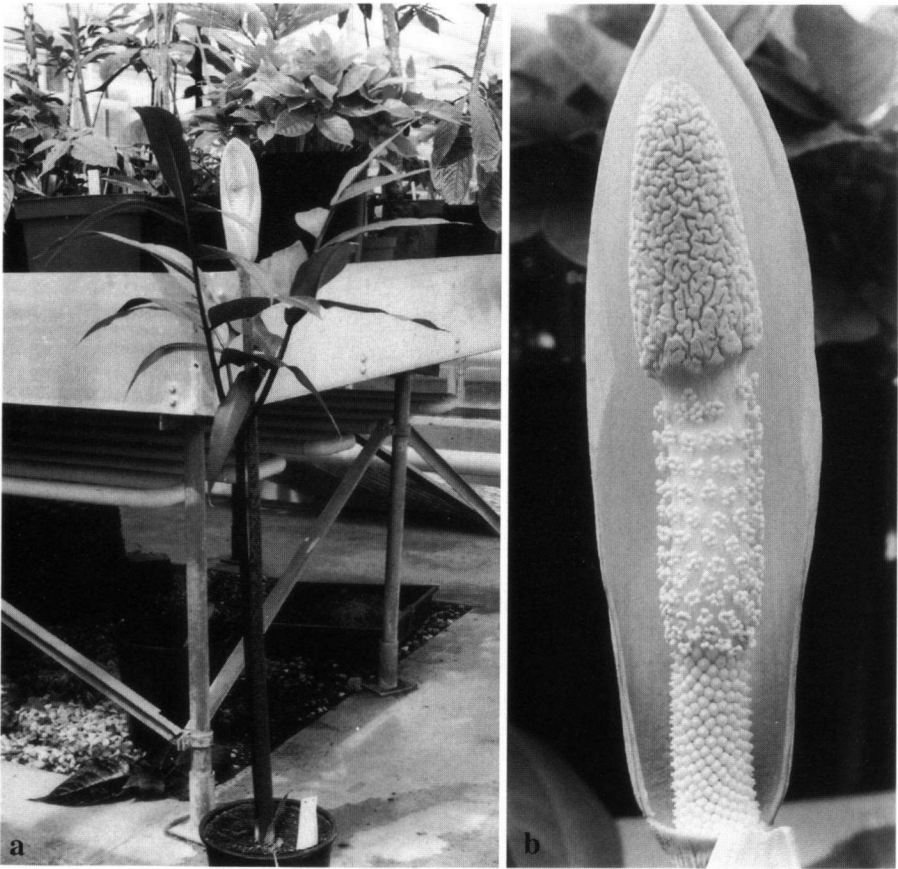


Fig. 2. *Pseudodracontium kuznetsovii* Serebryanyi (*Hetterscheid H.AM. 165*, type plant); a. habit, about $\times 0.07$; b. spathe cut open, about $\times 0.40$.

Robust plants. *Tuber* 11–13 cm long, diameter of the upper part 4–6 cm, the base branched. *Petiole* up to 68 cm long, 1.7 cm diam. at the base, ground colour chocolate brown with minute white spots, covered with large, near-black, faint spots, surface glossy; anterior main segment 24–43 cm long, undivided (young plant) or carrying up to c. 6 ‘leaflets’; posterior main segments carrying 4–9 ‘leaflets’, up to 55 cm long; ‘leaflets’ leathery, elongate elliptic to lanceolate, up to 20 cm long and 6.5 cm diam., upper surface glossy dark green. *Inflorescence* longer than petiole; *peduncle* 36–85 cm long, slightly paler than petiole, immediately below the spathe suddenly very pale purplish with darker purplish veins. *Spathe* cymbiform, acute, 17.5–25 cm long, 6–8 cm diam., green, becoming paler on both sides, base inside darker green and with many punctiform warts. *Spadix* 12–18.5 cm long; female zone cylindric, 3.5–4 cm long, 1.6–1.7 cm diam., flowers congested; male zone dorso-ventrally compressed, especially the upper half, 5.5–8 cm long, cross section at the top up to 2.3 × 1.4 cm, at the base 2.1 × 1.8 cm, flowers very distant; appendix shortly stipitate, obtuse, conic, slightly dorso-ventrally compressed, 3–6 cm long, up to 2.5 cm diam. at the base, ivory white, brain-like, with convolutions truncate at the apex (surface appearing smooth), stipe c. 0.5 cm long, 1.8 × 0.9 cm in cross section. *Ovaries* more or less pyriform, irregular in cross section, 2–2.5 mm diam., dirty white with a faint greenish flush; style 0.5 mm long; stigma 0.5–1 mm diam., discoid, surface scabrate. *Male flowers* consisting of (2 or) 4–6 stamens; filaments mostly free, in uppermost and lowermost flowers irregularly to entirely connate; anthers almost always free, occasionally irregularly connate in the lowermost flowers. Fruits and seeds not seen.

Distribution – South Vietnam (only known from the type locality).

Etymology – Named in honour of Dr. Andrew Kuznetsov, who collected the type plant.

Note – *Pseudodracontium kuznetsovii* differs from all other species on account of the robust and partly strongly dorso-ventrally compressed spadix. The description of *P. kuznetsovii* is entirely based on observations of the type plant during three years of cultivation (Hort. Bot. Leiden).

4. *Pseudodracontium lacourii* (Linden & André) N.E. Br. — Fig. 3

Pseudodracontium lacourii (Linden & André) N.E. Br., J. Bot. 20 (1882) 190; Engl., Pflanzenr. IV. 23C (Heft 48) (1911) 59, f. 23; Gagnep. in Lecomte, Fl. Gén. Indo-Chine 6 (1942) 1154; S.Y. Hu, Dansk Bot. Arkiv 23 (1968) 446. — *Amorphophallus lacourii* Linden & André, Illus. Hort. 25 (1878) 90, t. 316. — Type: *Lacour s.n.* (K holo, cult. in Kew), Vietnam (‘Cochinchine’), Phu Quoc Island, fl. 3 May 1882 (orig. coll. 1872).

Pseudodracontium anomalum N.E. Br., J. Bot. 20 (1882) 190; Engl., Pflanzenr. IV. 23C (Heft 48) (1911) 59; Gagnep. in Lecomte, Fl. Gén. Indo-Chine 6 (1942) 1153. — Type: *Godefroy-Leboeuf s.n.* (K holo, cult. in K), Vietnam (‘Cochinchine’), Phu Quoc Island, fl. 29 Oct. 1878.

[*Pseudodracontium siamense* Gagnep. in Lecomte, Fl. Gén. Indo-Chine 6 (1942) 1156, invalidly published. — Cited specimens: *Kerr s.n.*, Laos, Pu-wat, Nakawn-panom; *Kerr 4191*, Thailand, Sriracha, Hup Bon, 120 m alt., 10 April 1920; *Kerr 5907*, Thailand, Sukotai, Barin Ko, 50 m alt., 30 April 1922; *Kerr 12747*, Thailand, Kaw Tao, Surat, up to 200 m alt., 15 April 1927; *Marcan 228*, Thailand, Sriracha, Hup Bon, 10 April 1920; *Put 2859*, Thailand, Ban Chum Seng, Korat, 16 April 1930.]

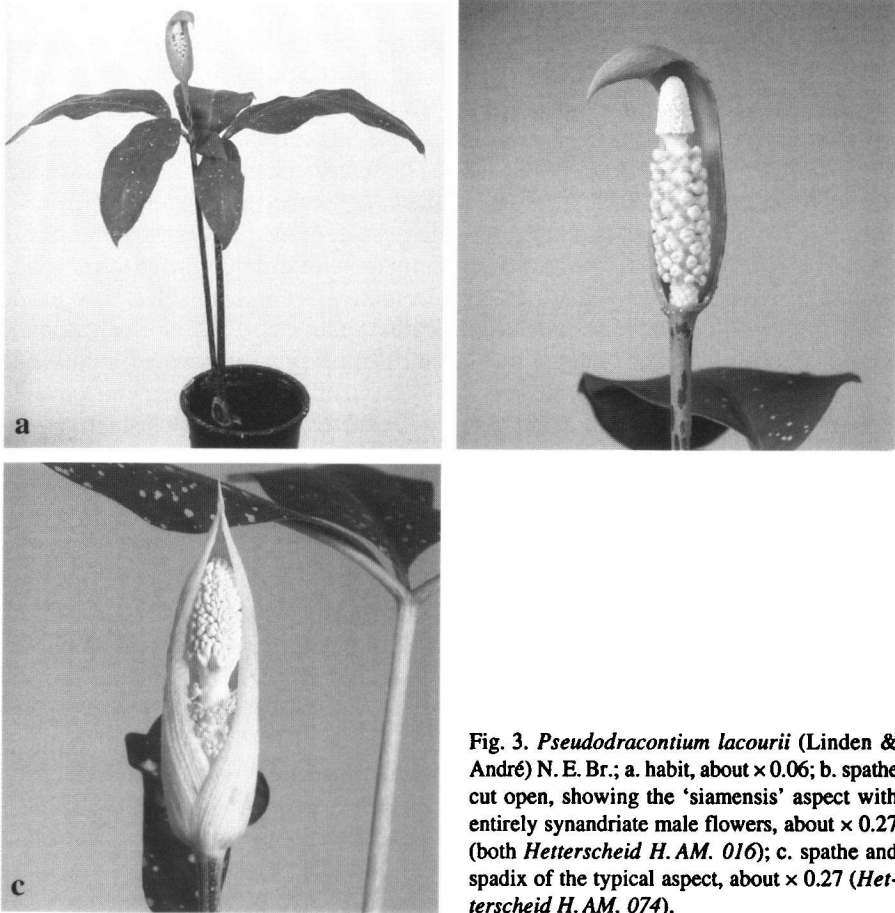


Fig. 3. *Pseudodracontium lacourii* (Linden & André) N. E. Br.; a. habit, about $\times 0.06$; b. spathe cut open, showing the 'siamensis' aspect with entirely synandriate male flowers, about $\times 0.27$ (both *Hettterscheid H. AM. 016*); c. spathe and spadix of the typical aspect, about $\times 0.27$ (*Hettterscheid H. AM. 074*).

Flowering plant with 1–3 leaves. *Tuber* strongly elongate, up to 25 cm long. Vegetative parts extremely variable in colour; petiole up to 50–55(–60) cm long, 2 cm diam. at the base (in the wild mostly only 0.5–1 cm diam.), those with variegated leaf blades with white, brown, black, yellowish, and green spots and blotches, those with green leaf blades with a pinkish ground colour, consisting of numerous parallel longitudinal stripes and with several dark green or brown spots throughout and a distinct green blotch at the top; anterior main segment undivided (then with a petiolule of up to 5 cm long) or consisting of 3 'leaflets', the largest broadly lanceolate to broadly ovoid, up to 35 \times 11 cm (in the wild usually smaller, lanceolate, 10–17 \times 4–5 cm), or occasionally strongly dissected with up to 10–12 'leaflets' (e.g., *Bogner 599*); posterior main segments 20–48 cm long, consisting of 5–9 'leaflets' (occasionally more, these ovate, broadly ovoid or ovate-lanceolate, (5–)7–15 \times 3–5 cm; 'leaflets' glossy dark green, both surfaces with numerous, scattered, more or less rounded white or yellowish white spots or entirely green. *Peduncle* as petiole but usually paler, about as long as petiole (slightly longer or shorter), up to 61 cm long (usually

shorter). *Spathe* cymbiform, \pm fornicate, (long) apiculate at the apex, 8–12 cm long, to 6 cm diam., outside green or pale green, inside pale green, on both sides with a few small, rounded, white spots, outside with a waxy layer, base within slightly darker, with numerous punctiform warts. *Spadix* almost as long as spathe, white; female zone cylindrical or slightly conic, (0.7–)1–2.7 cm long, to 1.1 cm diam., flowers congested, male zone \pm obconic, 3–3.5 cm long, 1–1.9 cm diam., flowers close in lower part, more distant at top; appendix mostly stipitate (stipe 0.4–1.2 cm long), more or less conic, distinctly thinner than the male zone, 2–4.3 cm long, to 1.8 cm diam. at the base, entirely brain-like or brain-like with short convolutions and a few papillae arranged in short vertical structures (appendix morphology extremely variable in one plant in different years). *Ovaries* white, to 2.5 mm diam., \pm prismatic in cross section; style short but distinct, 0.5–0.6 mm; stigma almost punctiform (sub-hemispheric), very thin, less than 5 mm diam., surface minutely scabrate. *Male flowers* extremely variable in one plant in different years, consisting of 3–7 stamens, mostly 5; filaments almost always connate except in the lowermost flowers, often forming column-like structures; anthers free to irregularly connate; sometimes all stamens fused into true synandria (*Bogner 943, 1620*). Mature berries and seeds not seen.

Distribution – Thailand, Laos, Vietnam, Cambodia.

Habitat & Ecology – *Pseudodracontium lacourii* occurs as dense populations of up to 25 m² with the leaves forming a continuous cover. The plants in each population are aggregated in clusters. Populations may contain up to 100 individuals (for a detailed description of the localities see under *P. fallax*). Individuals with different colour patterns grow in separate populations; they never mix or form intermediate zones between populations.

Notes – *Pseudodracontium lacourii* is an extremely variable species both in vegetative and generative characters. One plant may produce surprisingly different inflorescences in different years. One specimen in cultivation (*Serebryanyi 8905*, cult. in Leiden Bot. Gard.) developed no less than four inflorescences in 1994 but this may be a cultivation artefact. *Pseudodracontium lacourii* can generally be characterized by its multi-coloured petioles and peduncles, often variegated ‘leaflets’, a relatively small spadix equalling the spathe, female flowers with near punctiform stigmas on distinct styles and a more or less brain-like appendix on a long naked stipe. There are a few easily distinguishable forms within the species, described above. The specimens cited by Gagnepain (1942) with *P. siamense* represent some of these forms. Moreover the diagnostic character used by Gagnepain for that species, viz. completely connate stamens (fused into synandria) does not occur in all specimens mentioned by him (e.g. *Kerr 4191*). Though a number of living specimens showing this pattern exist (e.g. *Bogner 943, 1620*), the number of intermediate forms is much greater. Therefore I have not recognized *P. siamense* as meant by Gagnepain.

The type of *P. anomalum* completely agrees with the type and diagnosis of *P. lacourii* and there are no grounds for keeping it as a separate species.

Additional specimens. THAILAND. *Bogner 943* (M), island in Gulf of Siam (orig. coll. *Sumawong, 1973*); *Bogner 1620* (M), s. loc. (also cult. in Hort. Bot. Leiden as *Hettterscheid H.A.M. 016* and in the Main Bot. Gard. Moscow); *Fitch s.n.* (K, cult. in Hort. Bot. K and in Hort. Bot. Leiden as *Hettterscheid H.A.M. 039*), Songkhla, 1978; *Floto 7742* (C, A), Sillhan, alt. 300 m, 12 June 1959; *Ford s.n.* (K, cult. in Hort. Bot. K), Chang Mai Prov., Mowbay, 5 June 1983; *Geesink, Hattink &*

Phengkklai 6511 (K, L), Trat Prov., Saphan Hin, 3 May 1974; *Larsen, Smitinand & Warncke 856* (AAU, A), Phitsanulok, W of Tung Salaeng, 500 m alt., 24 July 1966; *Maxwell 75-424* (L), Chonburi Prov., Siricha Distr., Kow Kieo, 150 m alt., 11 April 1975. — CAMBODIA. *Couderc s.n.* (P), Watt Pnom, 1883–85; *Godefroy (in Exped. Harmand) 169* (P), Campon Chuang, 6 June 1875; *Hayata 929* (P), Krong-Pha, 23 June 1921; *Muller 89* (P), Kreh Forest, 8 May 1938; *Poilane 15136* (P), Pursat and Kg. Spen; *Poilane 15138* (P), Pusat Mts, 1 May 1928. — VIETNAM. Central: *Arnautov 85453, 85454*, Tay Nguyen plateau, An Khe near Plei Qu, 1985, living plants cult. at Bot. Gard. Komarov Inst., St. Petersburg. South: *Averyanov 910* (HN, LE), Vungtau-Condao Distr., Con Dao, Bay Canh, 8° 40' N, 103° 26' E; *Averyanov 1195* (HN, LE), Prov. Kien Giang, Hoh Thom, 9° 58' N, 104° 01' E; *Evrard s.n.* (P), 'Annam', Pongour, near Djiring, on slopes; *Evrard 779* (P), between Locninh and Budop, near Hongua; *Pierre s.n.* (P, SGN), 'Cochinchine', Saigon, Aug. 1865; *Serebryanyi 8903, 8904, 8905* (MHA, spirit coll.), limestone hills E of Vung Tau port, nearby N. Chau Vien Mt, 300 m alt., SE slope, 100 m below the Jesus Christ monument, in bushes, 28 May 1989.

5. *Pseudodracontium lanceolatum* Serebryanyi, *spec. nov.* — Fig. 4a, b

Planta laete viridis. Pedunculus petiolo longior. Laminae segmentis superioribus angusto lanceolatis, ad 24.5 cm longus, 5 cm latis, apice acuto. Flores masculi distantes. Stigma discoideum, stylum superans. Appendix cerebriformis, pallide flavovirens. — Typus: *Heteroscheid H.A.M. 179-T* (MHA holo; spirit coll.), 15 July 1992, cult. Hort. Bot. Leiden ex Vietnam, Xuen Moc Reserve, easternmost part of Dong Nai Prov. (orig. coll. *Kuznetsov*, 1991).

Tuber elongate. *Petiole* to 46 cm long, 1 cm diam. at the base, bright green with numerous, small, scattered white spots and fewer and larger dark green spots in the lower half; anterior main segment three-sect, to 35 cm long; posterior main segments 5-sect, 35–38 cm long; 'leaflets' (narrow-)lanceolate, acute, the largest up to 24.5 × 5 cm, upper surface glossy green, main vein impressed, lower surface paler, main vein whitish and strongly raised. *Inflorescence* distinctly taller than the leaf; *peduncle* to 63 cm long, 0.7 cm diam. at the base, pale yellowish green with a few almost indistinct, pale green spots and a few smaller whitish spots. *Spathe* strongly fornicate, acute, to 12 cm long, outside green at the base, distinctly paler to the top. *Spadix* to 7.5 cm long; female zone 0.8 cm long, 0.7 cm diam., flowers congested; male zone 3 cm long, 1.2 cm diam., flowers very distant; appendix almost sessile (not clearly stipitate), narrowly conic, acute at the top, pale yellowish green, equal to the male zone in length, to 1 cm diam. at the base, surface brain-like, rugae branching and interconnecting in all directions. *Ovaries* depressed-conic, cross section rounded to angulate, c. 2 mm diam., whitish green; style c. 0.5 mm long; stigma distinctly larger than style, slightly hemispheric, surface scabrate, 0.8–1 mm diam. *Male flowers* consisting of 4–6 stamens; filaments of upper and lower flowers connate, in middle flowers partly connate or free; anthers in upper flowers free or variously connate, in middle flowers mostly free, in lower flowers synandrious. Fruits and seeds not seen.

Distribution – South Vietnam (only known from type locality).

Habitat & Ecology – Found only solitary under the forest cover (*Kuznetsov*, pers. comm.).

Etymology – The species epithet refers to the shape of 'leaflets'.

Note – *Pseudodracontium lanceolatum* is easily distinguished by the extremely narrow, lanceolate 'leaflets', bright green vegetative parts, the male zone with very distant flowers, a pale yellowish green appendix and the discoid stigmas distinctly larger than the styles.

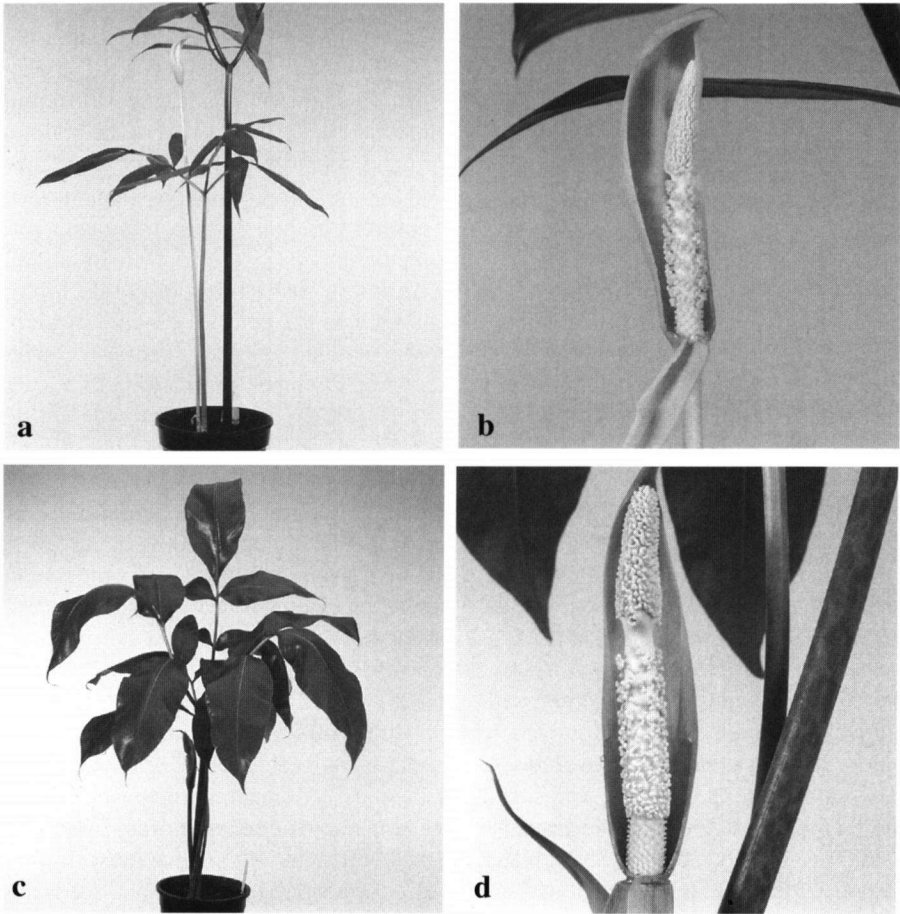


Fig. 4. — a, b: *Pseudodracontium lanceolatum* Serebryanyi (Hettterscheid *H.A.M.* 179, type plant); a. habit (left plant!), about $\times 0.07$; b. spathe cut open, about $\times 0.48$. — c, d: *Pseudodracontium latifolium* Serebryanyi (Hettterscheid *H.A.M.* 167, type plant); a. habit, about $\times 0.1$; b. spathe cut open, about $\times 0.4$.

6. *Pseudodracontium latifolium* Serebryanyi, *spec. nov.* — Fig. 4c, d

Petiolus pedunculo duplo longior. Laminae segmentis superioribus ad 39 cm longis, 14 cm latis, apice longe acuminato, acumen 3.5–4.5 cm longum. Spatha apice longe acuminata-cuspidato. Appendix irregulariter corrugata. — Typus: *Hettterscheid H.A.M.* 167-T (MHA holo; spirit coll., fl. 7 Aug. 1991), cult. Hort. Bot. Leiden ex Thailand, Kanchanaburi Prov., Thong Pha Phum, Kwai River valley, alt. 100 m, steep hill-slope covered in bamboo, 2 July 1985 (orig. coll. *Dransfield JD 6219*, p.p.).

Plants usually simultaneously bearing two leaves and two inflorescences. *Tuber* elongate, strongly branched, 8.5–10 cm long, top part 5–6 cm diam., accessory

buds down to the lower part of the tuber, branches developing into new plants. *Petiole* (35–)40–55 cm long, (1.7–)2–2.7 cm diam. at the base, to 2 cm diam. at the top, very turgid, ground colour bright green, with numerous greyish- or olive-green, oval to elongate spots up to the blade base (in different years and under different cultivation conditions the spots may cover almost the entire lower half of the petiole) and a very few small, whitish dots; anterior main segment up to 60 cm long, consisting of 1–5 ‘leaflets’; the latter up to 36 × 13.3 cm, thinly leathery, upper surface glossy green, inner collective vein 4–9 mm distant from the margin, main vein yellowish; anterior main segments to 65 cm long, the largest ‘leaflets’ 39 × 14 cm, all ‘leaflets’ long acuminate (acumen 3.5–4.5 cm long), base shortly or not decurrent on the rachis. *Peduncle* up to about half as long as the petiole, 22–29 cm long, 1.1–1.3 cm diam. at the base, colour pattern like petiole but usually denser and with more numerous white dots. *Spathe* elongate, gradually tapering to a long thin apex (acuminate-cuspidate), to 18 × 5 cm, base c. 2 cm long, outside pale green with a waxy layer, inside paler with darker veins and with a pale violet hue, densely but shallowly verrucate. *Spadix* shorter than spathe, c. 13 cm long; female zone c. 2 cm long and 1.2–1.3 cm diam., flowers densely congested, in a visible spiral of 10 or 11; male zone 5.5 cm long, 1.5 cm diam., flowers distant; appendix stipitate (stipe c. 0.7 cm long), more or less conical (in different years one plant may produce an almost conic-cylindrical appendix), ivory white, producing a heavy gaseous smell, c. 4.5 cm long, 1.5 cm diam. at the base, surface deeply and irregularly corrugate or somewhat papillate with elevated high and narrow ridges, these irregularly interconnected or isolated. *Ovaries* depressed, angulate, 1.5–2 mm diam., ivory white to slightly yellowish, narrowing to the style; style 0.7–0.8 mm long, 0.7 mm diam., colour as ovary; stigma discoid, 0.9–1 mm diam., surface densely scabrate. *Male flowers* consisting of 3 or 4 stamens; filaments mostly connate at the base, spreading, in the upper flowers more strongly connate, in the lower ones entirely fused into a column; anthers more or less club-shaped, mostly free but in the lowermost flowers irregularly fused to adjacent ones forming a disciform aggregate. Fruits and seeds not seen.

Distribution – Thailand (only known from the type locality).

Notes – *Pseudodracontium latifolium* somewhat resembles *P. fallax* in general habit but differs distinctly in having a peduncle that is half as long as the petiole, very broad and long acuminate to caudate ‘leaflets’ which are not or extremely shortly decurrent at the base, the acuminate-cuspidate spathe, and a deeply and irregularly corrugate appendix. *Pseudodracontium latifolium* can easily be identified even in the non-flowering stage by the shape of the ‘leaflets’; the caudate apices are unique in the genus.

Dransfield’s original collection (*Dransfield JD 6219*) is a mixture of *P. latifolium* and *P. lacourii*.

7. *Pseudodracontium macrophyllum* Gagnep. ex Serebryanyi, *spec. nov.*, *hoc. loc.* — Fig. 5

[*Pseudodracontium macrophyllum* Gagnep. in Lecomte, Fl. Gén. Indo-Chine 6 (1942) 1154, invalidly published.]

Tuber depresso-globosum. Cataphylla 4 vel 5, persistentia. Pedunculus petiolo duplo longior, inflorescentia praecox. Appendix muricata. — Typus: *Kerr 12866* (K holotype), Thailand, Wang Kanai, Kanchanaburi Prov., 200 m alt., in crevices of limestone rocks, 15 May 1927.

Tuber depressed-globose with a few irregular vertical and subhorizontal branches, c. 7 cm tall, to c. 10 cm diam., pale yellowish brown. *Cataphylls* 4 or 5, persistent, completely convolute, shortly apiculate at the apex, first one enclosing the peduncle base, next three enclosing the first one plus the peduncle plus the developing leaf, respectively 2 cm, 4–4.5 cm, 7.5 cm, and 9.5 cm long, pale whitish green with darker brown veins and some small, blackish green spots. *Petiole* 8.5–15 cm long, 0.8–1 cm diam. at the base, moderately glossy dark olive green with numerous narrow white stripes and a fewer black narrow-elliptic spots; anterior main segment always undivided, thick, coriaceous, dark green; posterior main segments consisting of three 'leaflets', these 18–25 × 10 cm. *Inflorescence* emerging before leaf or rarely simultaneously; *peduncle* at least twice as long as the petiole, 17–49 cm long, to 1.6 cm diam. at the base, angulate, angles ± rounded, colour pattern like petiole but paler, ground colour darkening towards the top; *spathe* 8.8–13 cm long, to 11 cm diam., base convolute, top acute to shortly-apiculate, fleshy, outside pale yellowish green with pale green hue near the base and a few punctiform whitish spots, inside similar but without spots, base within with numerous punctiform warts arranged on transversely elongate shallow elevations. *Spadix* 6.7–10.8 cm long, sessile; female zone slightly conic, 1–1.9 cm long, 1.4–1.7 cm diam. at the base, flowers congested, 6 per spiral, slightly distant in the upper part; male zone more or less fusiform to obconic, 2.9–4.5 cm long, 1.7–2.2 cm diam. at the middle, flowers distant; appendix elongate-conic to elongate triangular, stipitate (stipe to 0.4–1 cm long), 3–4.5 cm long, 1.2–1.6 cm diam. at the base, white, muricate, with numerous distinct, more or less parallel, longitudinal grooves and ridges, stipe of appendix sometimes entirely covered by flat scars of reduced male flowers. *Ovaries* 2–3 mm diam., depressed or slightly

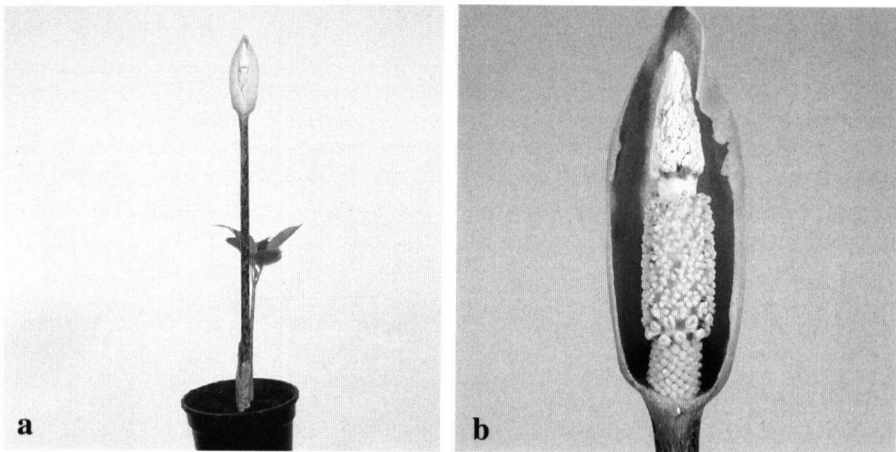


Fig. 5. *Pseudodracontium macrophyllum* Gagnep. ex Serebryanyi (*Hettterscheid H.A.M. 178*); a, habit, about × 0.08; b, spathe cut open, about × 0.4.

conic, quadrangular in cross section, dirty white, yellowish at the top; stigma sessile or subsessile, very large (to 2 mm diam.), thin, discoid with a central depression, surface minutely echinate, greyish to yellowish. *Male flowers* consisting of 3–6 stamens (mostly 5), ivory-white; filaments mostly free but in the lower flowers irregularly to entirely connate, forming a column; anthers free but in the lower flowers also irregularly to entirely connate in one flower forming a disciform fertile synandrium; pores elongate, oblique, in partly synandrious flowers often fused to arcuate pores, in completely synandrious flowers all fused into one pore around the entire circumference of the synandrium. *Infructescence*: mature berry pale red, nearly quadrangular, c. 0.6 cm long, 4 mm thick, one-seeded; seed white, oblong-ovoid, laterally compressed, 4 × 2 mm. Seedling leafblades consisting of 2 leaflets.

Distribution – Thailand (east) and South Vietnam.

Habitat & Ecology – In 1992 Kuznetsov described the habitat of *P. macrophyllum* as a seashore dry dipterocarp forest on carbonate sands. In the type locality the species is found in 'crevices of limestone rocks'.

Note – *Pseudodracontium macrophyllum* shows some characters unique for the genus. These are the depressed-globose irregularly branched tuber, the inflorescence emerging before the leaf, at least two times longer than the petiole, the anthers opening by rounded pores and the remarkable muricate appendix (see also the paragraph on the systematic position of the genus. *Pseudodracontium macrophyllum* was published without a Latin diagnosis by Gagnepain and therefore the species is validly published here for the first time.

Additional specimens: THAILAND. *Anon. FoT 9708* (AAU!, spirit coll.), Rachaburi, Khao Talu, 15 Nov. 1961; *Kerr 12866* (K), Wang Kanai, Kanchanaburi Prov., 200 m alt., in crevices of limestone rocks, 15 May 1927; *Marcan 2405* (K), Sai Yok, Kanchanaburi Prov., c. 70 m alt., 2 Aug. 1928. — VIETNAM. South: *Kuznetsov s.n.* (MHA, spirit coll.), Dong Nai Prov. (east), Xuen Moc Reserve, 1990 (8 May 1991, cult. in Main Bot. Gard. Moscow and Hort. Bot. Leiden as *Hettterscheid H.AM. 178*).

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