

## ***Anadendrum* (Araceae: Monsteroideae: Anadendreae) in Thailand**

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ABSTRACT. As part of the Araceae project for the Flora of Thailand a study of *Anadendrum* was undertaken with the result that all three species hitherto collected in Thailand are considered to represent new taxa. A key to the lianescent aroid genera in Thailand and a key to Thai *Anadendrum* are presented. All species are illustrated.

KEY WORDS: Araceae, *Anadendrum*, taxonomy, key, Flora of Thailand.

### INTRODUCTION

*Anadendrum* is taxonomically by far the least-known lianescent aroid genus in tropical Asia. The problems besetting researchers are several-fold. To begin with, historical types are for the most part woefully inadequate. They were mainly preserved post anthesis so that the spathes are unknown for most of the described species. In addition field notes for the types (indeed for almost all existing specimens) are poor to effectively nonexistent and field sampling is patchy in the extreme. Lastly, groups of species that are immediately recognizable as distinct in nature look indistinguishable from one another when preserved. In essence, working from herbarium specimens alone is wholly inadequate but nonetheless time constraints mean that a workable account for the flora must be produced without recourse to a much-needed full scale, field-based revision.

Given the above, I have opted for the pragmatic but unorthodox approach of not attempting to match Thai collections to any previously described species (a futile exercise in any case given the poor condition of almost all historical types) but instead have chosen to describe all species as new. Of course I am aware that this will in all probability produce redundant names once a full and thorough revision is undertaken but given that there is no sign of such a revision being undertaken in the near future I am confident that this approach will at least produce a temporarily stable taxonomy for Thailand, and from this allow other workers a point of reference from which to review their own *Anadendrum* flora and, it is hoped, spur someone to undertake a much needed field-based revision for the genus throughout its entire range.

Similar methodologies have been used by workers on *Dieffenbachia* Schott (Croat, 2004) and *Stenospermation* Engl. (Croat, 2007), two neotropical genera which are similarly speciose, insufficiently known and poorly served by their historical type-specimens. In both instances all of the novelties described have stood the test of time

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The species here described here are all from the south of Thailand. To date there are no confirmed collections from the north of Thailand, which is curious since *Anadendrum* is abundant in adjacent central and northern Vietnam and through into S.W. China. Incidentally, none of the species from China and Indochina are described; the names applied to them in the Floré Générale de l'Indo-Chine (Gagnepain, 1942), and the Flora of China (Li, 1979) are all misidentifications.

#### KEY TO THE LIANESCENT AROID GENERA OF THAILAND

1. Fruits each a discrete indehiscent berry
  2. Flowering plants with leaf blades pinnately divided and usually fenestrate; inflorescences solitary or at most three held loosely together in a weakly spiral arrangement; fruits ovoid, white at maturity **Amydrium**
  2. Leaf blades always entire; inflorescences several together distichously arranged; fruits truncate, red at maturity **Anadendrum**
1. Fruits a 'monstercarp', i.e., not a discrete berry, dehiscent via shedding of the stylar plate
  3. Fruits each with one to few large, curved seeds
    4. Seeds 2–4 per fruit on an intrusive parietal placenta; leaves entire or pinnately divided with pin-holes along the mid-rib **Epipremnum**
    4. Seed 1 per fruit on a basal placenta; leaves always entire **Scindapsus**
  3. Fruits each with numerous small, straight seeds **Rhaphidophora**

### ANADENDRUM

Schott, Bonplandia (Hannover) 5: 45. 1857; Hook.f., Fl. Brit. India 6: 539. 1893; Ridl., Fl. Malay Penin. 5: 115. 1925; Gagnep. in H.Lecomte (ed.), Fl. Indo-Chine 6: 1090. 1942; Mayo et al., Gen. Araceae 113, Pl. 11, 1997.—*Anadendron* Schott in Oesterr. Bot. Wochenbl. 7: 118. 1857, *orth. var.*

Slender to moderate evergreen *lianescent* to *hemiepiphytic herbs* lacking trichosclereids. *Leaves* distichous, frequently forming a terminal fan on the active shoot. *Lamina* obliquely ovate-oblong to oblong-lanceolate or oblong, entire; primary lateral veins pinnate, running into marginal vein, higher order venation reticulate. *Petiole* pulvinate apically, with petiolar sheath extending part way or fully to the base of the pulvinus, sheath persistent or marcescent. *Inflorescence* 1–10 or more in each floral sympodium. *Peduncle* relatively long, erect at first, later spreading with the spadix erect. *Spathe* oblong-ovate, boat-shaped to reflexed, white, greenish white, rarely deep green or blotched purple, rostrate apically and overtopping the spadix, caducous during anthesis, rarely persistent into or marcescent during early fruiting. *Spadix* long-stipitate, cylindric. *Flowers* bisexual, perigoniate; perigone membranaceous, a single cup-like structure, truncate, equalling or just shorter than gynoeceum. *Stamens* 4, free, filaments relatively short, broad, spatulate, connective slender, thecae linear-elliptic, dehiscing by longitudinal slit. *Gynoeceum* with ovary obconic or obpyramidal, subquadrangular, 1-locular, ovule 1, anatropous, funicle short, placenta basal, stylar region as broad as ovary, stigma transversely oblong. *Fruits* a berry, distinctly truncate apically, subglobose, orange red with a distinctive transverse stigmatic remnant. *Seed* rounded, subglobose, testa smooth, glossy, embryo large, endosperm absent.

At least 30 species (the majority undescribed) distributed from Thailand northwards to southern China and southwards through Malesia as far as Borneo and the Philippines. At least 3 species in Thailand, all (as defined here) endemic.

## KEY TO THE SPECIES

1. Lamina ovato-cordate to oblong, base truncate to weakly cordate or slightly cuneate; drying dull grey. Spathe creamy green with scattered purple blotches. Spadix fertile portion not exceeding 2 cm long **1. A. griseum**
1. Lamina oblong-lanceolate, often somewhat falcate, base never cordate or truncate; drying black-brown or chestnut brown. Spathe whitish or greenish white. Spadix fertile portion exceeding 2.5 cm long
  2. Petiole 12–20 cm, petiolar sheath extending 4/5 length of the petiole, degrading into fibres. Peduncle spreading to declinate with the spadix erect, much shorter than to exceeding petiole. Leaves drying black-brown **2. A. marcesovaginatum**
  2. Petiole 6–12 cm, petiolar sheath extending to the base of the pulvinus, marcescent and then deciduous but not fibrous. Peduncle erect, exceeding petiole. Leaves drying chestnut brown **3. A. badium**

**1. *Anadendrum griseum* P.C.Boyce sp. nov.**, ab aliis specibus *Anadendri* Thailandensi spadice fertili brevi (vix 2 cm longo); laminis foliorum ovato-cordatis ad basin cordatis vel vix cuneatis et in stato sicco griseis; spatha cremeo-viridi maculis purpureis instructa diversa. Typus: Thailand, Narathiwat, Bacho District, Budo-Sungai Padi N.P., Pacho Falls, *Wongprasert* 9912-79 [BKF140328] (holotypus **BKF**). Fig 1.

Evergreen, medium-sized, slender to moderate lianescent herb to 2 m. *Stem* of adult plants root-climbing. *Leaves* distichous, scattered on climbing shoots but congested into loose fans at shoot tips where flowering occurs. *Lamina* ovato-cordate to oblong 14–20 by 9–10 cm, base truncate to weakly cordate or slightly cuneate, apex acute to acuminate, briefly apiculate, medium green when fresh, drying dull grey; primary lateral veins pinnate, 4–7 per side, running into marginal vein, interprimary veins almost obscured, all higher order venation reticulate. *Petiole* pulvinate apically, 6–10 cm, petiolar sheath extending to just below the pulvinus, margins and then whole sheath soon marcescent. *Inflorescence* 1–6 in each floral sympodium. *Peduncle* spreading with the spadix erect, much shorter than to exceeding the petiole of the preceding foliage leaf, 4–7 cm, each peduncle subtended by membranous, later papery cataphylls and the whole synflorescence subtended by several such cataphylls. *Spathe* elongato-ovate, in bud apically strongly rostrate and basally contracted onto the stipe, gaping, then spreading and then reflexed at anthesis, then soon caducous, ca 3.5 by 2.5 cm, creamy green with scattered purple blotches. *Spadix* stipitate, fertile portion 1.75–2 by 0.5 cm, greenish white at anthesis, green post-anthesis, stipe 0.5–0.8 cm, green. *Flowers* bisexual, perigone membranous, just exceeding the gynoecium. *Stamens*: filaments short, broadly linear, anthers shorter than filaments. *Gynoecium* obpyramidal, tetragonal, styler region 2 by 3 mm, rhomboidal, truncate, stigma transverse-linear. *Fruit* a subglobose truncate-topped berry, green when immature, bright glossy red with black stigmatic remains when ripe.

Thailand.— PENINSULAR: Songkhla, [Nam Tok Boripat, 28 March 1997, *Boyce* 1210 (**BKF, K**)], Narathiwat [type].

Distribution.— Endemic.

Ecology.— Damp evergreen lowland forest; altitude 200 m.

Vernacular.— None recorded.

Uses.— None recorded.

Notes.— Immediately recognizable by the usually cordate-based laminae and the creamy green spathe limb with purple blotches. In the fresh state leaves are glossy medium green but specimens always dry distinctively dull grey, hence the specific epithet.

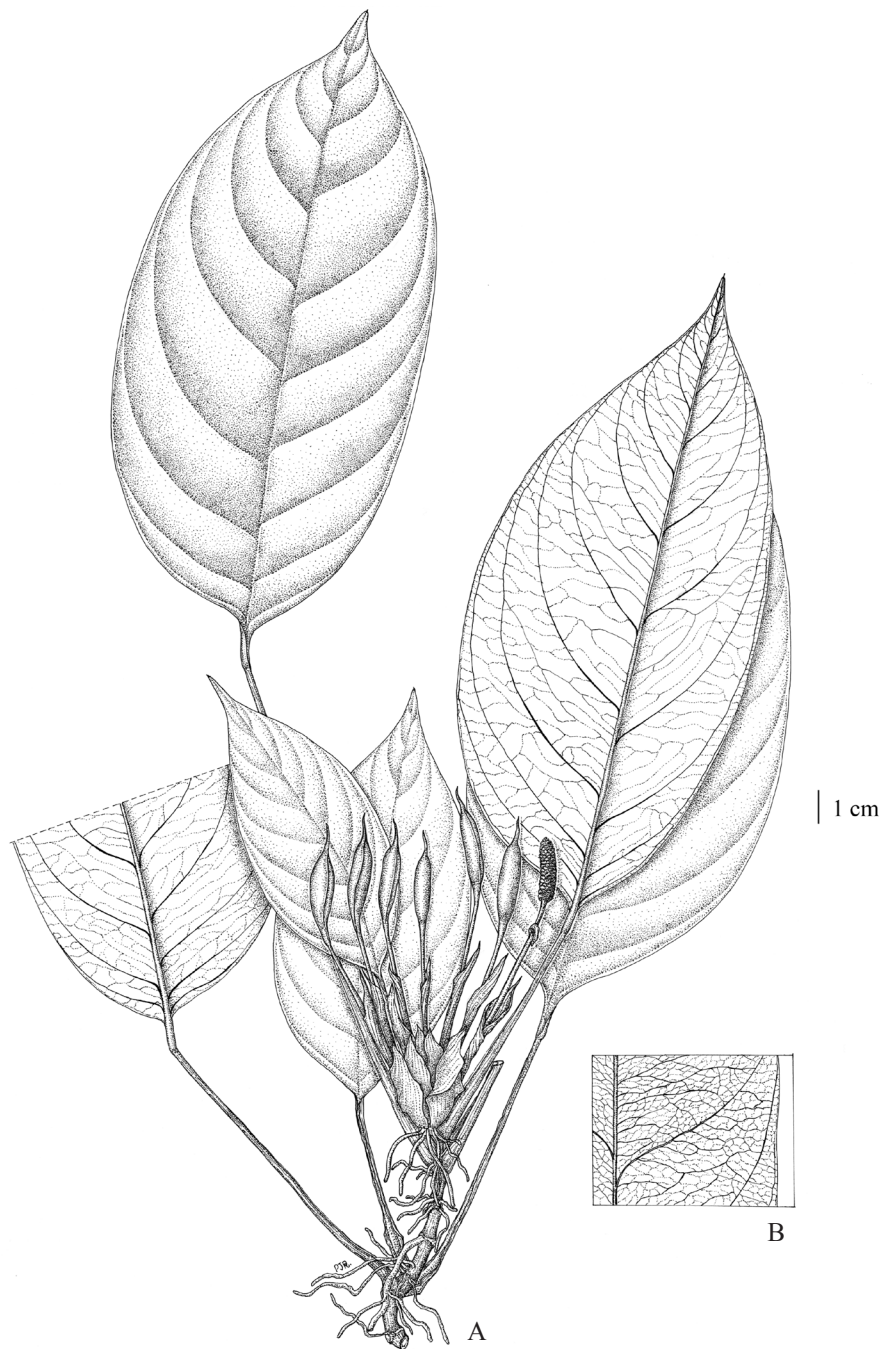


Figure 1. *Anadendrum griseum* P.C.Boyce: A. flowering shoot; B. detail of leaf abaxial venation. Prepared from Wongprasert 9912-79 [BKF140328]. Original artwork by Miss Pajaree Inthachub.

**2. *Anadendrum marcesovaginatum* P.C.Boyce sp. nov.**, ab omnibus speciebus generis ceteris vagina longitudine 4/5 partes petioli aequanti demum in fibras degradanti, pedunculo patenti vel declinato, spadice fertili 2.5 cm longo excedenti, foliorum lamina in statu sicco nigro-brunnea differt. Typus: Thailand, Nakhon Si Thammarat, Khao Luang N.P., Ka Rom Falls, 8° 22.42'N, 99° 44.21'E, 3 Sept. 1996, *Wilkin* 856 [BKF115915] (holotypus **BKF**; isotypus **K**). Fig. 2.

Evergreen, medium-sized, moderate lianescent herb to 2 m. *Stem* of adult plants root-climbing. *Leaves* distichous scattered on climbing shoots, barely congested into loose fans at shoot tips where flowering events occur, these flowering modules soon overtopped by primary shoot reiteration and then displaced to appear morphologically lateral. *Lamina* oblong-lanceolate, often somewhat falcate, weakly oblique, 22–25 by 8–9 cm, base cuneate, apex acuminate, apiculate, dark green above, paler below when fresh, drying black-brown above, very slightly paler below; primary lateral veins pinnate ca 7 per side, running into marginal vein, interprimary veins slightly less prominent, higher order venation reticulate. *Petiole* pulvinate apically, 12–20 cm long, petiolar sheath extending 4/5 length of the petiole, membranous but soon turning papery, thence degrading into fibres before falling to leave a papery scar. *Inflorescence* 1–3 in each floral sympodium. *Peduncle* spreading to declinate with the spadix erect, much shorter than to exceeding petiole, 4–7 cm long, each subtended by membranous, later papery cataphylls and the whole synflorescence subtended by several such cataphylls. *Spathe* lanceolate, strongly rostrate and also contracted onto the stipe, gaping, then reflexed at anthesis, then soon caducous, ca. 5 by 2.5 cm, very pale green. *Spadix* stipitate, fertile portion 2.5–3 by 0.5 cm, greenish white at anthesis, green post-anthesis, stipe 0.5 cm, green. *Flowers* bisexual, perigone membranous, just exceeding the gynoecium. *Stamens* with short, broadly linear filaments, anthers shorter than filaments. *Gynoecium* obpyramidal, tetragonal, styler region 3 by 3 mm, rhomboidal, truncate, stigma transverse-linear. *Fruit* a subglobose truncate-topped berry, green when immature, bright glossy red with black stigmatic remains when ripe.

Thailand.— PENINSULAR: Nakhon Si Thammarat [type], Phatthalung.

Distribution.— Endemic.

Ecology.— Evergreen forest; altitudes 100–200 m.

Vernacular.— None recorded.

Uses.— None recorded.

Notes.— The long petioles with soon-marcescent petiolar sheaths and plants drying black-brown are diagnostic. In drying very dark *A. marcesovaginatum* approaches *A. microstachyum* (Java) which differs, among other characters, in having persistent petiolar sheaths.

**3. *Anadendrum badium* P.C.Boyce sp. nov.**, a *Anadendro marcesovaginato* petioli vagina pulvinum distalem attingenti demum marcescenti non fibrosa, pedunculo inflorescentiae erecto (non patenti nec declinato), folio in statu sicco badio differt. Typus: Thailand, Songkhla, Ton Nga Chang, 18 Jan. 1992, *Niyomdham* 2912 [BKF112370] (holotypus **BKF**). Fig. 3.



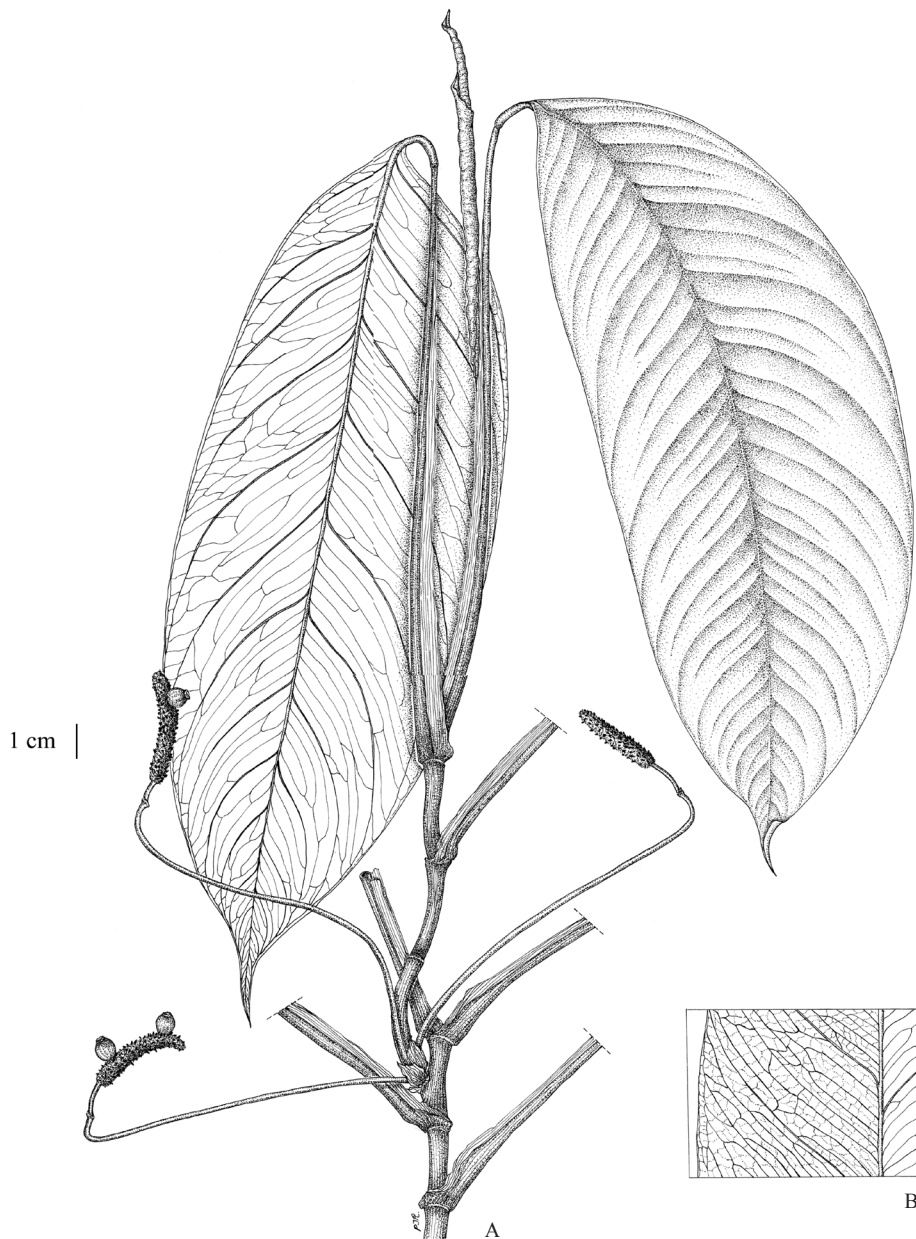


Figure 2. *Anadendrum marcesovaginatum* P.C.Boyce: A. flowering shoot; B. detail of leaf abaxial venation. Prepared from Wilkin 856 [BKF115915]. Original artwork by Miss Pajaree Inthachub.

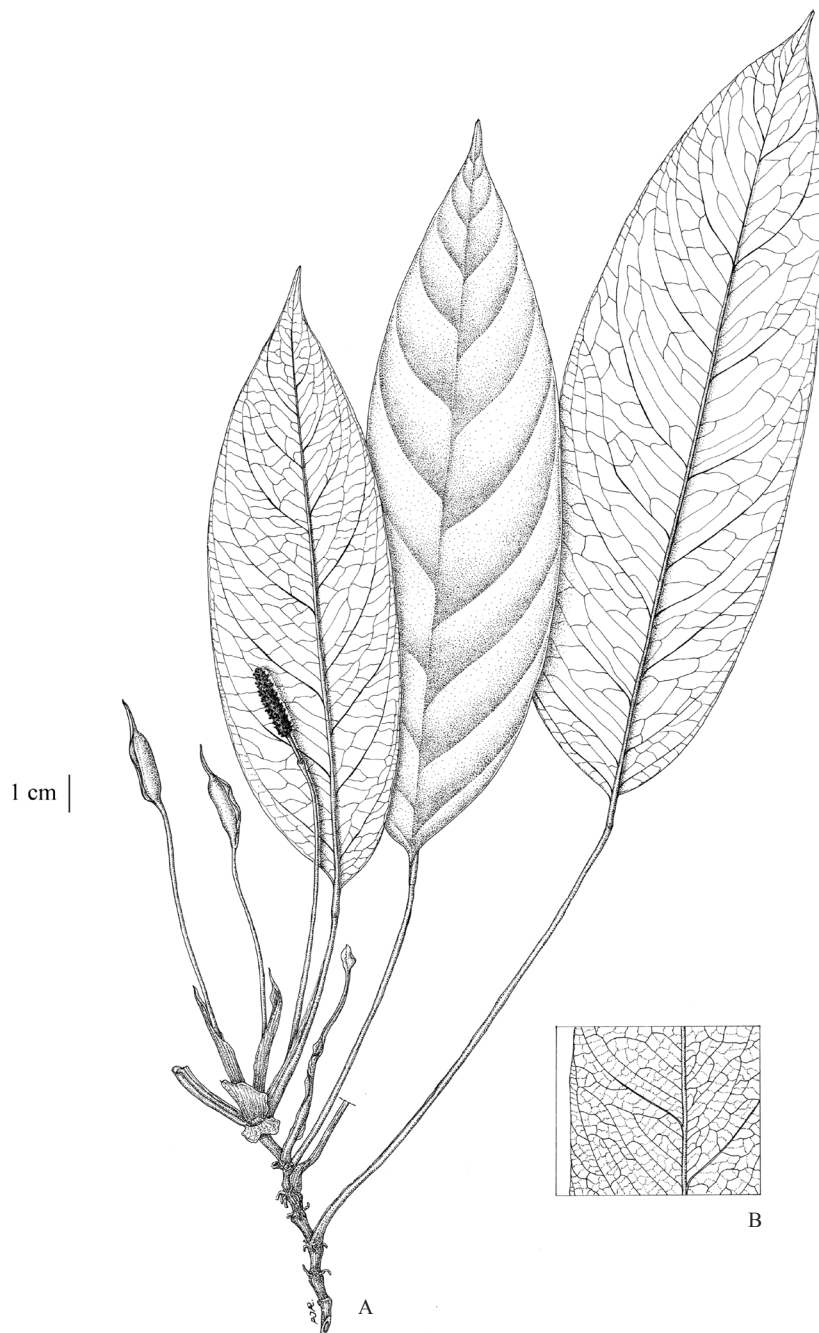


Figure 3. *Anadendrum badium* P.C.Boyce: A. flowering shoot; B. detail of leaf abaxial venation. Prepared from Niyomdham 2912 [BKF112370]. Original artwork by Miss Pajaree Inthachub.

Evergreen, medium-sized, slender lianescent herb to 1.5 m. *Stem* of adult plants root-climbing. *Leaves* distichous, scattered on climbing shoots, congested into loose fans at shoot tips where flowering occurs. *Lamina* oblango-lanceolate, somewhat falcate, oblique, 11–24 by 4–8 cm, base subacute, apex acuminate, briefly apiculate, medium green above, paler below when fresh, drying uniformly chestnut brown; primary lateral veins pinnate ca 6 per side, arising alternately from either side of the midrib, running into marginal vein, interprimary veins more or less invisible, higher order venation reticulate. *Petiole* pulvinate apically, 6–12 cm, petiolar sheath extending to the base of the pulvinus, membranous and very soon marcescent and falling. *Inflorescence* 1–3 in each floral sympodium. *Peduncle* erect, exceeding petiole, 11–14 cm, each subtended by membranous, later papery cataphylls and the whole synflorescence subtended by several such cataphylls. *Spathe* oblango-lanceolate, apex strongly rostrate, base very weakly contracted onto the stipe, limb gaping, then reflexed at anthesis, then soon caducous, ca 3 by 1.5 cm, creamy yellow. *Spadix* stipitate, fertile portion ca 3 by 0.5 cm, creamy at anthesis, green post-anthesis, stipe 1 cm, green. *Flowers* bisexual, perigone membranous, just exceeding the gynoeceum. *Stamens* with short, broadly linear filaments, anthers shorter than filaments. *Gynoeceum* obpyramidal, tetragonal, stylar region 2.5 by 2.5 mm, rhomboidal, truncate, stigma transverse-linear. *Fruit* a subglobose truncate-topped berry, green when immature, bright glossy red with black stigmatic remains when ripe.

Thailand.— SOUTH-EASTERN: Trat [Ko Chang N.P., Khlong Phlu Falls, 12°3'56"N, 102°18'50"E, 23 March 2001, *Chayamarit et al.* 2851 [BKF132856] (**BKF**)]; PENINSULAR: Songkhla [type]; Phatthalung [Tha Mot, 30 km S of Phatthalung, 07°20'N, 100°05'E, 5 Oct. 1991, *Larsen et al.* 42165 [BKF120188] (**AAU**, **BKF**, **PSU**)], Narathiwat [Chatwarin Falls, 12 Feb. 1991, *Niyomdham* 2077 [BKF124074] (**BKF**)].

Distribution.— Endemic.

Ecology.— Evergreen forest; altitudes 65–100 m.

Vernacular.— None recorded.

Uses.— None recorded.

Notes.— Immediately recognizable in the dry state in drying chestnut brown (*badius* in Latin, whence the trivial epithet). Living plants can be confused with *A. marcesovaginata* (see above) but differ in the erect (not spreading to declinate) peduncles exceeding the petiole of the subtending foliage leaf, and the petiolar sheath reaching the base of the distal pulvinus.

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