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## A REVISION OF *AESCHYNANTHUS* (*GESNERIACEAE*) IN THAILAND

D. J. MIDDLETON

The species of *Aeschynanthus* Jack (*Gesneriaceae*) in Thailand are revised. Twenty species are recognized, a key to the species is given, all names are typified, and detailed descriptions of all species are provided. Conservation assessments are given for all species. *Aeschynanthus minutifolius* D.J.Middleton is newly described. *Micraeschynanthus* Ridl. is reduced to synonymy and a new combination is given for its only species: *Aeschynanthus dischidioides* (Ridl.) D.J.Middleton.

*Keywords.* *Aeschynanthus*, *Gesneriaceae*, taxonomic revision, Thailand.

### INTRODUCTION

This revision of the genus *Aeschynanthus* in Thailand marks the first in a series of revisions of the genus throughout its distribution. It builds upon some of the groundwork provided by Mary Mendum, before her untimely death in 2004, and by others, with many of whom she collaborated (Denduangboripant *et al.*, 2001; Mendum *et al.*, 2001; Rashid *et al.*, 2001; Christie & Mendum, 2002; Jaidee, 2004). Much of this earlier work examined the relationships between the species and, in particular, discussed whether the classification system of the genus as a whole, largely based on seed characters, reflected the phylogeny of the genus. This revision of the species in Thailand, and those to come for other regions, will focus primarily on defining and describing the species of *Aeschynanthus*. Broader discussion will be limited to placing species in the context of the earlier classifications (provided or clarified primarily by Bentham, 1876; Clarke, 1883; Burt & Woods, 1975; Wang, 1984) or the evolutionary relationships discussed in the papers above. I hope that, as the revision of the whole genus progresses, and in collaboration with other botanists, a comprehensive new classification based on all the available information will be published later.

*Aeschynanthus* comprises approximately 160 species distributed from Sri Lanka and India through southern China and Southeast Asia to New Guinea and the Solomon Islands (Weber, 2004). The estimated number of species, however, will undoubtedly change over time as more of the species are revised. The limits of the genus are clear except in relation to the monotypic genus *Micraeschynanthus* Ridl. from Peninsular Malaysia. Its single species is known from only one collection which Burt (1968) suggested could be an abnormally developed specimen of an *Aeschynanthus*

species. The collection of this, Ridley 16122, is known from two specimens, one in K and one in SING. Neither specimen is in good condition and mature flowers are lacking. I believe that it is rather an immature or aberrant specimen of *Aeschynanthus myrmecophilus* P.Woods as the calyx and vegetative characters match well. Unfortunately this necessitates a new combination for this species (see appendix).

*Aeschynanthus* belongs in *Gesneriaceae* subfamily *Didymocarpoideae* (Weber, 2004) along with the majority of the Asian genera of *Gesneriaceae*. Weber, however, preferred to refer to them as the Didymocarpoid *Gesneriaceae*, given the fluidity in our understanding of relationships in the family as a whole. It has generally been placed in tribe *Trichosporeae* (see Burt & Wiehler, 1995) along with *Agalmyla*, *Lysionotus*, *Loxostigma* and *Micraeschynanthus*, but ongoing phylogenetic research suggests that this tribe is not monophyletic (see discussion in Hilliard & Burt, 2002; Weber, 2004). Weber (2004) chose not to recognize formal tribal delimitation within the subfamily until further research clarifies the issues. It may be noted that the tribe has been defined solely by the possession of one or more appendages at each end of the seed. As pointed out by Mendum *et al.* (2001), the appendages of *Agalmyla* and *Lysionotus* are very different from those of *Aeschynanthus*. Also Hilliard & Burt (2002) suggest these appendages may not be homologous and that further study is necessary.

#### HISTORICAL CONTEXT

*Aeschynanthus* was first described by Jack (1823) with two species, *A. volubilis* Jack and *A. radicans* Jack, both from Sumatra. *Trichosporum* had been described a year earlier by Don (1822) with two species, *T. grandiflorum* and *T. parviflorum*, both from Nepal. Species were then described in both genera by later botanists although more often in *Aeschynanthus* than in *Trichosporum*. Following the proposal by Sprague (1929: 59, 91), *Aeschynanthus* has been conserved against *Trichosporum* in the interests of stability. Sprague typified *Aeschynanthus* with *A. volubilis* Jack, but did not give a type specimen for the species. I have found no Jack material of this species. The most significant single contribution to the taxonomy of the genus to date is that of Clarke (1883) who listed and described 64 species, very many of them newly described in that work. Discussion of other important regional contributions to our understanding of the genus will be published in the appropriate future regional revisions.

The first accounts of the genus *Aeschynanthus* in Thailand were by Pellegrin (1926, 1930) who included seven Thai species in his 1930 account of the genus for Indo-China. The first complete checklist of only the Thai species was by Barnett (1962) who included 13 species and two unknown taxa. Burt (2001, 2002) published a checklist of 20 species.

#### THE CHARACTERS

*Habit.* All species are epiphytic although some may also be lithophytic or creeping on bankings or around the bases of trees. The branches may be erect (e.g.

*Aeschynanthus andersonii* and its relatives), robust but nevertheless arching and pendulous (e.g. *A. fulgens*), completely pendulous (e.g. *A. gracilis*), or creeping but usually then not exclusive of some of the other growth forms (e.g. *A. pulcher*). When the plant is creeping, adventitious roots often form at the nodes. In the *Aeschynanthus andersonii* group of species with erect stems it has been reported on specimens that the roots of the plant bury deep into the bark of the host tree.

*Leaves.* The leaves are mostly opposite but, in Thailand, are verticillate in *Aeschynanthus speciosus* and often so in the *Aeschynanthus andersonii* group of species. Leaves of a pair are equal in size. In addition, in the *Aeschynanthus andersonii* group of species the exact arrangement is often obscured by the fact that the leaves are densely crowded at the branch ends. No species in Thailand has sessile leaves but the petiole may often be very short. The blades are mostly thick and leathery but occasionally much thinner (e.g. in the *Aeschynanthus andersonii* group of species). The thickness is due to the presence of a large-celled and thin-walled hypodermis (Weber, 2004). These cells store water, preventing desiccation to which epiphytic plants can be prone. Looking for taxonomic distinctions in leaf thickness for those species with thick leaves is more or less impossible in herbarium material and with inadequate ecological information on the labels. The leaves are sometimes marbled, a good character for the recognition of the species of *Aeschynanthus* sect. *Polytrichium*, at least in Thailand.

*Inflorescence.* Weber (1973, 1982, 2004) describes the inflorescence structure of all *Gesneriaceae* as a pair-flowered cyme, thus: 'In this cyme, the terminal flower of each cyme unit is associated with an additional flower in frontal position. Thus, each cyme unit seems to end in a flower pair. In general, the front-flower has no subtending bracteole, while the lateral flowers are usually subtended by bracteoles'. In *Aeschynanthus* this underlying structure is difficult to recognize. The inflorescences appear as axillary few-flowered cymes, or the flowers are solitary in the axils of leaves, or they are in a pseudoterminal cluster. Weber (pers. comm.) describes the pseudoterminal inflorescences as being derived in a number of different ways: '(1) the two uppermost axillary cymes (emerging from normal foliage leaves) form a seemingly unitary terminal cluster, (2) the two (rarely more) uppermost cymes emerge from scale-like bracts at the end of the shoot axis, (3) a combination of (1) and (2): cymes of leaf and bract origin combine to form a terminal cluster'. In most species there is either no apparent peduncle or the peduncle is very short. In Thailand only in *Aeschynanthus acuminatus* and *A. superbus* is there sometimes a more elongated peduncle. Bracteoles are mostly short, awl-shaped and stiff and often deciduous. In Thailand only in *Aeschynanthus acuminatus* and *A. superbus* are they larger and more apparent.

*Calyx.* The calyx consists of five sepals that are free to the base or partially to almost completely fused into a tube. The form of the calyx is particularly valuable for species identification in *Aeschynanthus*. Closely related species can often be easily

distinguished on the extent of fusion of the sepals, e.g. *Aeschynanthus humilis*/ *A. andersonii*, *A. longicaulis*/*A. membranifolius*. However, in some species the calyx may also be extremely variable, e.g. *Aeschynanthus parviflorus*, *A. rhododendron*. The calyx matures very early, much earlier than the corolla. In those species with a tubular calyx this may lead to it filling with water and acting as a water-calyx (Burt & Woods, 1975). This allows the corolla to develop in a miniature bath and probably serves as protection from herbivory (Carlson & Harms, 2007).

*Corolla.* The corolla is zygomorphic, tubular, and weakly to quite strongly curved, mostly being longest on the dorsal side but rarely on the ventral in non-Thai species. It would appear to be most commonly adapted for bird pollination and generally produces copious nectar. There are five lobes: two upper lobes, two lateral lobes and a lower lobe. The two upper lobes sometimes appear more like one lobe which is split at the apex. In the descriptions below the dimensions are given for each of the individual lobes. The corolla length given in the descriptions is as measured from the base to the tip of the upper lobes. The base of the corolla tube is most often fairly narrow but is occasionally broad from the base upwards or may be inflated and bulbous at the base and then narrowing abruptly into the tube. Shrinkage is about 6% on drying.

The corolla colour, a character potentially of great importance, is perhaps the most difficult to describe adequately in words. In many species the colour is variable and may be very complex, with shading to different colours in various parts. The lobes, especially, often bear quite complex patterns. On top of this is the fact that much of the information available has been gleaned from herbarium material, as the few living specimens seen in some of the species may not fully represent the variation possible in a species. Once one begins to rely on the herbarium label then a large element of interpretation and subjectivity is introduced, and most labels do not record nuances of colour pattern but rather state 'flower red' or similar as a record of corolla colour.

*Stamens.* The flowers are strongly protandrous. There are four stamens, in two pairs, and one staminode in all species of *Aeschynanthus*. Generally speaking the posterior (upper) pair has shorter filaments and slightly smaller anthers than the anterior pair. They are also inserted slightly higher in the corolla tube. The anthers are dorsifixed and then cohere by their apices in each pair. Rarely, all four anthers cohere by their apices. The stamens are held in the two pairs on the dorsal surface and may be exerted or included in the tube. The same space is then occupied by the pistil once the stamens begin to wither. As the stamens wither they curve downwards and backwards under the lower lip in those species with exerted stamens.

*Gynoecium.* There is a small disk at the base of the pistil, mostly annular but sometimes weakly crenate at the top. The pistil is superior and is composed of two carpels. It consists of a stipe (a sterile part of the ovary, with two locules and rudimentary placentae; Weber, 1971), the ovary and the style. In the species descriptions below there are often huge variations in the lengths of the various parts as the flowers were collected at different stages of pistil development and most were not collected

during the stage of maximum pistil length. The length of the stipe relative to other parts of the gynoecium is an un-utilized but potentially interesting character. The ovary and style may be glabrous, or have sessile glands or various types of pubescence. These characters are useful for species recognition. The placentation is parietal and the ovules numerous.

*Fruit.* The fruit is a long and narrow capsule in all species. Dehiscence is loculicidal. In most species there is a portion at the base of the fruit where there are no seeds. This corresponds to the stipe of the gynoecium before fertilization. In the fruit the length of this stalk is very variable but is noticeably long in a number of species, particularly in the species of *Aeschynanthus* sect. *Microtrichium*, namely *Aeschynanthus rhododendron* and *A. garrettii*.

*Seeds.* Seeds have been the primary source of characters for use in sectional delimitation in *Aeschynanthus*. Consequently, the seeds have been much studied; the various seed types are explained in detail in Mendum *et al.* (2001) and Christie & Mendum (2002). The seeds of all species consist of the seed grain, one apical appendage and one or more hilar appendages. The apical appendage points towards the base of the capsule. The seed grain is small and the surface is either papillose or somewhat warty. In the descriptions below 'warty' is used to indicate the pattern that arises when the contiguous ends of two cells are both raised above the surface, and 'papillose' to indicate the raised part is only from one cell (for further discussion of the complexities of the patterning on the seeds see Christie & Mendum, 2002 – warty corresponds to their type B and papillose to their type A). In *Aeschynanthus radicans* and *A. pulcher* (and some of their relatives outside Thailand) there is a curious cluster of inflated cells, termed bubble cells, at the hilar end of the seed. The apical appendage may be long and filiform or short and stout. The hilar appendage(s) is/are either solitary, and then short and stout (in Thailand found in *Aeschynanthus garrettii* and *A. rhododendron*), intermediate (as in *A. acuminatus* and *A. superbus*) or long and filiform (as in all other solitary-appendaged species in Thailand), or of two filiform hairs, or of many filiform hairs. Dispersal is by wind.

Care must be taken if trying to draw conclusions based on the length of the seed appendages as it is extremely difficult to extract seeds from a capsule on a herbarium specimen without breaking the appendages. It is not always clear when the appendages are broken so the lower limit of an appendage length range may not always be entirely accurate. However, the seeds with the short and stout and the intermediate filaments are usually intact so the care need only be exercised with the long filaments.

*Pollen.* Luegmayer (1993) studied the pollen of several *Aeschynanthus* species in a comparative study on Old World *Gesneriaceae* and suggested that the pollen possessed characters of taxonomic relevance at the generic level. Palee *et al.* (2004) included six species of *Aeschynanthus* in their palynological study of Thai *Gesneriaceae*. They found the pollen to be spheroidal, tricolpate or tricolporoidate with long apertures and three different types of sculpturing. They found variation in the

three specimens they looked at of *Aeschynanthus persimilis* (but which they mistakenly identified as *A. hildebrandii* [= *A. andersonii*]).

*Pollination.* Burt & Woods (1975) note that the flowers of *Aeschynanthus* mostly have the syndrome of characters associated with bird pollination: arcuate corolla tube, exerted anthers shedding pollen downwards, strong protandry and copious nectar. McClure (1966) noted that the flowers of an unidentified *Aeschynanthus* species in Peninsular Malaysia were visited by three different species of spiderhunter birds (genus *Arachnothera*, family *Nectariniidae*). He also noted that flowers were robbed by green leafbirds which punctured the side and base of the corolla to obtain the nectar within. Freeman *et al.* (1991) analysed the composition of the nectar in various *Aeschynanthus* species from Peninsular Malaysia and found the nectar to have low sucrose levels which they suggest is typical for flowers associated with sunbirds (also family *Nectariniidae*). In the greenhouse little fruit set is observed unless the plants are hand pollinated. No self-incompatibility is known (Burt & Woods, 1975).

*Dispersal.* With the small seed size and the appendages at either end the seeds are quite clearly adapted for wind dispersal. Mendum *et al.* (2001) suggest that when the appendages are wet they may also help in anchoring the seeds to a suitable substrate.

*Chromosome number.* Chromosome counts are known from about 30 species (when allowing for synonymy for the names used in the literature) with  $x = 14$ ,  $x = 15$  and  $x = 16$ . Much of the information has been summarized by Rashid *et al.* (2001). Diploidy, tetraploidy and hexaploidy have been recorded even within single species (e.g. *Aeschynanthus ellipticus* Lauterb. & K.Schum. [Ratter & Prentice, 1964; Milne, 1975]). Reported chromosome numbers are given under each species.

#### MATERIAL STUDIED

Herbarium material was studied from the following herbaria: A, AAU, ABD, B, BK, BKF, BM, BR, C, CAL, CANB, CGE, E, G, G-DC, GH, K, KEP, KLU, K-W, L, M, MEL, MO, NY, P, PSU, S, SING, TCD, TI, UC, US, W, WU (herbarium codes from *Index Herbariorum* at <http://sweetgum.nybg.org/ih/>). All specimens cited have been seen unless otherwise indicated.

The dimensions given in the descriptions are for dried material for vegetative characters and rehydrated material for floral characters.

#### SYSTEMATIC TREATMENT

***Aeschynanthus*** Jack, Trans. Linn. Soc. London 14: 42 (1823), *nom. cons.* – Type species: *Aeschynanthus volubilis* Jack, designated by Sprague (1929).

*Trichosporum* D.Don, Edinburgh Philos. J. 7: 82 (1822). – Type species: *Trichosporum parviflorum* D.Don (= *Aeschynanthus parviflorus* (D.Don) Spreng.), designated here.

*Rheitrophyllum* Hassk., Flora 25(2): Beibl. 56 (1842). – Type species: *Rheitrophyllum subverticillatum* Hassk. (= *Aeschynanthus angustifolius* (Blume) Steud.).

*Euthamnus* Schltr., Bot. Jahrb. Syst. 58: 284 (1923). – Type species: *Euthamnus papuanus* Schltr. (= *Aeschynanthus papuanus* (Schltr.) B.L.Burtt).

*Oxychlamys* Schltr., Bot. Jahrb. Syst. 58: 286 (1923). – Type species: *Oxychlamys pullei* Schltr. (= *Aeschynanthus oxychlamys* Mendum).

*Micraeschynanthus* Ridl., Fl. Malay Penin. 5: 324 (1925). – Type species: *Micraeschynanthus dischidioides* Ridl. (= *Aeschynanthus dischidioides* (Ridl.) D.J. Middleton). See appendix.

Epiphytic herbs or subshrubs with erect, arching or pendulous stems, these sometimes rooting along their lengths when in contact with a suitable substrate. *Leaves* opposite or, more rarely, verticillate, pedicellate; blades coriaceous to distinctly fleshy, simple, margins entire to weakly crenate or weakly dentate, sometimes somewhat undulate, venation pinnate but more often than not obscure. *Inflorescence* an axillary few-flowered cyme, or flowers solitary in the axils of leaves, or a pseudoterminal cluster. Flowers strongly protandrous. *Calyx* of 5 sepals, these free or variously fused into a tube for part or most of length. *Corolla* zygomorphic, tubular, widening towards lobes, curved to various degrees, sometimes distinctly inflated at the base, glabrous to variously pubescent outside and inside; with 5 lobes, these consisting of a 2-lobed upper lip, 2 lateral lobes and a lower lobe; very variable in colour but most frequently (in Thailand) red, orange, yellow or green and then often with other darker or lighter patterning. *Stamens* 4, in 2 pairs (in Thailand), attached to the inside of the corolla tube and occupying the space in the upper curve of the flowers, included or exerted from corolla tube when mature; vestigial staminode present; anthers of each pair attached by their apices, occasionally all 4 attached together (mostly not in Thailand). *Disk* present, annular to dentate. *Pistil* developing as filaments wither and also occupying the space in the upper curve of the corolla tube, consisting of a sterile stipe at the base, the fertile ovary section, the style and peltate stigma; ovules many, anatropous. *Fruit* a long narrow capsule which opens loculicidally by 2 valves. *Seeds* many, tiny, with short to long appendages at both ends.

*Distribution.* From India and southern China through Southeast Asia and Malesia to the Solomon Islands.

*Key to the species in Thailand (flowering)*

- 1a. All leaves in whorls of 3 or more \_\_\_\_\_ 2  
 1b. All leaves opposite or with only occasional node with leaves in whorls of 3 or more \_\_\_\_\_ 5
- 2a. Corolla 54–118 mm long; leaf blades 3.8–15.3 cm long, margin weakly crenate; Peninsular Thailand \_\_\_\_\_ **19. A. speciosus**  
 2b. Corolla 15–38 mm long; leaf blades 0.5–5.3 cm long, margin entire; north and northeastern Thailand \_\_\_\_\_ 3

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- 3a. Lower lip of corolla 6.8–8.5 mm long, strongly reflexed; leaves densely pubescent above \_\_\_\_\_ **2. A. andersonii**
- 3b. Lower lip of corolla 2.5–6.5 mm long, at most weakly reflexed; leaves glabrous or sparsely pubescent above \_\_\_\_\_ 4
- 4a. Corolla tube with numerous stiff hairs near base inside \_\_\_\_\_ **8. A. humilis**
- 4b. Corolla tube without stiff hairs near base inside \_\_\_\_\_ **15. A. persimilis**
- 5a. Calyx lobes free to base or barely fused at extreme base \_\_\_\_\_ 6
- 5b. Calyx lobes fused for part (at least 15% of their length) or most of their length \_\_\_\_\_ 16
- 6a. Corolla  $\geq$  55 mm long \_\_\_\_\_ 7
- 6b. Corolla  $<$  50 mm long \_\_\_\_\_ 8
- 7a. Inflorescence with linear bracts to 6 mm long; Peninsular Thailand \_\_\_\_\_ **11. A. longiflorus**
- 7b. Inflorescence with ovate or elliptic bracts 38–60 mm long; northern Thailand \_\_\_\_\_ **20. A. superbus**
- 8a. Inflorescence clearly pedunculate with a peduncle at least 8 mm long; sepals strongly reflexed \_\_\_\_\_ **1. A. acuminatus**
- 8b. Inflorescence sessile; sepals not strongly reflexed \_\_\_\_\_ 9
- 9a. Leaves conspicuously marbled pale green on a darker green background; corolla predominantly green or green to yellow in lower half \_\_\_\_\_ 10
- 9b. Leaves not marbled; corolla predominantly red or orange (unknown in *A. minutifolius*) \_\_\_\_\_ 11
- 10a. Corolla predominantly green, 20.5–31 mm long; stamens exerted from tube \_\_\_\_\_ **10. A. longicaulis**
- 10b. Corolla red in upper third and on lobes, 14.5–19 mm long; stamens included in tube \_\_\_\_\_ **3. A. fecundus**
- 11a. Stems erect; corolla with short stiff upward pointing eglandular hairs near base inside; corolla 15–28 mm long \_\_\_\_\_ 12
- 11b. Stems predominantly pendulous or arching and pendulous; corolla without short stiff upward pointing eglandular hairs near base inside (when robust hairs present these clearly glandular); corolla 20–39 mm long \_\_\_\_\_ 13
- 12a. Lower lip of corolla strongly reflexed, 7.5–8.5 mm long; leaves densely pubescent above \_\_\_\_\_ **2. A. andersonii**
- 12b. Lower lip of corolla not or weakly reflexed, 2.5–6.5 mm long; leaves glabrous or sparsely pubescent above \_\_\_\_\_ **8. A. humilis**<sup>1</sup>

<sup>1</sup> The calyx lobes are actually fused at the extreme base for at least 15% of their length in this species but, given that this character could be misinterpreted, the species is also included here.

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- 13a. Stems with dense long hairs; leaves densely pubescent beneath; corolla glabrous inside \_\_\_\_\_ **6. *A. gracilis***
- 13b. Stems glabrous or only minutely puberulent; leaves glabrous or only sparsely pubescent beneath; corolla with glandular hairs inside \_\_\_\_\_ 14
- 14a. Style glabrous; stems glabrous but with numerous minute papery, ridged protuberances (use lens), very rarely these absent; corolla 31–39 mm long, lower lobe reflexed, with short glandular hairs with a robust base inside \_\_\_\_\_ **5. *A. garrettii***
- 14b. Style sparsely to densely glandular pubescent; stems puberulent or glabrous but without papery, ridged protuberances; corolla 21.5–32.5 mm long, lower lobe reflexed or not, internal pubescence variable but any glandular hairs without a robust base \_\_\_\_\_ 15
- 15a. Stems minutely puberulent; leaf apex rounded, blade 0.9–4 × 0.4–1.2 cm, 1–2.2 times as long as wide; corolla mouth strongly oblique and lower lobe reflexed \_\_\_\_\_ **13. *A. minutifolius***
- 15b. Stems glabrous; leaf apex obtuse to caudate, blade 2.2–12.2 × 0.6–5.5 cm, 1.6–6.2 times as long as wide; corolla mouth not strongly oblique and lower lobe not reflexed \_\_\_\_\_ **9. *A. lineatus***
- 16a. Corolla yellow or green, inside with 5 tufts of robust multicellular hairs near base \_\_\_\_\_ **12. *A. membranifolius***
- 16b. Corolla mostly red or orange, not predominantly yellow or green, inside pubescence variable but not as above \_\_\_\_\_ 17
- 17a. Stems short and erect; leaves mostly thin; corolla 15–38 mm long \_\_\_\_\_ 18
- 17b. Stems mostly arching or pendulous; leaves coriaceous to distinctly succulent; corolla 25–102 mm long \_\_\_\_\_ 19
- 18a. Corolla tube with numerous stiff hairs near base inside \_\_\_\_\_ **8. *A. humilis***
- 18b. Corolla tube without stiff hairs near base inside \_\_\_\_\_ **15. *A. persimilis***
- 19a. Corolla tube < 4 cm long \_\_\_\_\_ **14. *A. parviflorus***
- 19b. Corolla tube > 4 cm long \_\_\_\_\_ 20
- 20a. Apex of calyx lobes acute or acuminate \_\_\_\_\_ 21
- 20b. Apex of calyx lobes obtuse or rounded \_\_\_\_\_ 23
- 21a. Stamens not or barely exerted from corolla tube \_\_\_\_\_ **18. *A. rhododendron***
- 21b. Stamens strongly exerted from corolla tube \_\_\_\_\_ 22
- 22a. Calyx lobes > 10 mm long \_\_\_\_\_ **7. *A. hosseusii***
- 22b. Calyx lobes < 9 mm long \_\_\_\_\_ **4. *A. fulgens***
- 23a. Corolla not inflated at base and flaring gently from very base upwards; stamens always long exerted \_\_\_\_\_ **4. *A. fulgens***

- 23b. Corolla inflated at base before narrowing and then flaring gently upwards; stamens at most slightly exerted from corolla \_\_\_\_\_ 24
- 24a. Ovary as densely pubescent as stipe and style; leaves pubescent beneath \_\_\_\_\_ **17. A. radicans**
- 24b. Ovary only with sessile glands, only stipe and style pubescent; leaves glabrous to sparsely pubescent beneath \_\_\_\_\_ **16. A. pulcher**

*Key to the species in Thailand (fruiting)*

It is not always possible to accurately identify *Aeschynanthus* species solely on fruiting material, particularly in the absence of any remnant calyx. The key below should help identify taxa but not every couplet is completely diagnostic. Fruit characters are unknown in *Aeschynanthus minutifolius*, therefore the species is not included in this key.

- 1a. All leaves in whorls of 3 or more \_\_\_\_\_ 2
- 1b. All leaves opposite or with only occasional node with leaves in whorls of 3 or more \_\_\_\_\_ 4
- 2a. Leaf blades  $3.8\text{--}15.3 \times 1.2\text{--}5.5$  cm, thickly leathery, margin mostly crenate; Peninsular Thailand \_\_\_\_\_ **19. A. speciosus**
- 2b. Leaf blades  $0.5\text{--}5.3 \times 0.2\text{--}2$  cm, mostly thin, margin entire; north and northeast Thailand \_\_\_\_\_ 3
- 3a. Remnant calyx divided to base \_\_\_\_\_ **2. A. andersonii**
- 3b. Remnant calyx at least partly united at base \_\_\_\_\_ **15. A. persimilis** (north), **8. A. humilis** (north and northeast)
- 4a. Seeds with several to numerous filaments at one end and only 1 at the other; leaves distinctly marbled \_\_\_\_\_ 5
- 4b. Seeds with 1 or 2 short to long appendages at one end and 1 at the other; leaves not marbled \_\_\_\_\_ 7
- 5a. Remnant calyx united at base \_\_\_\_\_ **12. A. membranifolius**
- 5b. Remnant calyx divided to base \_\_\_\_\_ 6
- 6a. Hairs on hilar end of seed 11–18; remnant calyx lobes 2.3–13.5 mm long \_\_\_\_\_ **3. A. fecundus**
- 6b. Hairs on hilar end of seed 13–25; remnant calyx lobes 8–18 mm long \_\_\_\_\_ **10. A. longicaulis**
- 7a. Filaments on seeds 2 at one end and 1 at the other \_\_\_\_\_ 8
- 7b. Filaments on seeds 1 at each end \_\_\_\_\_ 9
- 8a. Remnant calyx 28–43 mm long \_\_\_\_\_ **7. A. hosseusii**
- 8b. Remnant calyx 5–14 mm long \_\_\_\_\_ **14. A. parviflorus**

- 9a. Filaments on seeds short and robust,  $\leq 1.3$  mm long \_\_\_\_\_ 10  
 9b. Filaments on seeds longer and more delicate,  $\geq 1.5$  mm long \_\_\_\_\_ 11
- 10a. Stems glabrous but with numerous minute papery, ridged protuberances (use lens), very rarely these absent; north \_\_\_\_\_ **5. *A. garrettii***  
 10b. Stems glabrous and without numerous minute papery, ridged protuberances (use lens); southern Peninsula \_\_\_\_\_ **18. *A. rhododendron***
- 11a. Seeds with collection of inflated cells at one end of the grain \_\_\_\_\_ 12  
 11b. Seeds without inflated cells \_\_\_\_\_ 13
- 12a. Leaves pubescent beneath; throughout Peninsular Thailand \_ **17. *A. radicans***  
 12b. Leaves glabrous or rarely only very sparsely pubescent beneath; only known from the deep south of Thailand (Pattani, Narathiwat and Yala) \_\_\_\_\_ **16. *A. pulcher***
- 13a. Stems erect; leaf blades mostly fairly thin, 0.5–5.3 cm long \_\_\_\_\_ 14  
 13b. Stems pendulous, arching, or both erect and arching together; leaf blades thickly fleshy to fairly thin, 0.6–22.4 cm long \_\_\_\_\_ 15
- 14a. Remnant calyx divided to base \_\_\_\_\_ **2. *A. andersonii***  
 14b. Remnant calyx at least partly united at base \_\_\_\_\_  
 \_\_\_\_\_ **15. *A. persimilis*** (north), **8. *A. humilis*** (north and northeast)
- 15a. Leaves softly hairy beneath \_\_\_\_\_ **6. *A. gracilis***  
 15b. Leaves glabrous beneath \_\_\_\_\_ 16
- 16a. Seed appendages  $< 10$  mm long \_\_\_\_\_ 17  
 16b. Seed appendages  $\geq 10$  mm long \_\_\_\_\_ 18
- 17a. Capsules  $< 30$  cm long; leaves  $3.6\text{--}13.2 \times 1.3\text{--}6.5$  cm \_\_\_\_ **1. *A. acuminatus***  
 17b. Capsules  $> 30$  cm long; leaves  $8\text{--}22.4 \times 1.9\text{--}10.6$  cm \_\_\_\_ **20. *A. superbus***
- 18a. Remnant calyx fused into a tube for part of length \_\_\_\_\_ **4. *A. fulgens***  
 18b. Remnant calyx divided to base \_\_\_\_\_ 19
- 19a. Remnant calyx lobes 4.8–23 mm long; Peninsular Thailand \_\_\_\_\_  
 \_\_\_\_\_ **11. *A. longiflorus***  
 19b. Remnant calyx lobes 4–9.4 mm long; not in Peninsular Thailand \_\_\_\_\_  
 \_\_\_\_\_ **9. *A. lineatus***

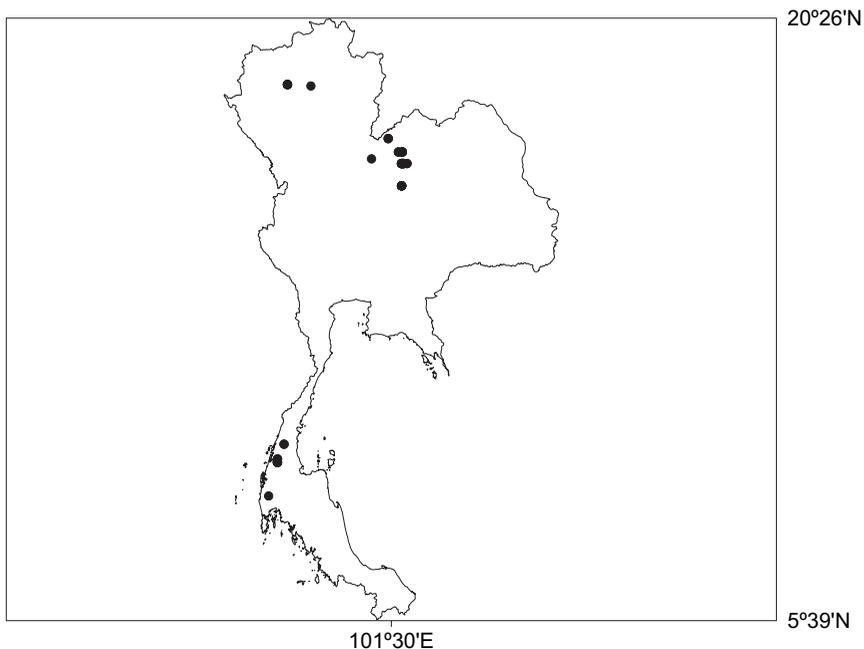
**1. *Aeschynanthus acuminatus*** Wall. ex A.DC., Prodr. 9: 263 (1845); Steudel, Nomencl. Bot. ed. 2, 1: 32 (1840); A.DC., Prodr. 9: 263 (1845); Clarke, Commelyn. Cyrtandr. Bengal. t.45 (1874); Clarke in A.DC. & C.DC., Monogr. Phan. 5(1): 30 (1883); Clarke in Hooker, Fl. Brit. Ind. 4: 341 (1884); Pellegrin, Bull. Soc. Bot. France 72: 823 (1926 [‘1925’]); Pellegrin, Fl. Indo-Chine 4: 495 (1930); Barnett, Dansk Bot. Ark. 20: 199 (1962); Barnett, Fl. Siam. 3(3): 198 (1962); Kao & DeVol, Taiwania 17(2): 142 (1972); Wang, Phytologia 45: 311 (1980); Li, Acta Bot.

Yunnan. 5(1): 28 (1983); Wang, Fl. Reipubl. Popularis Sin. 69: 502 (1990); Hô, Cayco Vietnam ed. 3, 3(1): 3 (1993); Wang et al., Fl. China 18: 377 (1998); Hilliard, Fl. Bhutan 2(3): 1300 (2001); Smitinand, Thai Pl. Names ed. 2, 14 (2001); Burt, Thai Forest Bull. (Bot.) 29: 83 (2001); Kress et al., Checkl. Myanmar 261 (2003). – *Trichosporum acuminatum* (Wall. ex A.DC.) Kuntze, Revis. Gen. Pl. 477 (1891). – Type: Bangladesh, Sylhet, *N. Wallich* 6397 (lecto G-DC, designated here; iso BR, CGE, G, K-W). **Map 1.**

*Aeschynanthus chinensis* Gardner & Champ., Hooker's J. Bot. Kew Gard. Misc. 1: 328 (1849). – *Aeschynanthus acuminatus* var. *chinensis* (Gardner & Champ.) C.B.Clarke in A.DC. & C.DC., Monogr. Phan. 5(1): 31 (1883). – Type: China, Hong Kong, *J.G. Champion* s.n. (lecto K, designated here; iso K).

*Aeschynanthus bracteatus* auct. non Wall. ex A.DC.: Bentham, Fl. Hongk. 258 (1861).

Creeping or hanging epiphyte, sometimes lithophytic, stems glabrous. *Leaves* opposite; petiole 2–10 mm long, glabrous; blade papery to slightly fleshy, green above and beneath, not marbled, obovate or elliptic, 3.6–13.2 × 1.3–6.5 cm, 1.4–5.5 times as long as wide, apex acuminate, base cuneate to obtuse, glabrous above and beneath, very faintly punctate or not beneath, 4–8 pairs of secondary veins, these clearly to weakly visible, tertiary venation obscure. *Inflorescences* axillary or terminal, 2–5-flowered; peduncle 8–45 mm long; bracts ovate to orbicular, 4–10 × 2–10 mm; pedicels 8–9 mm long, glabrous. *Calyx* of separate lobes free to base, green or green with purple tips, glabrous; lobes elliptic or ovate, spreading to recurved,



MAP 1. Thai distribution of *Aeschynanthus acuminatus* Wall. ex A.DC.

2.5–4.5 × 1.4–3.4 mm, apex rounded. *Corolla* 15–25 mm long, tube broad at base, mouth strongly oblique and consequently large, externally tube green, yellowish-green, or green with faint brown lines, lobes brown, greenish-yellow or green tinged with brown-red, internally paler; upper lobes oblong or ovate, slightly spreading, 4.6–7.7 × 3.3–6.2 mm, sinus 3–5.2 mm deep, apex rounded; lateral lobes ovate or deltoid, reflexed, 5.1–8 × 5.6–8.5 mm, apex rounded or obtuse; lower lobe oblong or elliptic, reflexed, 4.8–9.1 × 3.2–6 mm, apex rounded, outside glabrous except for ciliate lobes, inside with sparse glandular hairs throughout including on base of lobes and in throat, with sessile glands running down tube under lower 3 lobes. *Stamens* long exerted, fused in 2 pairs; filaments various shades of purple and/or red, glabrous or with very few sessile glands, anthers purple; anterior filaments inserted at 2.5–4 mm from corolla base which is 13–20% of corolla length, filaments 24–25 mm long, anthers 2.9–3.6 × 1.5 mm; posterior filaments inserted at 5.5–7 mm from corolla base which is 28–35% of corolla length, filaments 19–21 mm long, anthers 2.6–3 × 1.4–1.7 mm; staminode 1.3–3.5 mm long; pollen green. *Disk* 1.4–2.2 mm high, 5-crenate. *Pistil* 19–23 mm long; stipe 2–7 mm long, glabrous; ovary green, 9–22 mm long, glabrous or with very few sessile glands; style pink or green, 4.5–7 mm long, glabrous. *Capsule* 10.5–22 cm long, 2–3.2 mm wide. *Seed* grain 0.7–1.4 × 0.2 mm, fairly smooth, bubble cells absent; apical appendage a solitary hair, 2.9–3.7 mm long; hilar appendage a solitary hair, 3–3.2 mm long, appendages not papillose.

*Distribution.* Southern China, Taiwan, northeastern India, Burma, Thailand, Vietnam.

*Habitat and ecology.* In evergreen forest at 100–1300 m altitude.

*Proposed IUCN conservation status.* Least Concern (LC). This species is common and widespread.

*Specimens examined.* THAILAND. **Chaiyaphum:** Tunkamang, 16 xii 1971, *C.F.v. Beusekom et al.* 4347 (BKF, C, CANB, K, L, MO, P). **Chiang Mai:** Doi Sutep, 14 i 1912, *A.F.G. Kerr* 2302 (C, K, L, P, TCD). **Chumphon:** Langsuan, Ban Kraye, 19 ii 1927, *A.F.G. Kerr* 12000 (BM, K). **Lampang:** Muang Bahn, Chae Son, Mae Mawn Village-Mae Sah Bau Village trail, 31 x 1996, *J.F. Maxwell* 96-1447 (A, BKF, L). **Loei:** s.l., 27 x 1955, *T. Smitinand* 3089 (BKF); Phu Kradung, 1 xi 1984, *G. Murata, C. Phengklai, S. Mitsuta, T. Yahara, H. Nagamasu, N. Nantasan* T-42665 bis (A, AAU, BKF, L); *ibid.*, 28 xi 1965, *N. Tagawa, K. Iwatsuki, N. Fukuoka* T-526 (BKF, E, L); *ibid.*, 29 xi 1965, *N. Tagawa, K. Iwatsuki, N. Fukuoka* T-829 (BKF, E); *ibid.*, 7 xi 1970 – 9 xi 1970, *C. Charoenphol, K. Larsen, E. Warncke* 4744 (E, L); *ibid.*, 25 xi 1958, *T. Sorensen, K. Larsen, B. Hansen* 6222 (BKF, C); *ibid.*, 1 xi 1984, *G. Murata, C. Phengklai, S. Mitsuta, T. Yahara, H. Nagamasu, N. Nantasan* T-42683 (A, BKF, L); *ibid.*, 1 xi 1984, *G. Murata, C. Phengklai, S. Mitsuta, T. Yahara, H. Nagamasu, N. Nantasan* T-42690 (A, BKF, L); Phu Ruea District, Phu Luang, 26 xi 1957, *D. Bunpheng* 1007 (BKF); *ibid.*, 16 iii 2002, *V. Chamchunroon, C. Puff* VC 1418 (BKF); *ibid.*, 19 ii 1983, *H. Koyama, H. Terao, T. Wongprasert* T-33710 (A, BKF); Phu Ruea District, Phu Ruea Wildlife Sanctuary, 23 xii 1982, *H. Koyama, H. Terao, T. Wongprasert* T-31560 (BKF), T-31583 (A, BKF); Saphung, 22 iv 1948, *Din* 226 (BKF, K). **Phangnga:** Kapong, 17 ii 1929, *A.F.G. Kerr* 17552 (K). **Phitsanulok:** Phu Hin Rong Kla National Park, Kang Han Nam, 30 x 2001, *S. Watthana, P. Suksathan* 1597 (AAU). **Ranong:** Suksamran, Khlong Na Kha Wildlife Sanctuary, 11 i 1990, *S. Hoover, V. Girard, S.H. Macon, W. Wat* 5274 (E); *ibid.*, 12 i 1990, *S. Hoover, V. Girard, S.H. Macon,*

*W. Wat* 5538 (A); *ibid.*, 14 i 1990, *S. Hoover*, *V. Girard*, *S.H. Macon*, *W. Wat* 5600 (A, E); Kaper, Khao Po Ta Luang Kaeo, 28 ii 1983, *H. Koyama*, *H. Terao*, *T. Wongprasert* T-33820 (A, BKF).

This is one of the most distinctive species in Thailand due to the short corolla tube and strongly reflexed corolla lobes. For reasons that are not entirely clear, considering their considerable differences, it has been frequently confused with *Aeschynanthus bracteatus* in other parts of its range. *Aeschynanthus bracteatus* has much larger red flowers.

This species was mentioned by Brown (1839), Brown (1840) and Steudel (1840), all of whom took up Wallich's epithet, but not until De Candolle (1845) was a description provided, thereby validating the name.

**2. *Aeschynanthus andersonii*** C.B. Clarke, *Commelyn. Cyrtandr. Bengal.* t.48B (1874); Clarke in A.DC. & C.DC., *Monogr. Phan.* 5(1): 29 (1883); Wang, *Phytologia* 45: 314 (1980); Li, *Acta Bot. Yunnan.* 5(1): 32 (1983); Wang, *Fl. Reipubl. Popularis Sin.* 69: 516 (1990); Wang et al., *Fl. China* 18: 382 (1998); Smitinand, *Thai Pl. Names* ed. 2, 14 (2001); Burt, *Thai Forest Bull. (Bot.)* 29: 83 (2001); Kress et al., *Checkl. Myanmar* 261 (2003). – *Trichosporum andersonii* (C.B. Clarke) Kuntze, *Revis. Gen. Pl.* 477 (1891). – Type: China, Yunnan, *J. Anderson* s.n. (holo CAL).

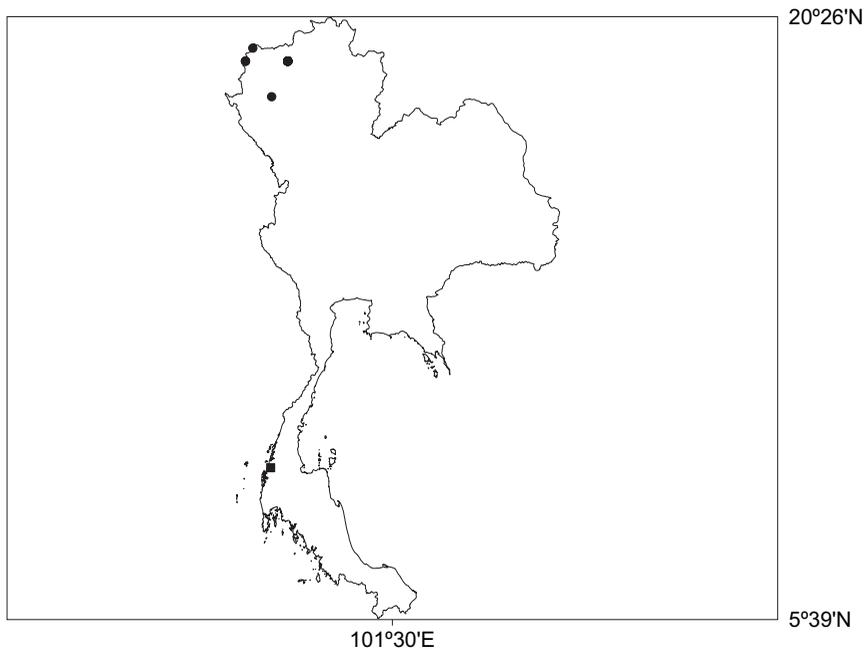
**Fig. 1, Map 2.**

*Aeschynanthus hildebrandii* Hemsl. ex Hook.f., *Bot. Mag.* t.7365 (1894); Barnett, *Dansk Bot. Ark.* 20: 199 (1962), *pro parte*; Barnett, *Fl. Siam.* 3(3): 199 (1962); Burt, *Thai Forest Bull. (Bot.)* 29: 83 (2001); Gao, *Acta Phytotax. Sin.* 40(6): 549 (2002); Kress et al., *Checkl. Myanmar* 261 (2003); Mendum, *Gloxinian* 53(1): 8 (2003). – Type: Burma, Mông Hsawk, ix 1892, *H.H. Hildebrand* s.n. (lecto K, designated here).

An epiphyte with erect stems, these brown or grey, densely puberulent. *Leaves* opposite, subopposite or densely clustered at stem apex and appearing verticillate; petiole 1.5–4 mm long, densely puberulent; blade papery, mid green above, paler beneath, not marbled, elliptic or obovate, 0.5–4 × 0.2–1.2 cm, 1.3–4 times as long as wide, apex rounded to acute, base cuneate; densely puberulent all over above, densely puberulent all over beneath, secondary veins obscure, tertiary venation obscure. *Inflorescences* terminal, 1–6-flowered, peduncle absent; pedicels 6–11 mm long, green, puberulent. *Calyx* of separate lobes free to base or barely cohering at extreme base for up to 0.5 mm, 9–13% of length, green, sparsely to densely eglandular puberulent; lobes linear, narrowly triangular or narrowly elliptic, erect or spreading, 3.5–4.6 × 0.7–2.2 mm, apex acuminate to acute. *Corolla* 18–25 mm long, tube broad at base, externally tube orange and darker orange on ventral surface, lobes orange edged maroon, hairs pinkish, internally tube pale orange, lobes orange edged maroon and with a central red stripe; upper lobes oblong or ovate, not spreading or reflexed, 1.5–2 × 1–1.7 mm, sinus 1.5–2 mm deep, apex rounded; lateral lobes deltoid, reflexed, 1.3–1.6 × 4–8.2 mm, apex rounded; lower lobe oblong



FIG. 1. *Aeschynanthus andersonii* C.B. Clarke.



MAP 2. Thai distribution of *Aeschynanthus andersonii* C.B. Clarke (●) and *Aeschynanthus fecundus* P. Woods (■).

to narrowly elliptic, reflexed,  $6.8\text{--}8.5 \times 1.7\text{--}2.5$  mm, apex rounded; outside densely to sparsely glandular puberulent, inside with short stiff upward pointing hairs near base. *Stamens* long exserted; filaments white at base and purple higher up, with glandular hairs, these sometimes very few, anthers grey; anterior filaments inserted at 9–10.6 mm from corolla base which is 40–60% of corolla length, filaments 12–23.5 mm long, anthers  $2.3\text{--}2.4 \times 0.6\text{--}0.8$  mm; posterior filaments inserted at 8.7–13 mm from corolla base which is 41–55% of corolla length, filaments 18.5–24 mm long, anthers  $1.2\text{--}1.5 \times 0.6\text{--}0.8$  mm; staminode 0.4–0.8 mm long. *Disk* 0.7–0.9 mm high, 5-dentate or 5-crenate. *Pistil* 25–37 mm long; stipe 2–4 mm long, glabrous; ovary green, 4.5–9 mm long, glabrous; style white, 18–26 mm long, sparsely glandular pubescent, sometimes very sparsely so; stigma very pale purple. *Capsule* 3.8–10 cm long, 2–3 mm wide. *Seed* grain  $1.5\text{--}2 \times 0.4\text{--}0.6$  mm, fairly smooth, bubble cells absent; apical appendage a filiform hair, 16–26 mm long; hilar appendage a single filiform hair, 11–24 mm long; appendages papillose.

*Distribution.* Southern China (Yunnan), Burma, northern Thailand.

*Habitat and ecology.* In primary or secondary evergreen or seasonal forest at 1400–1900 m altitude.

*Proposed IUCN conservation status.* Least Concern (LC). This species is common and widespread.

*Chromosome number.* Jaidee (2004) gives the chromosome number as  $2n = 28$  (but under the name *Aeschynanthus hildebrandii* – it is likely that the plant she called *A. andersonii* is rather *A. persimilis* as much of the literature has confused them but I have seen no voucher material of the latter).

*Nomenclatural notes.* The protologue of *Aeschynanthus hildebrandii* says that the species is a native of Burma from whence living material was sent to Kew by H. H. Hildebrand who lived near Fort Stedman. This would suggest that the description was based on the living material grown in Kew. However, the citation of '*A. hildebrandii*, Hemsl. in Herb. Kew' in the protologue also allows for a herbarium specimen to be considered original material, presumably referring to the actual Hildebrand specimen from Fort Stedman which is in Kew. There is a sheet at Kew that has three packets and the original drawings of the flower dissection and a seed that appeared in the protologue. One of the packets has no indication of its provenance on it, the other is the Hildebrand specimen from Fort Stedman, and the third says 'Kew Gardens April 19, 1894' and 'Type of Bot. Mag. t.7365'. This type designation would appear to have been added after publication. Unfortunately this packet contains only half a flower and two loose leaves. The Hildebrand specimen, although small, does have stems, leaves, flowers and fruits on it and is lectotypified here.

*Specimens examined.* THAILAND. **Chiang Mai:** Doi Chiang Dao, *K. Bunchuai* 185 (BKF); *ibid.*, 18 x 1926, *N. Put* 392 (ABD); *ibid.*, 16 viii 1963, *T. Smitinand*, *H.O. Sleumer* 1040 (BKF, K, KEP, L); *ibid.*, 16 vii 1958, *T. Sorensen*, *K. Larsen*, *B. Hansen* 4208 (ABD, C); *ibid.*, 16 vii

1958, *T. Smitinand* 4718 (BKF); *ibid.*, 27 ix 1971, *J.E. Vidal* 5219 (AAU, P); *ibid.*, 22 x 1979, *T. Shimizu et al.* T-20192 (BKF); Doi Chiang Dao, Huay Mae Gok Station area, 4 xi 1995, *J.F. Maxwell* 95-1060 (A, BKF); Doi Inthanon, 11 ix 1974, *K. Larsen, S.S. Larsen* 34397 (AAU); Jom Tong, Mae Soi Subdistrict, Mae Soi Ridge, 5 ix 1992, *J.F. Maxwell* 92-495 (AAU, GH, P). **Mae Hong Son:** Huay Hee Village, *M. Mendum* CULT 172 (E).

There are three species in the *Aeschynanthus andersonii* group in Thailand: *A. andersonii*, *A. persimilis* and *A. humilis*. There has been considerable confusion in distinguishing these taxa and additional related species from outwith Thailand and much confusion in the herbarium and the literature, with names being routinely misapplied. Craib (1911) suggested that his new species *Aeschynanthus persimilis* might eventually prove to be a form or variety of *Aeschynanthus humilis*. Barnett (1962) suggested that *Aeschynanthus persimilis* and *A. humilis* should be included within a variable and more widespread *A. hildebrandii*. No mention was made of *Aeschynanthus andersonii* in which I consider *A. hildebrandii* to be a synonym. Although the three species in Thailand are clearly closely related there are clear morphological characters to separate them. The species of this group in Thailand can be distinguished thus:

- 1a. Calyx lobes free to base; lower lip of corolla strongly reflexed — *A. andersonii*  
 1b. Calyx at least partially fused into a tube at the base; lower lip of corolla not strongly reflexed \_\_\_\_\_ 2  
 2a. Corolla tube with numerous stiff hairs near base inside \_\_\_\_\_ *A. humilis*  
 2b. Corolla tube without stiff hairs near base inside \_\_\_\_\_ *A. persimilis*

**3. *Aeschynanthus fecundus*** P.Woods, Notes Roy. Bot. Gard. Edinburgh 33: 482 (1975); Turner, Gard. Bull. Singapore 47(1): 243 (1997 [‘1995’]); Smitinand, Thai Pl. Names ed. 2, 14 (2001); Burt, Thai Forest Bull. (Bot.) 29: 83 (2001). — *Aeschynanthus parviflorus* Ridl., J. Fed. Malay States Mus. 4: 48 (1909), *non* (D.Don) Spreng. (1827). — *Aeschynanthus breviflorus* Ridl., Fl. Malay Penin. 2: 497 (1923), *non* (S.Moore) K.Schum. (1899). — Type: Malaysia, Pahang, Telom, xi 1900, *H.N. Ridley* 13599 (holo SING; iso BM, K). **Map 2.**

Epiphyte with erect, arching or pendulous stems; stems green, flushed purplish or reddish-brown, glabrous. *Leaves* opposite; petiole green, 2–4 mm long, glabrous; blade slightly fleshy, green with paler green or yellow mottling above, pale green beneath, elliptic, 2.1–8.6 × 0.5–3.7 cm, 1.7–5.3 times as long as wide, apex acuminate, base rounded to cuneate, glabrous above and beneath, not punctate beneath, margin with few minute red-tipped teeth, secondary veins obscure, tertiary venation obscure. *Inflorescences* axillary, 1–2-flowered, peduncle absent; pedicels green, 4–7 mm long, sparsely minutely papillose or glabrous. *Calyx* of separate lobes free to base, yellow-green or green, tips red, glabrous or with sparse sessile glands; lobes linear to narrowly ovate, slightly spreading or erect, 2.3–13.5 × 0.6–1.5 mm, apex acute or acuminate. *Corolla* 14.5–19 mm long, externally tube yellowish-green

or yellow in lower two-thirds, brownish-red higher, lobes dark red or brownish-red, internally tube light yellowish, lobes pale brownish-red, tube fairly broad at base; upper lobes oblong or elliptic, not spreading or reflexed,  $1.1\text{--}2.3 \times 1.2\text{--}2.3$  mm, sinus  $1.4\text{--}2.6$  mm deep, apex rounded; lateral lobes ovate, not spreading or reflexed,  $1.1\text{--}2.5 \times 1.6\text{--}2.9$  mm, apex rounded; lower lobe elliptic, not spreading or reflexed,  $1.3\text{--}2.3 \times 1\text{--}2.6$  mm, apex rounded; glabrous or with few sessile glands around top outside, with irregular tufts of multicellular hairs near base and glandular papillose on ventral surface near throat inside. *Stamens* not exerted, fused in 2 pairs, filaments yellow or greenish-yellow, with glandular hairs, anthers yellow to grey, pollen cream; anterior filaments inserted at  $7\text{--}8.6$  mm from corolla base which is 45–48% of corolla length, filaments  $7\text{--}9$  mm long, anthers  $1\text{--}1.3 \times 0.6$  mm; posterior filaments inserted at  $8\text{--}12$  mm from corolla base which is 55–63% of corolla length, filaments c.6 mm long, anthers  $0.7\text{--}0.9 \times 0.5\text{--}0.6$  mm; staminode  $0.8\text{--}2$  mm long. *Disk* 1 mm high, a simple annular ring. *Pistil*  $17\text{--}19$  mm long; stipe c.1.5 mm long, with few sessile glands; ovary green,  $4.5\text{--}5.5$  mm long, with sessile glands; style green or yellowish-green,  $11\text{--}12$  mm long, glandular pubescent; stigma pink or purple. *Capsule*  $3.6\text{--}11$  cm long,  $2.2\text{--}2.8$  mm wide. *Seed* grain  $2\text{--}2.4 \times 0.2\text{--}0.3$  mm, only weakly warty, bubble cells absent; apical appendage a filiform hair,  $20\text{--}28$  mm long; hilar appendage of several (11–18) filiform hairs,  $12\text{--}15$  mm long, appendages papillose.

*Distribution.* Peninsular Thailand, Peninsular Malaysia.

*Habitat and ecology.* In primary evergreen forest at low altitudes.

*Proposed IUCN conservation status.* Least Concern (LC). This species is known from very few collections but, in Thailand, the forest where it has been collected is extensive, protected and undercollected. It is likely to be widespread in Ranong. In Malaysia it has only once been collected and that was in November 1900.

*Nomenclatural notes.* This species was originally published under the name *Aeschynanthus parviflorus* by Ridley (1909) who later realized that it was a later homonym and proposed the name *A. breviflorus* (Ridley, 1923) without realizing that name too was a later homonym. It was eventually validated under the current name by Woods (in Burt & Woods, 1975).

*Chromosome number.* Reported as  $n = 16$  (see Rashid *et al.*, 2001).

*Specimens examined.* THAILAND. Cultivated RBGE, locality within Thailand unknown, *M. Mendum* CULT 146 (E), *Unknown collector* C5838 (E); s.l., 1958, *T. Sorensen, K. Larsen, B. Hansen* 995 (C). **Ranong:** Cultivated RBGE, *D.J. Middleton* 4211 (E), wild collected in Suksamran, Khlong Na Kha Wildlife Sanctuary, Trail from Kam Puan Ranger Substation towards summit of Khao Dan, 21 ii 2006.

This species is only known from very few collections in Thailand and Malaysia. Unfortunately two of the collections from Thailand, one of which has been grown on and collected several more times from living material, are not localized to a place or

even province. The third collection is from Ranong and it is likely the other collections are also from Peninsular Thailand.

**4. *Aeschynanthus fulgens*** Wall. ex R.Br., *Cyrtandreae* 115 (1839); Steudel, *Nomencl. Bot. ed. 2*, 1: 32 (1840); Brown in Bennett, *Pl. Jav. Rar.* 115 (1840); A.DC., *Prodr.* 9: 261 (1845); Clarke in A.DC. & C.DC., *Monogr. Phan.* 5(1): 21 (1883); Clarke in Hooker, *Fl. Brit. Ind.* 4: 338 (1884); Smitinand, *Thai Pl. Names ed. 2*, 14 (2001); Burt, *Thai Forest Bull. (Bot.)* 29: 83 (2001); Kress et al., *Checkl. Myanmar* 261 (2003); Poona, *Threatened Pl. Thailand* 70 (2005). – *Trichosporum fulgens* (Wall. ex R.Br.) Kuntze, *Revis. Gen. Pl.* 477 (1891). – Type: Burma, Tavoy, *W. Gomez in Wallich* 797 (lecto K-W, designated here; iso BM, CGE, G, G-DC, K). **Figs 2–3, Map 3.**

*Aeschynanthus evrardii* Pellegr., *Bull. Soc. Bot. France* 72: 824 (1926 [‘1925’]); Pellegrin, *Fl. Indo-Chine* 4: 499 (1930). – Type: Vietnam, Lam Dong, Ang Kroet, 26 x 1920, *F. Evrard* 358 (lecto P, designated here; iso P).

*Aeschynanthus stenosphonium* W.T.Wang, *Bull. Bot. Res., Harbin* 3(4): 49 (1983); Smitinand, *Thai Pl. Names ed. 2*, 15 (2001); Burt, *Thai Forest Bull. (Bot.)* 29: 84 (2001). – Type: Laos, Vieng Pa Pow Tha Kaw, 2 xi 1921, *B. Hayata* s.n. (holo TI; iso TI).

*Aeschynanthus macranthus auct. non* (Merr.) Pellegr.: Pellegrin, *Fl. Indo-Chine* 4: 498 (1930), *pro parte*; Barnett, *Fl. Siam.* 3(3): 201 (1962); Burt, *Thai Forest Bull. (Bot.)* 29: 84 (2001).

Epiphyte with arching and pendulous stems, stems dull olive-green or green with purple mottling, glabrous. *Leaves* opposite; petiole 3–20 mm long, glabrous; blade slightly to very fleshy, dark or mid green above, paler beneath, not marbled, elliptic or oblong, 3.3–17 × 1.1–5.2 cm, 1.7–7.5 times as long as wide, apex acuminate, base cuneate to obtuse, glabrous above and beneath, very faintly punctate or not beneath, margin entire, secondary veins weakly visible or obscure, 4–8 pairs, tertiary venation obscure. *Inflorescences* mostly terminal, occasionally also axillary, with up to 16 flowers, peduncle absent, bracts linear, to 10 mm long; pedicels 3.5–24 mm long, green, glabrous or with glandular hairs. *Calyx* united into a tube for part of its length, yellowish, greenish or brownish, sometimes with reddish lobes, glabrous except for ciliate lobes, or few hairs only on very tips of lobes, to glandular pubescent all over, 7–23.5 mm long; tube 2.4–18.5 mm long which is 34–94% of total length, 3.5–14 mm wide at top of tube; lobes triangular, erect, 1–8 × 1.2–5.5 mm, apex rounded to acuminate. *Corolla* 41–73 mm long, tube narrow at base, externally bright red to darker red or orange-red, sometimes yellowish at base, usually with darker lines on tube, red or orange-red with a black central line on lobes, sometimes yellowish at very base, internally yellowish to pale red in tube, lobes orange-red or red with a dark red or black central line or arrow and pale orange to cream at base; upper lobes slightly falcate, reflexed or not, 3.2–7.5 × 3.3–7 mm, sinus 3.5–10.5 mm deep, apex obtuse or rounded; lateral lobes deltoid, not spreading or reflexed,

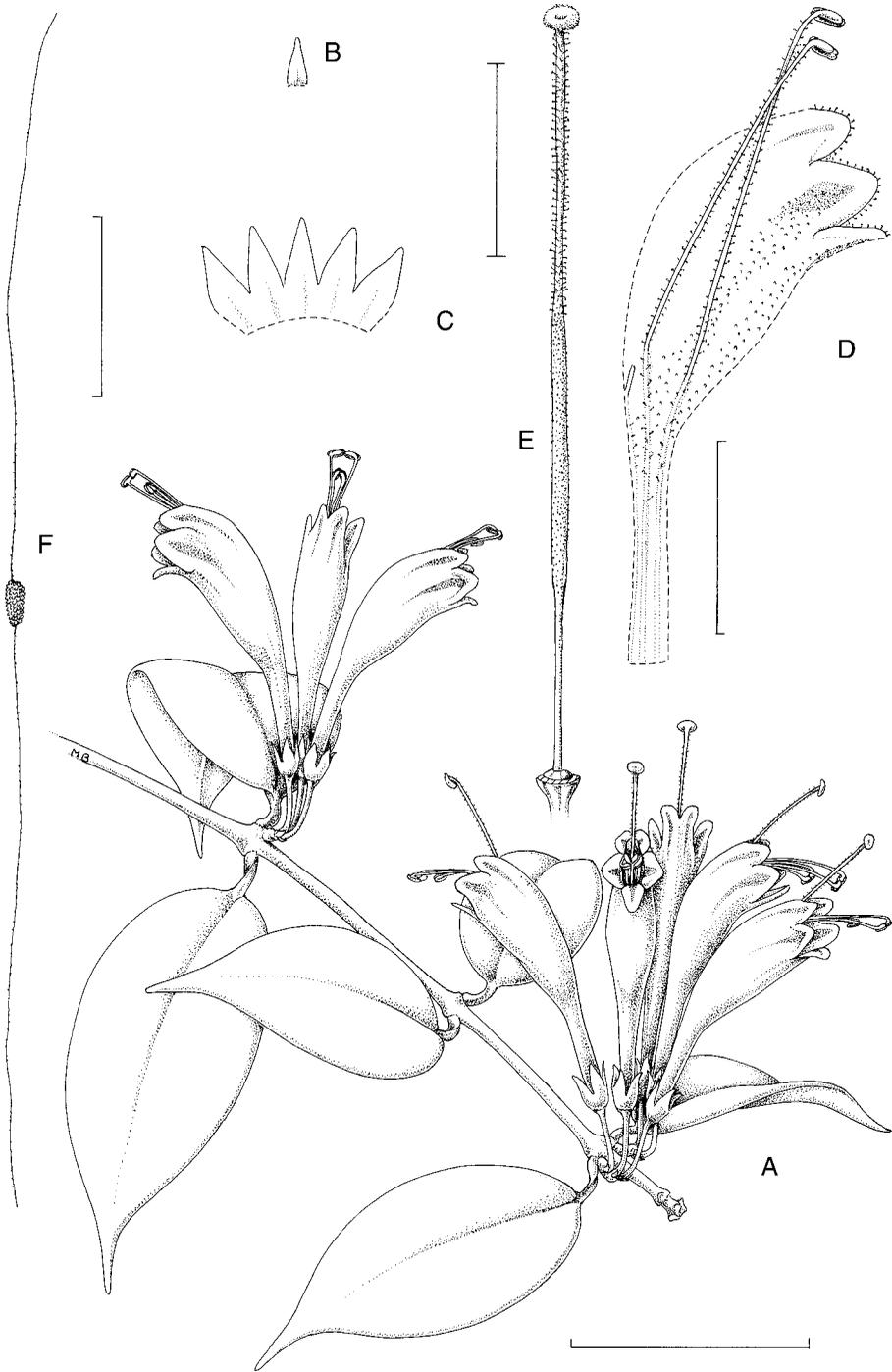
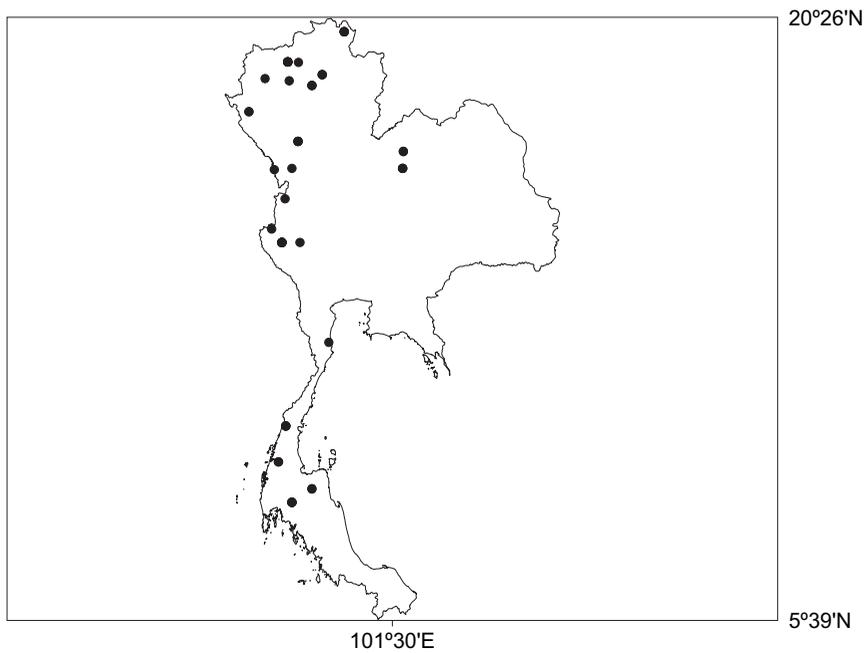


FIG. 2. *Aeschynanthus fulgens* Wall. ex R.Br., short calyx tube form. A, habit; B, bract; C, calyx opened up; D, flower dissection; E, pistil; F, seed. From *Mendum* s.n. (E). Drawn by Mary Mendum. Scale bars: A, 5 cm; B–D, 2 cm; E, 1 cm; F, 5 mm.



FIG. 3. *Aeschynanthus fulgens* Wall. ex R.Br., long calyx tube form.



MAP 3. Thai distribution of *Aeschynanthus fulgens* Wall. ex R.Br.

2.8–8 × 5.2–9.5 mm, apex rounded or obtuse; lower lobe oblong or elliptic, reflexed, 5.1–14 × 3–6 mm, apex obtuse or rounded; sparsely to densely glandular puberulent outside or only at top of tube and on lobes or only ciliate on lobes, minutely and sparsely to very sparsely glandular puberulent internally, this sometimes denser towards the upper half, sessile glands present at top of tube. *Stamens* long exerted, fused in 2 pairs or rarely all 4 attached; filaments mostly darker in the upper half and ranging from reddish to purplish and then to white at base, sparsely glandular pubescent to glabrous, anthers dark maroon, purple, white and purple, or greyish-purple; anterior filaments inserted at 29–48 mm from corolla base which is 54–72% of corolla length, filaments 25–50 mm long, anthers 3–5.6 × 0.9–2 mm; posterior filaments inserted at 32–50 mm from corolla base which is 58–82% of corolla length, filaments 25–42 mm long, anthers 2.5–5 × 1–2.1 mm; staminode 0.7–11 mm long. *Disk* 0.5–1.8 mm high, 5-crenate to strongly 5-lobed. *Pistil* 15.5–80 mm long; stipe 3–26 mm long, glabrous; ovary green or cream, 8–38 mm long, glabrous or with few sessile glands; style white or cream, 4.5–41 mm long, glabrous to glandular pubescent. *Capsule* 15.7–42 cm long, 2.9–5 mm wide. *Seed* grain 0.8–2 × 0.2–0.5 mm, warty, bubble cells absent; apical appendage a filiform hair, 16–34 mm long; hilar appendage a single filiform hair, 13.5–35 mm long, appendages papillose.

*Distribution.* Burma, Thailand, Laos, Cambodia, Vietnam, Peninsular Malaysia.

*Habitat and ecology.* In primary or disturbed evergreen, mixed deciduous or mossy forest at 10–1350 m altitude.

*Proposed IUCN conservation status.* Least Concern (LC). This species is common and widespread.

*Specimens examined.* THAILAND. Unknown province: *M. Mendum* s.n. (E); *ibid.*, Unknown C7647 (E); Kopah, 4 ix 1918, *M. Haniff*, *M. Nur* s.n. (SING). **Chiang Mai:** 13 km W of Phrao, 14 xi 1985, *H. Kurzweil* HK474 (WU); Doi Chiang Dao, *Winit* 798 (BKF); *ibid.*, *K. Bunchuai* 848 (BKF); *ibid.*, 29 x 1989, *J.F. Maxwell* 89-1316 (E, L, MO); Doi Chiang Dao, Ban Tham Khao, 30 x 1963, *K. Bunchuai* 1293 (BKF); Doi Chiang Dao, Ban Yang Pong Luang, 6 i 1989, *J.F. Maxwell* 89-23 (L); Doi Chiang Dao, Wat Chiangdao, 30 x 1963, *Adisai* 582 (BK); Chiang Dao, Tong Khao Puang, Ban Goon Nai, 15 ii 1990, *J.F. Maxwell* 90-207 (A, L, MO); Mae Tang, Bah Bae Village, 21 i 1992, *J.F. Maxwell* 92-47 (L); Mae Tang, Ban Mae Sae, 13 x 1990, *J.F. Maxwell* 90-1136 (A, L, MO); Me Rim, 21 x 1922, *A.F.G. Kerr* 6420 (BM); West of Mae Jon Luang, 25 i 1993, *K. Larsen et al.* 44852 (K). **Chiang Rai:** Phan, Doi Luang National Park, Doi Mok, 7 x 1998, *P. Palee* 432 (A, BKF); *ibid.*, 28 x 1997, *J.F. Maxwell* 97-1250 (L). **Kampaeng Phet:** Mae Wong National Park, 22 viii 1995, *R. Pooma* 1132 (BKF). **Kanchanaburi:** Huay Bankan, 9 xi 1971, *C.F.v. Beusekom et al.* 3577 (BKF, L, MO); *ibid.*, 10 xi 1971, *C.F.v. Beusekom et al.* 3659 (BKF n.v., K n.v., L n.v., MO n.v., P n.v.); Sankhlaburi, Thung Yai Naresuan Wildlife Sanctuary, 10 x 1993, *J.F. Maxwell* 93-1190 (A, L); Sisawat, Klang Dong, 29 i 1962, *T. Smitinand* 7379 (BKF). **Lampang:** Doi Luang National Park, 25 iii 1997, *J.F. Maxwell* 97-217 (A, BKF, L); Muang Bahn, Chae Son, 4 xii 1995, *J.F. Maxwell* 95-1277 (A, BKF, L). **Loei:** Phu Ruea District, Phu Luang, 18 ix 1966, *S. Phusomsaeng*, *K. Bunchuai* 48 (BKF); *ibid.*, 2 ix 1968, *K. Bunchuai* 1753 (BKF). **Mae Hong Son:** Mae Sarieng, 18 x 1954, *W.T. Komes* s.n. (BKF [2]). **Phangnga:** Kasoom, x 1898, *C. Curtis* s.n. (SING); Khao Pawta Luang Keow, 29 xi 1973, *T. Santisuk* 722 (BKF); *ibid.*, 27 xi 1974, *R. Geesink et al.* 7630

(BKF, K, L). **Phetchabun**: Nam Nao National Park, 20 iii 1980, *G. Seidenfaden* C7717 (E [2]); *ibid.*, 20 iii 1980, *G. Seidenfaden* C7718 (E); *ibid.*, Cultivated RBGE 15028 (E). **Ranong**: Kra Buri, Thungraya Nasak Wildlife Sanctuary, 28 viii 2002, *D.J. Middleton et al.* 1388 (A, BKF, E, SING); Suksamran, Khlong Na Kha Wildlife Sanctuary, 17 xi 1973, *T. Santisuk* 584 (BKF); *ibid.*, 11 ix 1982, *T. Shimizu et al.* T-29295 (BKF). **Surat Thani**: Khao Nong, 10 viii 1927, *A.F.G. Kerr* 13257 (BM, K). **Tak**: Mae Sot to Umphang, 14 vii 1999, *T. Wongprasert* 997-110 (BKF); Mae Sot, Doi Muser, 24 viii 1961, *C. Chermisrivathana* 57 (BK); Umphang to Doi Hua Mod, 14 iv 1999, *K. Chayamarit* 1597 (BKF).

This is an extremely variable species, particularly in the calyx characters. The type of *Aeschynanthus fulgens* has a long and very narrow calyx which, at first sight, seems quite different from the shorter and wider calyx of the types of *A. evrardii* and *A. stenosphonius* and other material with even shorter calyces from western Thailand. However, there are no clear points of demarcation between the various calyx forms and, after recent collections from Laos of specimens with very narrow calyces, also no obvious geographical distinction. There are far fewer differences in corolla characters except for some variation in the size of the corolla and in the degree of pubescence outside. Much of the Thai material which is more similar to the type of *Aeschynanthus evrardii* was previously and mistakenly referred to *Aeschynanthus macranthus*, a distinct species from northern Vietnam and Burma. Burt (2001) had already raised the possibility that this material, which he called *Aeschynanthus macranthus*, was not specifically distinct from *A. fulgens*.

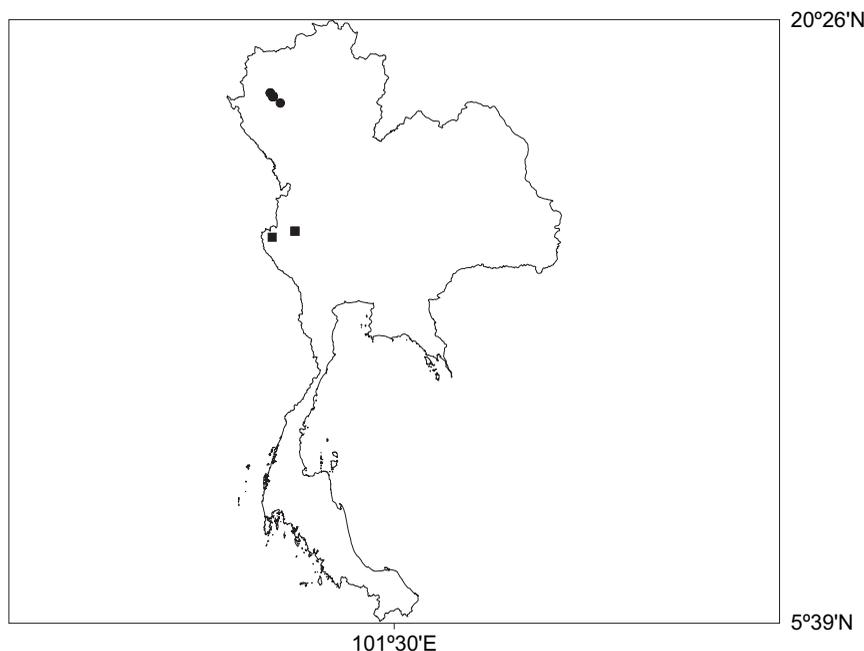
**5. *Aeschynanthus garrettii*** Craib, Bull. Misc. Inform. Kew 1913: 201 (1913); Pellegrin, Bull. Soc. Bot. France 72: 823 (1926 [‘1925’]); Pellegrin, Fl. Indo-Chine 4: 497 (1930), *pro parte*; Barnett, Fl. Siam. 3(3): 198 (1962); Smitinand, Thai Pl. Names ed. 2, 14 (2001); Burt, Thai Forest Bull. (Bot.) 29: 83 (2001); Pooma, Threatened Pl. Thailand 70 (2005). – Type: Thailand, Chiang Mai, Doi Inthanon, Pha Ngaem, 25 x 1910, *H.B.G. Garrett* 86 (lecto K, designated here; iso BKF, BM, K, L). **Fig. 4, Map 4.**

Epiphyte with arching and pendulous stems; stems purplish, glabrous but with papery ridges giving them a wrinkled look. *Leaves* opposite; petiole 2–11 mm long, glabrous; blade coriaceous or slightly fleshy, mid green above, pale green beneath, not marbled, elliptic or ovate, 1–7.3 × 0.6–3.4 cm, 1.4–3.7 times as long as wide, apex acuminate, base cuneate to obtuse, glabrous above and beneath, not punctate beneath, margin entire to strongly undulate, secondary veins obscure or weakly visible and then with about 3 pairs, tertiary venation obscure. *Inflorescences* terminal, subterminal or axillary, with 1 flower in each axil of a pair of leaves so appearing paired; peduncle absent; bracts linear, 6–13 mm long; pedicels 11–22 mm long, green, glabrous. *Calyx* of separate lobes free to base, green faintly flushed red, glabrous, lobes linear or obovate, erect, 4.5–10.5 × 1.2–1.7 mm, apex acute to obtuse. *Corolla* 31–39 mm long; externally orange-red or bright red on tube and lobes, internally yellowish in tube, bright red in upper lobes and bright red with paler and darker red and yellowish lines in lower lobes, this sometimes also in



FIG. 4. *Aeschynanthus garrettii* Craib.

upper lobes; upper lobes ovate, oblong or orbicular, slightly spreading or reflexed,  $4.5-8 \times 2.8-4.5$  mm, sinus 2.4–3 mm deep, apex rounded; lateral lobes deltoid, reflexed,  $3.5-6.2 \times 4.8-6$  mm, apex rounded; lower lobe squarish or oblong, reflexed,  $5.5-7.6 \times 4.5-6.4$  mm, apex rounded; corolla glabrous externally, with short glandular hairs with a robust base throughout inside and with glandular hairs on inside of lobes internally. *Stamens* long exserted, fused in 2 pairs; filaments white at base and red higher up, sparsely glandular puberulent to glabrous, anthers dark red, pollen ochre; anterior filaments inserted in tube at 10.5–18 mm from corolla base which is 34–48% of corolla length, filaments 27.5–30 mm long, anterior anthers  $2.9-3.3 \times 1.1-1.6$  mm; posterior filaments inserted at 15–23 mm from corolla base which is 42–61% of corolla length, filaments 21.5–25 mm long, posterior anthers  $2.2-2.8 \times 1.1-1.6$  mm; staminode 0.8–1.6 mm long. *Disk* 1.5–3.3 mm high, a simple annular ring or 5-crenate. *Pistil* 32–39 mm long; stipe 8–15 mm long, glabrous; ovary green, glabrous, 7–20 mm long; style red, 8–14 mm long, glabrous; stigma pale red. *Capsule* 6.5–11.5 cm long, 2.7–3.6 mm wide, stipe long and narrow. *Seed* grain  $1-1.3 \times 0.1-0.3$  mm, papillose, bubble cells absent, apical appendage short and stout, 0.9–1.1 mm long; hilar appendage single, stout, 0.8–1.3 mm long; appendages not papillose.



MAP 4. Thai distribution of *Aeschynanthus garrettii* Craib (●) and *Aeschynanthus gracilis* Parish ex C.B. Clarke (■).

*Distribution.* Endemic to Thailand. Known only from Chiang Mai Province in northern Thailand (most collections from Doi Inthanon).

*Habitat and ecology.* In hill evergreen or mossy forest at 1500–2600 m altitude.

*Proposed IUCN conservation status.* Least Concern (LC). Although this species is geographically very restricted it is not under any immediate threat.

*Specimens examined.* THAILAND. **Chiang Mai:** Doi Inthanon, x 1986, *T. Smitinand* s.n. (BKF); *ibid.*, 29 xi 1999, *P.G. Valder* 37 (E, WU); *ibid.*, 10 ix 1994, *P. Palee* 249 (BKF); *ibid.*, 10 xii 1969, *C.F.v. Beusekom*, *C. Phengkklai* 2433 (BKF, E, L); *ibid.*, 16 ix 1995, *W. Nanakorn et al.* 4441 (E); *ibid.*, 30 x 1962, *T. Smitinand et al.* 7683 (BKF); *ibid.*, 17 ii 1979, *T.M. Koyama et al.* 15415 (AAU, BKF, NY); *ibid.*, 3 x 1971, *G. Murata et al.* T-15930 (L, MO); *ibid.*, 3 x 1971, *G. Murata et al.* T-15937 (L, MO); *ibid.*, 16 x 1979, *T. Shimizu et al.* T-18860 (BKF), T-18868 (BKF); *ibid.*, 16 x 1979, *T. Shimizu et al.* T-18874 (BKF); *ibid.*, 7 x 1982, *F. Konta*, *T. Wongprasert*, *B. Sangkhachand* T-29795 (A); *ibid.*, 19 xii 1983, *N. Fukuoka*, *M. Ito* T-35347 (BKF); *ibid.*, 9 xii 1984, *H. Koyama et al.* T-39918 (BKF); *ibid.*, 5 xii 1984, *S. Mitsuta et al.* T-43192 (A, BKF, L); *ibid.*, 4 viii 1988, *H. Takahashi* T-62728 (A, BKF); Doi Inthanon, Pha Ngaem, 25 x 1910, *H.B.G. Garrett* 86 (BKF, BM, K, L – type of *Aeschynanthus garrettii*); Chom Thong, 14 xii 1964, *K. Bunchuai* 1457 (BKF).

This species is one of the easiest to recognize in fruit as the seeds have a very short appendage at each end. This seed shape has traditionally defined *Aeschynanthus* sect. *Microtrichium* which, in Thailand, is represented only by *A. garrettii* in the north and

*A. rhododendron* in the far south. In addition the fruits have an extraordinarily long stipe, up to c.4 cm long, longer than other species in Thailand.

The material of this species cited for Vietnam by Pellegrin (1926, 1930) is not *Aeschynanthus garrettii* but further research is necessary to determine what it should be called.

**6. *Aeschynanthus gracilis*** Parish ex C.B.Clarke, Commelyn. Cyrtandr. Bengal. 75 (1874); Clarke in A.DC. & C.DC., Monogr. Phan. 5(1): 27 (1883); Clarke in Hooker, Fl. Brit. Ind. 4: 340 (1884); Barnett, Fl. Siam. 3(3): 198 (1962); Li, Acta Bot. Yunnan. 5(1): 31 (1983); Burt, Edinburgh J. Bot. 55: 487 (1998); Wang et al., Fl. China 18: 382 (1998); Hilliard, Fl. Bhutan 2(3): 1299 (2001); Burt, Thai Forest Bull. (Bot.) 29: 83 (2001); Kress et al., Checkl. Myanmar 261 (2003). – *Trichosporum gracile* (Parish ex C.B.Clarke) Kuntze, Revis. Gen. Pl. 477 (1891). – *Aeschynanthus novogracilis* W.T.Wang, Acta Phytotax. Sin. 13(2): 65 (1975), *nom. illeg.*; Wang, Phytologia 45: 314 (1980); Li, Acta Bot. Yunnan. 5(1): 31 (1983); Wang, Fl. Reipubl. Popularis Sin. 69: 516 (1990). – Type: Burma, Moulmein, *C.S.P. Parish* s.n. (lecto K, designated here). **Map 4.**

*Aeschynanthus setosus* Kraenzl., Repert. Spec. Nov. Regni Veg. 24 (1928). – Type: Unknown locality, *T. Lobb* s.n. (holo W; iso K).

Epiphyte with hanging stems; stems reddish-brown or green turning brown with age, with dense long hairs. *Leaves* opposite, rarely also with some leaves in whorls of 3; petiole 1 mm long, with dense long hairs; blade coriaceous to fleshy, mid green or blue-green above, pale to mid green beneath, not marbled, ovate or elliptic, 0.6–3.6 × 0.5–1.2 cm, 1.3–3.9 times as long as wide, apex apiculate or acuminate, base cuneate to rounded; glabrous above, densely long pubescent all over beneath. *Inflorescences* axillary, 1-flowered; pedicels 8.5–11 mm long, green. *Calyx* of separate lobes free to base, pale green, with long eglandular hairs; lobes elliptic, linear or narrowly triangular, erect, 3–5.7 × 0.7–1.5 mm, apex acuminate or acute. *Corolla* 20–33 mm long, externally bright red on tube and lobes or with some yellow on base of lower 3 lobes, hairs white, internally pale orange or yellow in tube, upper 2 lobes orange and lower 3 red and yellow at base with darker markings or yellowish with dark margins, tube base fairly broad; upper lobes oblong, mostly not spreading, 2.8–4.7 × 1.3–3 mm, sinus 1.5–2.3 mm deep, apex rounded; lateral lobes deltoid, usually reflexed, 1.8–4 × 7.2–11 mm, apex rounded or obtuse; lower lobe elliptic, reflexed, 5–10.5 × 3–4.5 mm, apex rounded; outside sparsely glandular puberulent, inside glabrous. *Stamens* long exserted, fused in 2 pairs, filaments cream, with glandular hairs, anthers purple, pollen ochre; anterior filaments inserted at 10–14 mm from corolla base which is 38–44% of corolla length, filaments 18–20 mm long, anthers 2–2.6 × 1–1.8 mm; posterior filaments inserted at 12–15.5 mm from corolla base which is 48–49% of corolla length, filaments 14.5–16 mm long, anthers 1.8–1.9 × 1.2–1.3 mm; staminode c.0.6 mm long. *Disk* 1.5–2.9 mm high, often irregular with one side much shorter than other and toothed. *Pistil* 24–32.5 mm

long; stipe 4.5–5 mm long, glabrous; ovary green, 10–11 mm long, very few sessile glands or glabrous; style green, 9–17 mm long, sparsely glandular pubescent. *Capsule* 6.6–15 cm long, c.2.5 mm wide. *Seed* grain 0.8–1 × 0.2–0.3 mm, warty, bubble cells absent; apical appendage a filiform hair, 15–18 mm long; hilar appendage a single filiform hair, 19–20 mm long; appendages papillose.

*Distribution.* Northeastern India, Nepal, Sikkim, Bhutan, Burma, Thailand.

*Habitat and ecology.* In Thailand collected in mixed evergreen/deciduous forest at 200 m altitude. Elsewhere occurs up to 1100 m altitude.

*Proposed IUCN conservation status.* Least Concern (LC). Although it has been collected only twice in Thailand this species has a widespread distribution in the Himalayan foothills.

*Chromosome number.* Rashid *et al.* (2001) report  $2n = 28$  for multiple accessions.

*Specimens examined.* THAILAND. **Kanchanaburi:** Sankhlaburi, Thung Yai Naresuan Wildlife Sanctuary, 16 i 1994, *J.F. Maxwell* 94-77 (A, L); Wangka, 28 i 1926, *A.F.G. Kerr* 10324 (BM).

This is primarily a species of the Himalayan foothills in northeastern India, Sikkim and Bhutan but is also known from collections in Burma and Thailand. In Thailand it has been collected only in Kanchanaburi.

7. *Aeschynanthus hosseusii* Pellegr., Bull. Soc. Bot. France 72: 823 (1926 [‘1925’]); Pellegrin, Fl. Indo-Chine 4: 498 (1930); Barnett, Dansk Bot. Ark. 20: 199 (1962); Barnett, Fl. Siam. 3(3): 200 (1962), *pro parte*; Raymond, Mém. Jard. Bot. Montreal 55: 34 (1962); Smitinand, Thai Pl. Names ed. 2, 14 (2001); Burtt, Thai Forest Bull. (Bot.) 29: 83 (2001). – *Aeschynanthus macrocalyx* Hosseus, Notizbl. Bot. Gart. Berlin-Dahlem 4 (1907), *non* C.B. Clarke (1883). – Type: Thailand, Chiang Mai, Doi Sutep, *C.C. Hosseus* 223 (holo B<sup>+</sup>; lecto M, designated here). **Fig. 5, Map 5.**

Epiphyte with arching and pendulous stems; stems green, glabrous. *Leaves* opposite; petiole 4–15 mm long, glabrous; blade fleshy, dark green above, paler beneath, not marbled, oblong or elliptic, 3.6–17 × 1–5 cm, 2.2–8.7 times as long as wide, apex caudate to acuminate, base cuneate to acute; glabrous above and beneath, secondary veins obscure, tertiary venation obscure. *Inflorescences* terminal or axillary, 2–5-flowered, peduncle absent, bracts linear, c.10 mm long; pedicels 12–16 mm long, glabrous. *Calyx* fused for part of length, yellowish or pale green, sparsely eglandular puberulent or glabrous, 28–43 mm long; tube 16–22.5 mm long which is 45–66% of total length, 8–9 mm wide at top of tube; lobes linear or narrowly triangular, slightly spreading or erect, 11.5–22 × 2–5.5 mm, apex acuminate. *Corolla* 52–62 mm long, externally tube bright red with darker lines, lobes red with a black or brown central line, internally tube light yellowish, lobes light yellowish with a red margin; upper lobes ovate, squarish or orbicular, not spreading or reflexed, 3.7–6.5 × 4.2–7 mm, sinus 3.5–7 mm deep, apex rounded; lateral lobes orbicular, deltoid or oblique ovate,

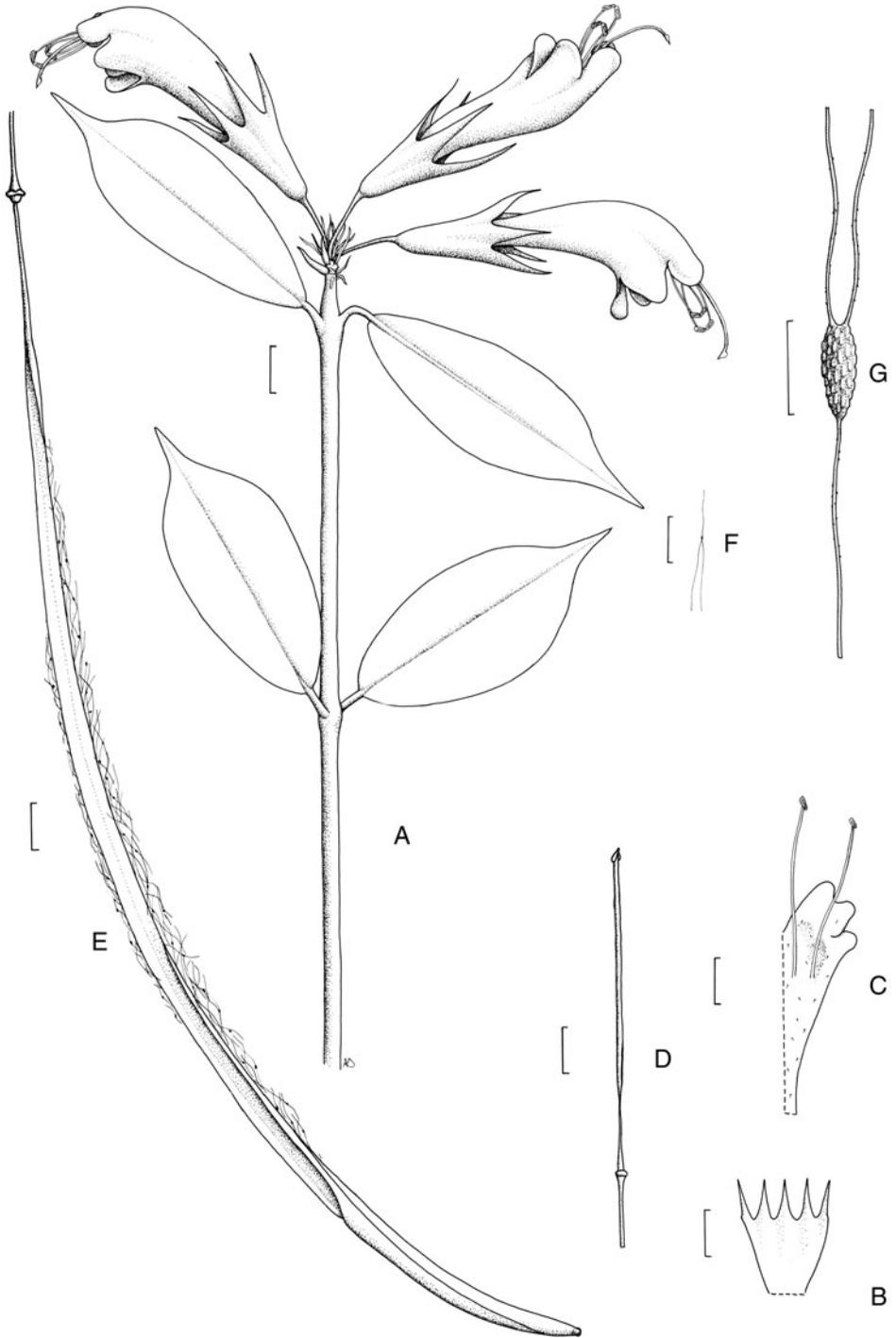
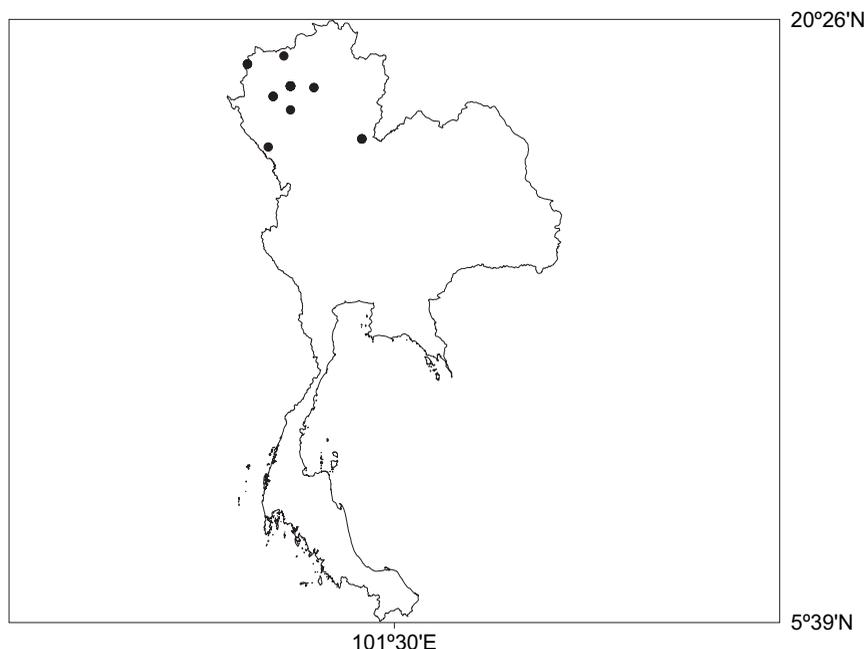


FIG. 5. *Aeschynanthus hosseusii* Pellegr. A, habit; B, calyx opened up; C, flower dissection; D, pistil; E, fruit; F, seed; G, seed grain with part of appendages. A–D from Kerr 1997 (K); E–G from Maxwell 91-256 (E). Drawn by Anna Dorward. Scale bars: A–F, 1 cm; G, 1 mm.



MAP 5. Thai distribution of *Aeschynanthus hosseusii* Pellegr.

not spreading or reflexed, 3.5–6.5 × 6.5–10 mm, apex rounded; lower lobe oblong or squarish, not spreading or reflexed, 6.5–11 × 3.7–9 mm, apex rounded or flat; outside glabrous or sparsely puberulent with glandular hairs in rows down tube, inside with sparse glandular hairs, these often with a rather robust base. *Stamens* long exserted; filaments maroon, with glandular hairs, these often very sparse or so small as to appear papillose, anthers dark brown; anterior filaments inserted at 30–33 mm from corolla base which is 48–58% of corolla length, filaments 24–40 mm long, anthers 3.2–4 × 1.2–1.9 mm; posterior filaments inserted at 31–40 mm from corolla base which is 57–67% of corolla length, filaments 27–42 mm long, anthers 2.6–3.2 × 1.2–1.5 mm; staminode 0.9–2 mm long. *Disk* 0.7–1.2 mm high, a simple annular ring or 5-crenate. *Pistil* 71–79 mm long; stipe 16–20 mm long, glabrous or sparsely minutely papillose; ovary 26–27 mm long, minutely papillose puberulent or glabrous; style pinkish-white, 24–31 mm long, glandular pubescent. *Capsule* 24–52 cm long, 1.9–4 mm wide. *Seed* grain 1–1.1 × 0.3 mm, warty, bubble cells absent; apical appendage a filiform hair, 14–23 mm long; hilar appendages two filiform hairs, 13–22 mm long; appendages papillose.

*Distribution.* So far endemic to Thailand, but likely also to occur in Burma.

*Habitat and ecology.* In evergreen or mixed deciduous forest at 800–1685 m altitude.

*Proposed IUCN conservation status.* Least Concern (LC). This species is widespread in northern Thailand.

*Chromosome number.* Reported as  $2n = 32$  (see Rashid *et al.*, 2001).

*Specimens examined.* THAILAND. **Chiang Mai:** Cultivated RBGE, *M. Mendum* CULT 147 (E), wild collected Doi Sutep, 1 vii 1957; Cultivated RBGE C1644 (E), C4589 (E), wild collected Doi Sutep; Doi Sutep, 21 vii 1915, *A.F.G. Kerr* s.n. (P); *ibid.*, *C.C. Hosseus* 223 (M – type); *ibid.*, 20 xii 1988, *J.F. Maxwell* 88-1388 (AAU, BKF, L); *ibid.*, 27 viii 1911, *A.F.G. Kerr* 1997 (AAU, BM, K, P, TCD); *ibid.*, 13 vii 1958, *T. Sorensen, K. Larsen, B. Hansen* 4052 (C); *ibid.*, 8 ix 1967, *K. Iwatsuki et al.* T-9418 (BKF); Jom Tong, Mae Soi Ridge, Mae Soi Subdistrict, 9 iii 1991, *J.F. Maxwell* 91-256 (GH, L, MO, P); Doi Inthanon, 9 ii 1998, *F. Konta, C. Phengkklai, S. Khao-Iam* 4140 (BKF); *ibid.*, 16 vii 1927, *H.B.G. Garrett* 406 (K, L); Chiang Dao, Mae Taman, 27 ix 1994, *W. Nanakorn* 1968 (E). **Lampang:** Muang Bahn, Chae Son, 27 ix 1995, *J.F. Maxwell* 95-824 (BKF, L). **Lamphun:** Mae Ta, Doi Khun Tan, 3 viii 1994, *J.F. Maxwell* 94-865 (BKF, L). **Phitsanulok:** Phu Miang, 28 vii 1966, *K. Larsen et al.* 954 (BKF, L); *ibid.*, 13 ii 1964, *B. Hansen, G. Seidenfaden, T. Smitinand* 11127 (L); Phu Rom Rot, 3 x 1967, *T. Shimizu et al.* T-11563 (A). **Tak:** Doi Pe Po, 29 vi 1922, *A.F.G. Kerr* 6175 (K).

This is one of the most distinctive species in Thailand with its very large calyx with long narrow lobes and large corolla. It is, however, rather difficult to distinguish from *Aeschynanthus lineatus* when in fruit if there are no calyx remnants.

Raymond (1962) described finding this species on Doi Sutep and gave some background to the nomenclatural confusions. However, he described the species as having only one hair at each end of the seed whereas it actually has two at the hilar end.

**8. *Aeschynanthus humilis*** Hemsl., *J. Linn. Soc.* 35: 516 (1903); Pellegrin, *Bull. Soc. Bot. France* 72: 823 (1926 [1925]); Pellegrin, *Fl. Indo-Chine* 4: 497 (1930), *pro parte*; Wang, *Phytologia* 45: 315 (1980); Li, *Acta Bot. Yunnan.* 5(1): 31 (1983); Wang, *Fl. Reipubl. Popularis Sin.* 69: 515 (1990); Wang *et al.*, *Fl. China* 18: 382 (1998); Burt, *Thai Forest Bull. (Bot.)* 29: 83 (2001). – Type: China, Yunnan, Simao, 7 xi [year unknown], *A. Henry* 13204 (lecto K, designated here; iso E, US).

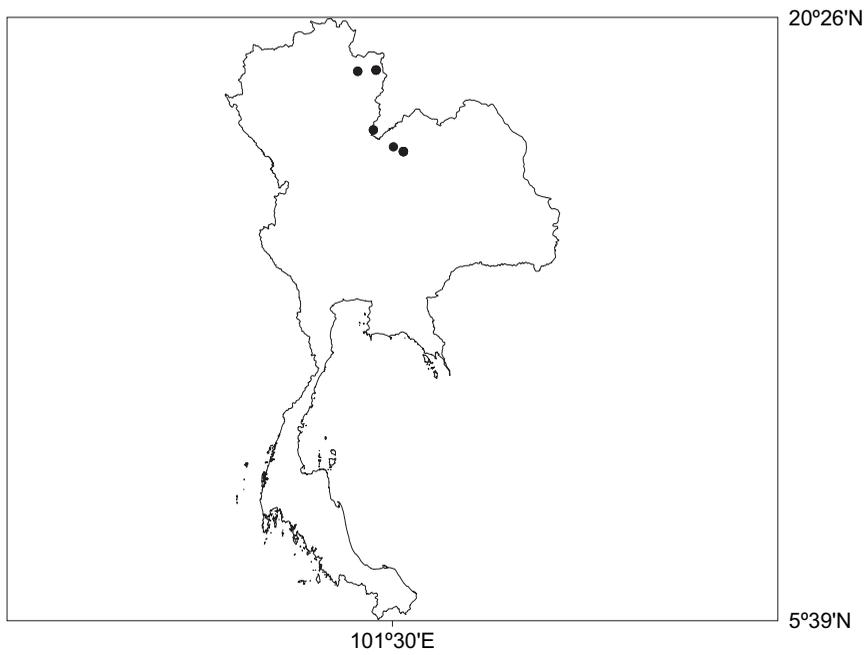
**Fig. 6, Map 6.**

*Aeschynanthus persimilis auct. non* Craib: *Mendum*, *Gloxinian* 53(1): 8 (2003).

Epiphyte with erect stems, these sometimes somewhat decumbent; stems green or grey-brown, sparsely to densely puberulent. *Leaves* subopposite, opposite or in whorls of 3–5, sometimes densely clustered at stem apex; petiole 1–6 mm long, sparsely to densely puberulent; blade papery to coriaceous, dark to mid green above, sometimes slightly blue-green, paler green beneath, not marbled, obovate to elliptic, 1–5 × 0.5–2 cm, 1.2–4.2 times as long as wide, apex acute to rounded or apiculate, base cuneate; glabrous to sparsely puberulent all over above, sparsely to densely puberulent all over beneath, not punctate beneath, c.4 pairs of secondary veins, but these mostly obscure, tertiary venation obscure. *Inflorescences* axillary or terminal, flowers 1–4, peduncle absent; pedicels 6.5–11 mm long, glabrous to puberulent. *Calyx* pale green, sometimes suffused reddish, fused into a short tube at base, glabrous to eglandular puberulent or with few hairs only on very tips, 1–4.2 mm long; tube 0.3–1.2 mm long which is 16–40% of total length, 1.8–2.3 mm wide at apex; lobes triangular or narrowly triangular, erect, 0.6–3 × 0.5–1.6 mm, apex



FIG. 6. *Aeschynanthus humilis* Hemsl.



MAP 6. Thai distribution of *Aeschynanthus humilis* Hemsl.

acuminate or acute. *Corolla* 15–28 mm long, externally tube bright red or bright red with darker lines, lobes bright red and with darker lines on lower 3 lobes, hairs red, internally tube cream, lobes cream with darker marks on lower 3 lobes; upper lobes ovate, not spreading or reflexed,  $1\text{--}2.7 \times 0.8\text{--}3$  mm, sinus 0.9–3.7 mm deep, apex rounded; lateral lobes deltoid, not spreading or reflexed,  $1.2\text{--}2.2 \times 2\text{--}5.5$  mm, apex rounded or obtuse; lower lobe elliptic, slightly spreading or not,  $2.5\text{--}6.5 \times 0.8\text{--}2.3$  mm, apex rounded; outside sparsely to densely glandular puberulent, inside with short stiff upward pointing hairs near base. *Stamens* long exerted; filaments white, sometimes pale purple in upper part, with few glandular hairs, anthers grey or pale purple, pollen grey or ochre; anterior filaments inserted at 8.5–12 mm from corolla base which is 40–41% of corolla length, filaments 22–25 mm long, anthers  $1.5\text{--}2.4 \times 0.6\text{--}0.8$  mm; posterior filaments inserted at 12–16 mm from corolla base which is 49–60% of corolla length, filaments 15–19 mm long, anthers  $1\text{--}1.5 \times 0.5\text{--}0.8$  mm; staminode 0.5 mm long. *Disk* 0.3–1.3 mm high, 5-crenate or a simple annular ring. *Pistil* 22–27 mm long; stipe 0–2 mm long, glabrous; ovary 6–10.2 mm long, glabrous; style 8–20 mm long, sparsely glandular pubescent. *Capsule* 3.7–11 cm long, 2.4–3 mm wide. *Seed* grain  $1.6\text{--}2.3 \times 0.4\text{--}0.7$  mm, smooth, bubble cells absent; apical appendage a filiform hair, c.14 mm long; hilar appendage a single filiform hair, 13–14 mm long; appendages papillose.

*Distribution.* Southern China, Thailand, Laos.

*Habitat and ecology.* In evergreen forest at 1000–1670 m altitude.

*Proposed IUCN conservation status.* Least Concern (LC). This species is fairly widespread in northern and northeastern Thailand and in neighbouring countries.

*Chromosome number.* Jaidee (2004) reports  $2n = 28$  but I have not seen a voucher and the species of the *Aeschynanthus andersonii* group have frequently been confused.

*Specimens examined.* THAILAND. **Loei:** Phu Ruea District, Phu Luang, 28 x 1980, *T. Smitinand*, *W. Nanakorn* s.n. (BKF); *ibid.*, *J. Parnell* 98/18/JP (TCD); *ibid.*, 15 xi 1968, *C. Chermisrivathana* 1102 (BKF); Cultivated RBGE, *M. Mendum* CULT 171 (E), CULT 190 (E), *Unknown* C14554 (E), from material collected Phu Ruea District, Phu Luang. **Nan:** Doi Phu Kha National Park, 29 viii 1938, *Khit* 169 (ABD, S); *ibid.*, 10 xi 1991, *R. Pooma* 567 (BKF); *ibid.*, 13 xii 1990, *K. Larsen*, *S.S. Larsen*, *W. Nanakorn*, *W. Ueachirakan*, *P. Sirirugsa* 41953 (AAU); Doi Wao, 10 ix 1995, *K. Larsen*, *S.S. Larsen*, *C. Tange*, *D. Sookchaloem* 46323 (AAU, SING). **Phitsanulok:** Phu Miang, 28 vii 1966, *K. Larsen*, *T. Smitinand*, *E. Warncke* 982 (AAU, BKF).

*Aeschynanthus humilis* is close to *A. andersonii* but differs in the calyx which is fused into a short tube at the base, and the shorter, less strongly reflexed, lower corolla lobe (see note under *A. andersonii*). It is also rather similar to *Aeschynanthus mannii* from northeastern India and Burma but that species has a calyx divided to the base and the lower corolla lobe is broader.

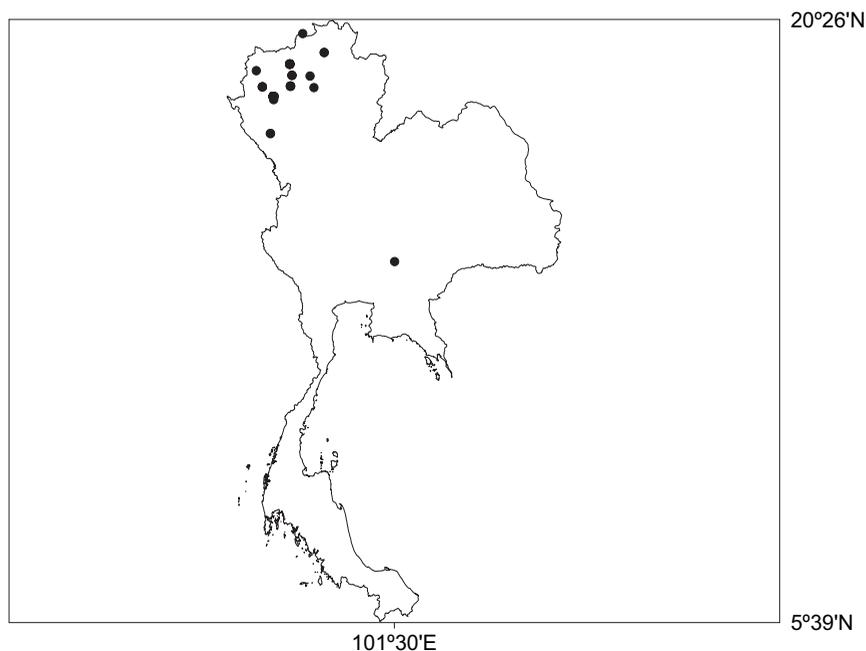
**9. *Aeschynanthus lineatus*** Craib, Bull. Misc. Inform. Kew 1913: 201 (1913); Pellegrin, Bull. Soc. Bot. France 72: 823 (1926 [‘1925’]); Pellegrin, Fl. Indo-Chine 4: 495

(1930); Barnett, Fl. Siam. 3(3): 200 (1962); Li, Acta Bot. Yunnan. 5(1): 32 (1983); Wang, Fl. Reipubl. Popularis Sin. 69: 520 (1990); Wang et al., Fl. China 18: 383 (1998); Smitinand, Thai Pl. Names ed. 2, 14 (2001). – Type: Thailand, Chiang Mai, Doi Inthanon, Pha Ngaem, 25 x 1910, *H.B.G. Garrett* 87 (lecto K, designated here; iso BM, K, L). **Map 7.**

*Aeschynanthus chorisepalus* Orr, Notes Roy. Bot. Gard. Edinburgh 8: 223 (1914); Wang, Phytologia 45: 312 (1980); Li, Acta Bot. Yunnan. 5(1): 35 (1983). – Type: China, Yunnan, Tengyueh, viii 1913, *G. Forrest* 11742 (holo E; iso K).

*Aeschynanthus* sp. Barnett, Dansk Bot. Ark. 20: 199 (1962). – Based on: Thailand, Chiang Mai, Doi Chiang Dao, 17 ii 1958, *T. Sorensen et al.* 1328 (BKF).

Epiphytic, stems creeping or hanging, brown or green or grey-brown, glabrous or sparsely puberulent when young. *Leaves* opposite; petiole 2–14 mm long, glabrous; blade coriaceous or slightly fleshy, dark to mid green above, paler beneath, not marbled, ovate or elliptic, 2.2–12.2 × 0.6–5.5 cm, 1.6–6.2 times as long as wide, apex obtuse to caudate or apiculate, base rounded to cuneate, glabrous above and beneath, very faintly punctate or not beneath, secondary veins visible to obscure, 3–5 pairs, tertiary venation obscure. *Inflorescences* axillary or terminal, 1-flowered, often paired in axils of opposite leaves, peduncle absent, bracts linear, 3.2–9 mm long; pedicels 7.5–18 mm long, green, glabrous. *Calyx* of separate lobes free to base, green, glabrous or with occasional isolated hair; lobes obovate, elliptic or linear, slightly spreading or erect, 4–9.4 × 0.6–3 mm, apex acute to obtuse. *Corolla*



MAP 7. Thai distribution of *Aeschynanthus lineatus* Craib.

21.5–32.5 mm long, externally red to orange-red and with darker lines in upper half on tube, orange-red to orange with darker lines on lobes, hairs red, internally orange with a red midline on lobes; upper lobes squarish, slightly falcate or ovate, not spreading or reflexed,  $1.8\text{--}3.5 \times 2\text{--}3.5$  mm, sinus 2.2–3.1 mm deep, apex rounded; lateral lobes deltoid or ovate, not spreading or reflexed,  $1.8\text{--}3 \times 3.2\text{--}6.5$  mm, apex rounded or obtuse; lower lobe ovate or elliptic, not spreading or reflexed,  $2.7\text{--}6 \times 2.4\text{--}3.8$  mm, apex rounded; outside glabrous except for ciliate lobes, or with glandular hairs around top of tube and on lobes, or glandular puberulent in rows down tube, or sparsely glandular puberulent all over, inside with (very) sparse to dense glandular hairs throughout or concentrated in lower half, these without a robust base. *Stamens* long exerted, fused in 2 pairs, filaments reddish, with glandular hairs, anthers blackish or greyish-purple; anterior filaments inserted at 10.3–16 mm from corolla base which is 42–56% of corolla length, filaments 19.5–32 mm long, anthers  $1.7\text{--}3 \times 0.8\text{--}1.6$  mm; posterior filaments 12–21 mm from corolla base which is 49–68% of corolla length, filaments 13–27 mm long, anthers  $1.4\text{--}2.4 \times 0.8\text{--}1.5$  mm; staminode 0.4–2.5 mm long. *Disk* 0.5–1.4 mm high, a simple annular ring or 5-crenate. *Pistil* 20–49 mm long; stipe 4–11 mm long, glabrous or with a few sessile glands; ovary green, 9–16.5 mm long, with sessile glands or minutely papillose puberulent; style white, 7–25.5 mm long, sparsely to more densely glandular pubescent. *Capsule* 19–25 cm long, 2–3 mm wide. *Seed* grain  $1\text{--}1.5 \times 0.3\text{--}0.4$  mm, warty, bubble cells absent; appendages papillose; apical appendage a filiform hair, 10–38 mm long; hilar appendages two filiform hairs, 15–30 mm long; appendages papillose.

*Distribution.* Southern China, Burma, Thailand.

*Habitat and ecology.* In primary or degraded evergreen forest, hill forest and montane forest at 350–2090 m altitude.

*Proposed IUCN conservation status.* Least Concern (LC). This species is common and widespread in Thailand and neighbouring countries.

*Chromosome number.* Reported as  $2n = 30$  (see Rashid *et al.*, 2001).

*Specimens examined.* THAILAND. **Chiang Mai:** Doi Sutep, 31 x 1967, *B.L. Burt* 5592 (E); *ibid.*, 6 xii 1957, *T. Smitinand* 3922 (BKF); *ibid.*, 6 x 1912, *A.F.G. Kerr* 2723 (K, TCD); Doi Inthanon, Pha Ngaem, 25 x 1910, *H.B.G. Garrett* 87 (BM, K, L – type of *Aeschynanthus lineatus*); Doi Inthanon, 11 ix 1974, *K. Larsen, S.S. Larsen* KL34405 (K); *ibid.*, 8 xii 1984, *T. Yahara* T-49846 (A, BKF); *ibid.*, 15 x 1979, *T. Shimizu et al.* T-18798 (BKF); *ibid.*, 15 x 1979, *T. Shimizu et al.* T-18823 (BKF); *ibid.*, 13 x 1997, *W. Nanakorn et al.* 9720 (E); *ibid.*, 8 xi 1992, *M. Balick, W. Nanakorn* 3424 (NY); *ibid.*, 11 xi 1976, *E.F. Anderson* 3889 (UC); *ibid.*, 13 x 1986, *T. Smitinand* s.n. (BKF); *ibid.*, 9 ix 1994, *J.F. Maxwell* 94-989 (L); *ibid.*, 20 ix 1994, *P.C. Boyce* 992 (K); Mae Dang, Doi Chang, 3 ii 1990, *J.F. Maxwell* 90-177 (A, L, MO); *ibid.*, 18 i 1983, *H. Koyama, H. Terao, T. Wongprasert* T-32717 (BKF); Om Koi, Mae Teun, Mae Rah Ah Watershed Station, 8 viii 1999, *O. Petrmitr* 453 (A, L); Doi Chiang Dao, 17 ii 1958, *T. Sorensen et al.* 1328 (BKF, C); *ibid.*, 27 ix 1971, *G. Murata et al.* T-15149 (K, L, MO); *ibid.*, 8 ii 1983, *H. Koyama, H. Terao, T. Wongprasert* T-33208 (A, BKF); *ibid.*, 26 ix 1971,

*G. Murata, K. Iwatsuki, C. Phengklai* T-15083 (BKF, K, L, MO); Doi Pha Hom Pok, 23 xi 1998, *P. Suksathan* 1440 (E); Pha Mon, 29 x 1962, *M.E.D. Poore, R.G. Robbins* 7617 (BKF). **Chiang Mai/Mae Hong Son border:** Doi Hoa Lohn, Mae Jam/Khun Yuam, 14 i 1997, *J.F. Maxwell* 97-33 (A, BKF, L). **Lampang:** Muang Bahn, Chae Son, Summit ridge of Doi Lohn/Doi Mawn Lahn, 3 iii 1997, *J.F. Maxwell* 97-175 (L). **Mae Hong Son:** Muang Mae Hong Son, Doi Pui, Baan Huai Hee, 24 viii 1999, *S. Watthana, P. Suksathan, G.C.G. Argent* 647 (E); Muang Mae Hong Son, Doi Pui, 8 viii 1988, *J.F. Maxwell* 88-973 (BKF, L). **Nakhon Nayok:** Khao Yai National Park, 13 viii 2000, *J.F. Maxwell* 00-373 (A, L).

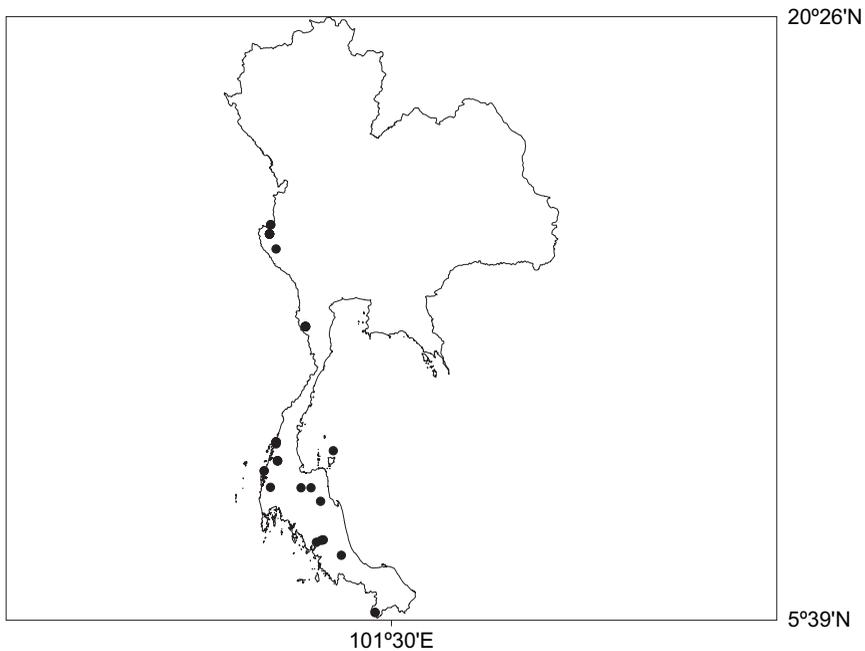
The material of this species is mostly concentrated in northern Thailand but with one collection, *Maxwell* 00-373 (A, L), in Khao Yai National Park (see Map 7). This specimen has the longest sepals and corolla of this species in Thailand. In some ways it is rather reminiscent of *Aeschynanthus parviflorus*, which is common in Khao Yai National Park, but that species has a quite obvious calyx tube. It may be that the distinction between *Aeschynanthus lineatus* and *A. parviflorus* is not as clear as is here suggested (based on the very different calyx morphology) or that the same geographic and ecological factors that favour *A. parviflorus* in northern Thailand and again in Khao Yai National Park also favour *A. lineatus* (Maps 7, 10).

**10. *Aeschynanthus longicaulis*** Wall. ex R.Br., *Cyrtandreae* 116 (1839); Steudel, *Nomencl. Bot.* ed. 2, 1: 32 (1840); Brown in Bennett, *Pl. Jav. Rar.* 116 (1840); A.DC., *Prodr.* 9: 262 (1845); Miquel, *Fl. Ned. Ind.* 2: 719 (1858); A.DC. & C.DC., *Monogr. Phan.* 5(1): 19 (1883); Clarke in A.DC. & C.DC., *Monogr. Phan.* 5(1): 19 (1883); Barnett, *Fl. Siam.* 3(3): 201 (1962); Burt & Woods, *Notes Roy. Bot. Gard. Edinburgh* 33(3): 481 (1975), *pro parte*; Chin, *Gard. Bull. Singapore* 32: 147 (1979); Li, *Acta Bot. Yunnan.* 5(1): 36 (1983); Wang, *Fl. Reipubl. Popularis Sin.* 69: 526 (1990); Turner, *Gard. Bull. Singapore* 47(1): 243 (1997 [‘1995’]); Wang et al., *Fl. China* 18: 385 (1998); Smitinand, *Thai Pl. Names* ed. 2, 14 (2001); Burt, *Thai Forest Bull. (Bot.)* 29: 83 (2001); Kress et al., *Checkl. Myanmar* 261 (2003). – *Trichosporum longicaule* (Wall. ex R.Br.) Kuntze, *Revis. Gen. Pl.* 478 (1891). – Type: Burma, Chappedong, *N. Wallich* 888 (lecto K, designated here; iso BM, G-DC, K-W). **Map 8.**

*Aeschynanthus griffithii* R.Br., *Cyrtandreae* 115 (1839); Brown in Bennett, *Pl. Jav. Rar.* 115 (1840); A.DC., *Prodr.* 9: 261 (1845); Miquel, *Fl. Ned. Ind.* 2: 719 (1858); Clarke in A.DC. & C.DC., *Monogr. Phan.* 5(1): 24 (1883); Clarke in Hooker, *Fl. Brit. Ind.* 4: 339 (1884); Kress et al., *Checkl. Myanmar* 261 (2003). – *Trichosporum griffithii* (R.Br.) Kuntze, *Revis. Gen. Pl.* 477 (1891). – Type: Burma, Tavoy, *W. Griffith* s.n. (holo BM).

*Aeschynanthus zebrinus* Van Houtte, *Hort. Vanhoutt.* 1(2): 42 (1846). – Type: not located.

*Aeschynanthus marmoratus* T.Moore, *Paxton’s Fl. Gard.* 3: 56 (1852); Clarke in A.DC. & C.DC., *Monogr. Phan.* 5(1): 38 (1883); Ridley, *J. Linn. Soc. Bot.* 32: 500 (1896); Ridley, *J. Straits Branch Roy. Asiat. Soc.* 44: 13 (1905); Ridley, *J. Asiat. Soc. Bengal* 74(2): 732 (1909); Ridley, *Fl. Malay Penin.* 2: 498 (1923); Barnett, *Fl. Siam.* 3(3): 202 (1962). – *Trichosporum marmoratum* (T.Moore) Kuntze, *Revis. Gen. Pl.* 478 (1891). – Type: Cultivated at the Royal Botanic Gardens Kew, x 1851, *T. Moore* s.n. (holo K).



MAP 8. Thai distribution of *Aeschynanthus longicaulis* Wall. ex R.Br.

Epiphyte with arching and pendulous branches; stems grey-brown or grey, glabrous. *Leaves* opposite; petiole 2–14 mm long, glabrous; blade fleshy, background mid to dark green above but marbled with much paler venation, same but paler beneath, elliptic,  $2.8\text{--}12.2 \times 0.3\text{--}4$  cm, 2.2–9 times as long as wide, apex caudate to acuminate, base cuneate to acute, glabrous above and beneath, 5–6 pairs of secondary veins, weakly visible, tertiary venation obscure. *Inflorescences* terminal, peduncle absent; pedicels 9.5–11 mm long, green suffused purple, glabrous. *Calyx* of separate lobes free to base, orange, purple or green flushed maroon-purple, glabrous or with sparse glandular hairs; lobes narrowly elliptic to linear, erect,  $8\text{--}18 \times 0.8\text{--}1.8$  mm, apex acute to acuminate. *Corolla* 20.5–31 mm long, externally tube green, yellowish-green or green with flushes of orange, purple or brown, lobes purple or maroon with an orange or yellow margin or all orange, internally tube dark red, maroon or green, lobes maroon, purple or red with a yellow or orange margin; upper lobes ovate or orbicular, not spreading or reflexed,  $2.5\text{--}3.8 \times 2.4\text{--}4.5$  mm, sinus 2.2–4.5 mm deep, apex rounded; lateral lobes orbicular or oblique ovate, not spreading or reflexed,  $2\text{--}3.9 \times 3.3\text{--}4.8$  mm, rounded; lower lobe ovate or squarish, not spreading or reflexed,  $2.5\text{--}5.8 \times 3.8\text{--}4.2$  mm, apex rounded, outside glabrous except for ciliate lobes, to densely glandular puberulent, inside with five dense tufts of multicellular hairs near base. *Stamens* long exserted; filaments green or yellow, with glandular hairs; anthers pale brown or grey; anterior filaments inserted at 12–19.5 mm from corolla base which is 48–52% of corolla length, anthers  $c.3.2 \times 1$  mm; posterior

filaments inserted at 12.5–21 mm from corolla base which is 50–55% of corolla length, filaments 23–27.5 mm long, anthers 1.8–2.8 × 0.7–1.3 mm; staminode 0.9 mm long; pollen greenish-grey. *Disk* 1.1–1.3 mm high, a simple annular ring. *Pistil* 44–45 mm long; stipe 2–4 mm long, glabrous; ovary 10–12 mm long, glabrous or with sessile glands; style yellow or green flushed purple towards apex, 30–31 mm long, glandular pubescent; stigma purple or yellow. *Capsule* 5.4–37 cm long, 1.8–3.2 mm wide. *Seed* grain 1.6–2.2 × 0.1–0.5 mm, warty, bubble cells absent; apical appendage a filiform hair, c.22.5 mm long; hilar appendages of many (13–25) filiform hairs, 10–25 mm long; appendages papillose.

*Distribution.* Southern China (but see note below), Burma, Thailand, Peninsular Malaysia.

*Habitat and ecology.* In primary and secondary evergreen forest and in rubber plantations at 50–900 m altitude.

*Proposed IUCN conservation status.* Least Concern (LC). This species is common and widespread in Thailand and neighbouring countries.

*Chromosome number.* Reported as  $2n = 30$  and once as  $n = 14$  (see Rashid *et al.*, 2001).

*Specimens examined.* THAILAND. s.l., *C.B. Kloss* 6722 (K); Bangtaphan, 1890, *A. Keith* 342 (SING). **Kanchanaburi:** Near Neekey, 25 iv 1946, *S. Bloembergen* 17 (L); *ibid.*, 29 iv 1946, *S. Bloembergen* 38 (A, BK, K, L, P); *ibid.*, 25 iv 1946 – 28 iv 1946, *A.J.G.H. Kostermans* 58 (GH, K, L); Sankhlaburi, Thung Yai Naresuan Wildlife Sanctuary, Ban Sanepong, 17 iii 1993, *J.F. Maxwell* 93-255 (A, L); Thongphaphum – Pilok, 26 i 1983, *H. Koyama et al.* T-32931 (BKF). **Nakhon Sri Thammarat:** Khao Luang National Park, *K. Larsen* CULT 7642 (E). **Narathiwat:** Nikhom Waeng, 2 v 1968, *Prayad* 1350 (BK). **Phangnga:** Khlong Nang Yon, 29 iv 1973, *R. Geesink*, *T. Santisuk* 5049 (BKF, L); Kapog, Highway 401, 17 ii 2005, *K. Williams*, *R. Pooma* 1577 (A, BKF, E). **Phetchaburi:** Kaeng Krachan National Park, Khao Phanoen Thung, 15 xii 2002, *D.J. Middleton et al.* 1677 (A, BKF, E, KEP); Kaeng Krachan National Park, Than Thip Waterfall, 14 xii 2002, *D.J. Middleton* 1658 (A, E). **Ranong:** s.l., 26 xi 1973, *T. Santisuk* 681 (BKF, C, K, L); South of Ranong, 30 i 1958, *T. Sorensen et al.* 858 (C); Suksamran, Khlong Na Kha Wildlife Sanctuary, 5 i 1990, *S. Hoover et al.* 5036 (E); *ibid.*, 8 i 1990, *S. Hoover et al.* 5097 (E); *ibid.*, 8 i 1990, *S. Hoover et al.* 5495 (A). **Songkhla:** Boriphath Falls National Park, 4 i 1985, *J.F. Maxwell* 85-18 (PSU). **Surat Thani:** Ban Ta Khun, 28 xi 1986, *C. Niyomdham* 1268 (AAU, BKF, C, E, K, L, NY, P); Bandon, 22 i 1935, *G. Seidenfaden* 2417 (SING); Bangbao, 12 viii 1955, *T. Smitinand* 2928 (BKF); Tan Tac, 7 viii 1927, *A.F.G. Kerr* 13195 (BM); Ko Pangan, 6 xi 1927, *N. Put* 1182 (BM). **Trang:** Grown on in cultivation from material collected Kachong, *M. Mendum* CULT 210 (E); Kachong, 10 x 1970, *C. Charoenphol et al.* 3554 (E); Thung Khai, 17 xii 1998, *V. Chamchumroon* 434 (BKF). **Yala:** Betong, Ban Koo Nun, 15 xii 1986, *J.F. Maxwell* 86-1059 (BKF, L).

This is one of the most distinctive species due to the yellowish or green flowers and marbled leaves, characters shared with *Aeschynanthus fecundus* (although that species also has red on the corolla) and *A. membranifolius*. These three species are the only members of *Aeschynanthus* sect. *Polytrichium* in Thailand. They can be distinguished thus:

- 1a. Calyx shortly but distinctly fused into a tube at base \_\_\_\_\_ *A. membranifolius*  
 1b. Calyx lobes free to base \_\_\_\_\_ 2
- 2a. Corolla predominantly green, 20.5–31 mm long; stamens exerted from tube  
 \_\_\_\_\_ *A. longicaulis*  
 2b. Corolla red in upper third and on lobes, 14.5–19 mm long; stamens included in  
 tube \_\_\_\_\_ *A. fecundus*

The specimens from Surat Thani north to Phetchaburi have shorter glabrous corollas but are not so distinct as to merit formal recognition. A specimen from Thailand without precise locality has a pubescent calyx but a glabrous corolla which is 2.8 cm long, making it rather intermediate between the forms.

There is one specimen from Chiang Rai, *Winit* 782, which may be this species but, unfortunately, is sterile. It would appear to have marbled leaves but the lack of flowers or fruit makes it difficult to place with certainty. Given its wide separation from other members of *Aeschynanthus* sect. *Polytrichium* in Thailand its identification is very uncertain. Wang *et al.* (1998) have recorded *Aeschynanthus longicaulis* from China. I have only seen fruiting material from China and it may be that the specimens there are the same species as the northern Thai specimen which may or may not be *Aeschynanthus longicaulis*. This cannot be ascertained until flowering specimens are collected.

**11. *Aeschynanthus longiflorus*** (Blume) A.DC., Prodr. 9: 262 (1845); Hooker, Bot. Mag. 73: t.4328 (1847); Zollinger, Syst. Verz. 3: 57 (1855); Miquel, Fl. Ned. Ind. 2: 717 (1858); Clarke in A.DC. & C.DC., Monogr. Phan. 5(1): 32 (1883); Ridley, J. Linn. Soc. Bot. 32: 499 (1896); Ridley, J. Straits Branch Roy. Asiat. Soc. 44: 14 (1905); Ridley, J. Asiat. Soc. Bengal 74(2): 734 (1909); Ridley, Fl. Malay Penin. 2: 498 (1923); Backer & Bakhuizen van den Brink, Fl. Java 2: 524 (1965); Turner, Gard. Bull. Singapore 47(1): 243 (1997 [‘1995’]); Smitinand, Thai Pl. Names ed. 2, 15 (2001); Burt, Thai Forest Bull. (Bot.) 29: 83 (2001). – *Lysionotus longiflorus* Blume, Bijdr. 766 (1826). – *Trichosporum longiflorum* (Blume) Kuntze, Revis. Gen. Pl. 478 (1891). – Type: Indonesia, Java, *C.L.v. Blume* 247 (lecto L [Leiden number 903,307-102], designated here). **Fig. 7, Map 9.**

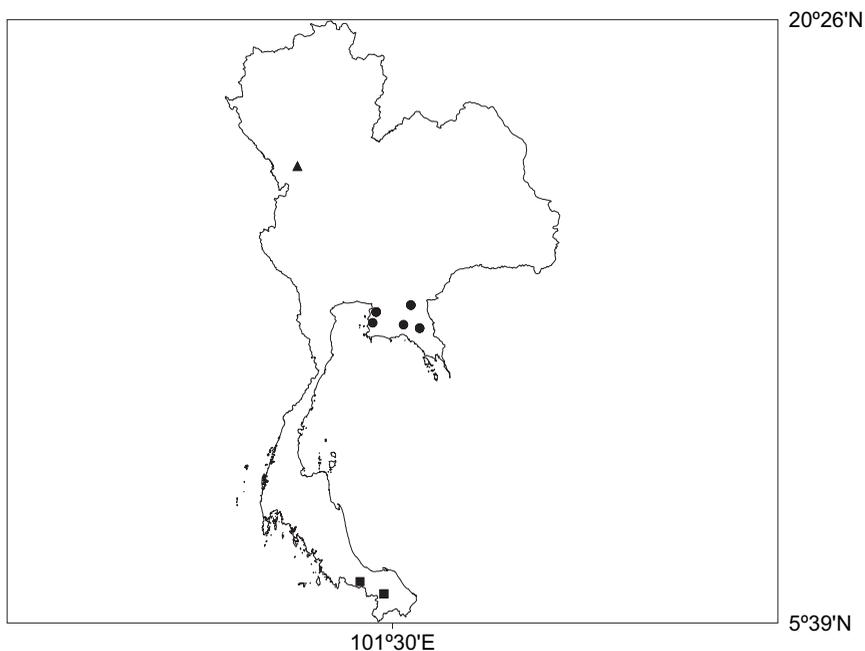
*Aeschynanthus perakensis* Ridl., J. Linn. Soc. Bot. 32: 499 (1896); Ridley, J. Straits Branch Roy. Asiat. Soc. 44: 15 (1905); Ridley, J. Asiat. Soc. Bengal 74(2): 734 (1909); Ridley, Fl. Malay Penin. 2: 498 (1923); Henderson, Malay. Wild. Fl. Dicot. 340 (1959); Turner, Gard. Bull. Singapore 47(1): 243 (1997 [‘1995’]). – Type: Malaysia, Peninsular Malaysia, Perak, Taiping, Maxwell’s Hill [Bukit Larut], 1891, *H.N. Ridley* s.n. (lecto SING, designated here). See note below.

Epiphyte with arching stems; stems glabrous. *Leaves* opposite; petiole 3–16 mm long, glabrous; blade slightly fleshy or coriaceous, dark to mid green above, pale green beneath, ovate or elliptic, not marbled, 3.7–17.5 × 1.6–6.7 cm, 1.5–6.1 times as long as wide, apex acuminate to caudate, base rounded to cuneate, glabrous above



FIG. 7. *Aeschynanthus longiflorus* (Blume) A.DC.

and beneath, margin entire, secondary veins obscure to weakly visible, 3–8 pairs, tertiary venation obscure. *Inflorescences* terminal, 2–5-flowered, peduncle absent, bracts linear, 3–6 mm long; pedicels 11–16 mm long, brownish-green or purplish, glabrous. *Calyx* of separate lobes free to base, often differing quite substantially in length even within a single flower, green to dark red or purplish, with sparse glandular hairs or glabrous, sometimes with ciliate lobes or with just a few hairs only on very tips, 4.8–23 mm long; lobes linear, narrowly triangular, narrowly ovate or oblong, erect,  $4.8\text{--}23 \times 1\text{--}2.2$  mm, apex obtuse to acuminate. *Corolla* 43–90 mm long, tube narrow at base; externally tube bright red or dark red, lobes bright red or dark red, internally tube cream-coloured, lobes bright red on upper 2 lobes and bright red at margin with a darker W-shaped line on lower 3 lobes; upper lobes orbicular, oblong or ovate, not spreading or reflexed,  $3.2\text{--}8.1 \times 3.2\text{--}5$  mm, sinus 3–5.8 mm deep, apex rounded; lateral lobes oblique ovate or deltoid, not spreading or reflexed,  $3.2\text{--}7.5 \times 5.5\text{--}9$  mm, apex rounded; lower lobe ovate, not spreading or reflexed,  $6\text{--}12 \times 4\text{--}6.2$  mm, apex rounded; outside glabrous to sparsely glandular puberulent, usually with ciliate lobes, inside with sparse glandular hairs throughout,



MAP 9. Thai distribution of *Aeschynanthus longiflorus* (Blume) A.DC. (■), *Aeschynanthus membranifolius* (Costantin) D.J.Middleton (●) and *Aeschynanthus minutifolius* D.J.Middleton (▲).

sometimes very sparsely so, and sessile glands below lobes. *Stamens* long exerted, fused in 2 pairs; filaments reddish, purple or pink, with small glandular hairs, anthers pale pink; anterior filaments inserted at 49–60 mm from corolla base which is 72–77% of corolla length, filaments 29–50 mm long, anthers  $3.3\text{--}5 \times 1\text{--}2$  mm; posterior filaments inserted at 50–64 mm from corolla base which is 77–81% of corolla length, filaments 23–37 mm long, anthers  $2.4\text{--}3.8 \times 0.9\text{--}2$  mm; staminode 0.7–5 mm long. *Disk* 1–1.5 mm high, 5-crenate. *Pistil* 45–83 mm long; stipe 13–20 mm long, glabrous to sparsely minutely papillose; ovary 19–29 mm long, minutely papillose puberulent or with few sessile glands; style purple or purplish-pink, 13–34 mm long, glandular pubescent to papillose, sometimes sparsely so. *Capsule* 21–57 cm long, 3.5–4 mm wide. *Seed* grain  $1\text{--}1.8 \times 0.3\text{--}0.4$  mm, warty, bubble cells absent; apical appendage a filiform hair, 15–24 mm long; hilar appendage a single filiform hair, 15–24 mm long; appendages papillose.

*Distribution.* Peninsular Thailand, Peninsular Malaysia, Sumatra, Java, Borneo.

*Habitat and ecology.* In primary evergreen forest, montane forest or scrub, or in disturbed forest at 200–1000 m altitude.

*Proposed IUCN conservation status.* Least Concern (LC). Although little collected in Thailand this species is common in neighbouring countries.

*Chromosome number.* Reported as  $2n = 30$  (see Rashid *et al.*, 2001).

*Nomenclatural notes.* The type of *Aeschynanthus perakensis* is cited by Ridley as 'Perak, on Gunong Hijan; Thaiping Hills, at an altitude of 5,000 feet'. No Ridley material has been found which has this locality information on the label and only one specimen has been found which could possibly be original material. This specimen is labelled 'Maxwell's Hill', now known as Bukit Larut of which Gunung Hijau (the modern name for Gunong Hijan) is a part. This specimen is lectotypified here. A second Ridley specimen from the area cannot be counted as original material as Ridley explicitly says he has seen no fruiting material and the specimen has fruits.

*Specimens examined.* THAILAND. **Nakhon Sri Thammarat:** Khiriwong, Thap Chang, 24 ix 1951, T. Smitinand 684 (BKF). **Yala:** Khao Pok Yok, 10 x 1991, K. Larsen *et al.* 42294 (AAU, BKF).

This species has been infrequently collected in Thailand but is fairly common in Peninsular Malaysia where it occurs in a similar habitat to *Aeschynanthus rhododendron* but at rather lower altitudes. It is rather similar to *Aeschynanthus speciosus* from which it differs in the opposite leaves (verticillate in *A. speciosus*), fewer flowers in the inflorescence, and the generally much darker red corolla (mostly orange in *A. speciosus*).

**12. *Aeschynanthus membranifolius*** (Costantin) D.J.Middleton, *Edinburgh J. Bot.* 64: 48 (2007). – *Hoya membranifolia* Costantin, *Fl. Indo-Chine* 4: 133 (1930). – Type: Laos, Champassak, Bassac, iii 1877, J.H.A.J. Harmand 1187 (lecto P, designated by Middleton (2007); iso P). **Map 9.**

*Aeschynanthus longicaulis* auct. non Wall. ex R.Br.: Pellegrin, *Bull. Soc. Bot. France* 72: 822 (1926 [1925]); Pellegrin, *Fl. Indo-Chine* 4: 492 (1930); Burtt & Woods, *Notes Roy. Bot. Gard. Edinburgh* 33(3): 481 (1975), *pro parte*.

Epiphyte with hanging stems, glabrous. *Leaves* opposite; petiole 5–11 mm long, glabrous; blade fleshy, dark and pale green above, green to reddish-green beneath, with a distinct marbling on both sides, elliptic, 2.9–12 × 1–3.1 cm, 3.8–7 times as long as wide, apex acuminate to caudate, base cuneate, glabrous above and beneath, margin entire to very weakly toothed, often undulate, venation obscure. *Inflorescences* axillary, 1-flowered although often appearing paired due to presence in the axils of opposite leaves, peduncle absent, bracts minute; pedicels 5–18 mm long, glabrous. *Calyx* fused into a tube at the base, green or yellowish-green with reddish lobes, glabrous, 18.5–26.5 mm long; tube 3.9–5 mm long which is 16–21% of the total length, 5–5.5 mm wide at the top of the tube; lobes narrowly triangular or linear, erect, 18.5–21 mm long, 3 mm wide, acuminate. *Corolla* 24.5–29 mm long, externally yellow or yellowish-green on tube, green tinged with pink on lobes, internally green with red stripes in tube, green with red patches in lobes, tube broad at base; upper lobes ovate, not spreading or reflexed, 3.3–4 × 3–4.2 mm, sinus 3.5–3.7 mm deep, rounded; lateral lobes orbicular or oblong, not spreading or reflexed, 3.2–4 × 4–4.8 mm, rounded; lower lobe squarish or orbicular, not spreading or reflexed, 3.2–5 × 3.5–4 mm, rounded; outside with a few sessile glands around

top of tube, inside with five dense tufts of multicellular hairs near base and with very sparse glandular hairs in upper half. *Stamens* long exerted, fused in 2 pairs; filaments green, with glandular hairs; anterior filaments inserted at 13–14 mm from corolla base which is 48–52% of corolla length, filaments 21–28 mm long, anthers 2–3.2 × 0.8–1.7 mm; posterior filaments inserted at 15–16 mm from corolla base which is 56–64% of corolla length, filaments 18–24 mm long, anthers 1.7–2 × 0.7–1.1 mm; staminode c.0.9 mm long. *Disk* 0.7–1.3 mm high, 5-crenate. *Pistil* 32–35 mm long; stipe 2.5–3 mm long, glabrous; ovary 11–13.5 mm long, glabrous; style 17–21 mm long, glandular pubescent. *Capsule* 18–22 cm long, 2.7–2.9 mm wide. *Seed* grain 1.7–1.8 × 0.4–0.5 mm, warty, bubble cells absent; apical appendage a filiform hair, c.10 mm long; hilar appendages of many (c.30) filiform hairs, 19–21 mm long; appendages papillose.

*Distribution.* Southeast Thailand, southern Laos, southern Vietnam. Almost certainly also present in Cambodia.

*Habitat and ecology.* Growing in evergreen forest, often in shade, epiphytic or on muddy banks or rocks at 100–1500 m altitude.

*Proposed IUCN conservation status.* Least Concern (LC). This species is common and widespread in Thailand and neighbouring countries.

*Specimens examined.* THAILAND. **Chanthaburi:** Pong Namron, Khao Soi Dao Wildlife Sanctuary, 5 vii 1960, *Bunnak* 33 (BKF); *ibid.*, 26 xi 1979, *T. Shimizu et al.* T-23633 (BKF); Khao Phra Bat, Kathing Falls, 26 viii 1972, *K. Larsen et al.* 32070 (BKF, E, K, L). **Chon Buri:** Sri Racha, Khao Khieo, 29 viii 1976, *J.F. Maxwell* 76-624 (AAU, BK, L); *ibid.*, 14 xii 1975, *J.F. Maxwell* 75-1128 (AAU, BK, L). **Rayong:** Khao Chamao, 5 ix 1972, *K. Larsen et al.* 32461 (E, L). **Sa Kaeow:** Khao Takrup, 10 ix 1999, *D.J. Middleton* 224 (A, BKF, E).

This species is probably closest to *Aeschynanthus albidus* from western Malesia from which it differs in the marbling of the leaves, the generally larger corolla, and in having a calyx shorter than the corolla. Burt & Woods (1975) included the only collection then available to them, *Pierre* 4539 from Vietnam, in *Aeschynanthus longicaulis*, presumably based on the marbled leaves. This collection is in fruit and it is true to say that in fruit and in the absence of a remnant calyx *Aeschynanthus membranifolius* and *A. longicaulis* are indistinguishable. They do not, however, overlap in distribution so assigning fruiting specimens to the correct species is not difficult if the collection locality is known. *Aeschynanthus membranifolius* and *A. longicaulis* differ in the presence of a calyx tube and the longer calyx lobes in *A. membranifolius*.

### 13. *Aeschynanthus minutifolius* D.J.Middleton, *sp. nov.*

*Aeschynantho monetario* (Indiam inter septentriones et orientem atque Birmaniam habitans) aspectu similis sed corollae forma (ad faucem multo magis obliqua et lobo inferiore multo longiore), indumento corollae extus eglanduloso (nec ut in

*A. monetario* glanduloso), intus minute glanduloso-pubescenti (in *A. monetario* glabro) differt. – Type: Thailand, Tak Province, Raheng, ix 1924, *Mrs Smith's Collector* s.n. (holo ABD; iso BM). **Fig. 8, Map 9.**

Epiphytic with creeping stems, sparsely puberulent, rooting along length. *Leaves* opposite; petiole 2–4 mm long, glabrous or sparsely puberulent; blade thin, not marbled, obovate or elliptic, 0.9–4 × 0.4–1.2 cm, 1–2.2 times as long as wide, apex rounded, base cuneate, upper surface with a few long hairs near margins or puberulent only on midrib, lower surface sparsely puberulent all over or puberulent only on midrib, becoming glabrous, not punctate beneath, secondary veins mostly obscure. *Inflorescences* axillary, 1-flowered, peduncle absent; pedicels 12–15 mm long, sparsely eglandular puberulent. *Calyx* of separate lobes free to base, sparsely eglandular puberulent; lobes narrowly elliptic, erect, c.3.2 × 1.2 mm, apex acute. *Corolla* 24–24.5 mm long, base of tube broad, colour not recorded; upper lobes oblong, not spreading or reflexed, c.3.6 × 3.6 mm, sinus 3 mm deep, apex rounded; lateral lobes ovate, not spreading or reflexed, c.3.2 × 6.5 mm, apex rounded; lower lobe elliptic, reflexed, c.7.7 × 3.8 mm, apex rounded; outside densely eglandular puberulent, inside with sparse glandular hairs throughout, without a robust base. *Stamens* long exerted, fused in 2 pairs; filaments with very few sessile glands; anterior filaments inserted at c.12 mm from corolla base which is 49% of corolla length, filaments c.20 mm long, anthers c.2.2 × 1.4 mm; posterior filaments inserted at c.14.5 mm from corolla base which is c.59% of corolla length, filaments c.16.5 mm long, anthers c.1.9 × 1 mm; staminode c.0.8 mm long. *Disk* c.0.9 mm high, a simple annular ring. *Pistil* c.18.5 mm long; stipe c.7 mm long, glabrous; ovary c.5.5 mm long, with sessile glands; style c.6 mm long, sparsely glandular pubescent. *Fruit* unknown.

*Distribution.* Thailand (Tak Province). Known only from the type collection near the Burmese border and likely also to occur there.

*Habitat and ecology.* Unrecorded.

*Proposed IUCN conservation status.* Vulnerable (VU D2). This species is known only from the type locality in a region where there has been deforestation.

*Specimens examined.* Known only from the type collection.

This species is known only from one collection from Tak Province. It is superficially similar to *Aeschynanthus monetarius* from India and Burma, especially in the small rounded leaves, but differs substantially in flower characters. In *Aeschynanthus minutifolius* the corolla mouth is strongly oblique with a long lower lobe compared with the much less oblique and much shorter lower lobe of *A. monetarius*. In addition the indumentum on the flowers of *Aeschynanthus minutifolius* is eglandular whereas in *A. monetarius* it is glandular, and the corolla is minutely glandular pubescent inside rather than glabrous. Its affinities are unclear. The corolla shape is reminiscent of species such as *Aeschynanthus gracilis*, *A. bracteatus* and *A. garrettii*

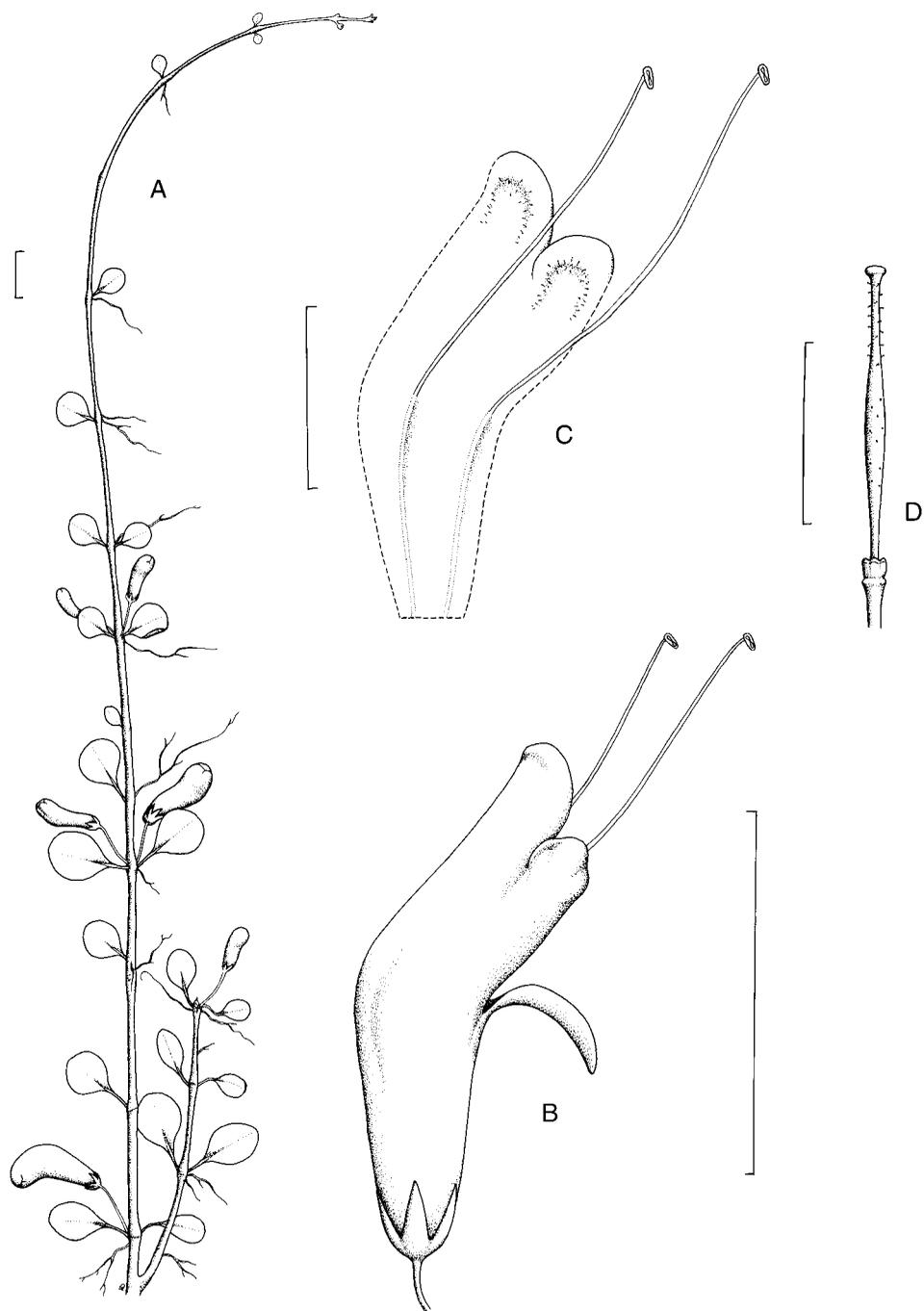
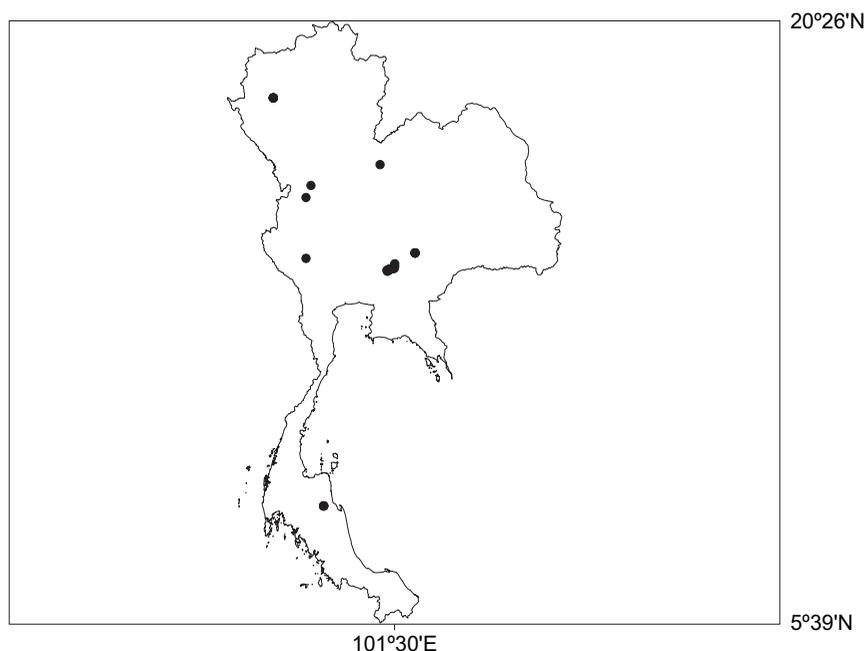


FIG. 8. *Aeschynanthus minutifolius* D.J.Middleton. A, habit; B, flower; C, flower dissection; D, pistil. All parts from *Mrs Smith's Collector* s.n. (ABD). Drawn by Anna Dorward. Scale bars: A, C, D: 1 cm, B: 2 cm.

but in other characters it could possibly be more closely related to species such as *A. lineatus*.

**14. *Aeschynanthus parviflorus*** (D.Don) Spreng., Syst. Veg. 4(2): 238 (1827); Steudel, Nomencl. Bot. ed. 2, 1: 32 (1840); A.DC., Prodr. 9: 261 (1845); Miquel, Fl. Ned. Ind. 2: 718 (1858); Hilliard, Fl. Bhutan 2(3): 1303 (2001). – *Trichosporum parviflorum* D.Don, Edinburgh Philos. J. 7: 85 (1822). – *Aeschynanthus ramosissimus* Wall., Pl. Asiat. Rar. 1: 55 (1830); Brown, Cyrtandreae 115 (1839); Steudel, Nomencl. Bot. ed. 2, 1: 32 (1840); Brown in Bennett, Pl. Jav. Rar. 115 (1840); A.DC., Prodr. 9: 260 (1845); Clarke, Commelyn. Cyrtandr. Bengal. t.50 (1874); Clarke in A.DC. & C.DC., Monogr. Phan. 5(1): 23 (1883); Clarke in Hooker, Fl. Brit. Ind. 4: 339 (1884). – Type: Nepal, *N. Wallich* 799 (lecto K-W, designated here; iso CGE, G-DC, K, P). **Map 10.**

*Aeschynanthus maculatus* Lindl., Bot. Reg. t.28 (1841); A.DC., Prodr. 9: 261 (1845); Miquel, Fl. Ned. Ind. 2: 718 (1858); Clarke in A.DC. & C.DC., Monogr. Phan. 5(1): 24 (1883); Clarke in Hooker, Fl. Brit. Ind. 4: 339 (1884); Li, Acta Bot. Yunnan. 5(1): 35 (1983); Wang, Fl. Reipubl. Popularis Sin. 69: 525 (1990); Burt, Edinburgh J. Bot. 55: 487 (1998); Wang et al., Fl. China 18: 384 (1998); Hilliard, Fl. Bhutan 2(3): 1303 (2001). – *Trichosporum maculatum* (Lindl.) Kuntze, Revis. Gen. Pl. 478 (1891). – Type: Without locality information, *Unknown collector* s.n. (holo CGE).



MAP 10. Thai distribution of *Aeschynanthus parviflorus* (D.Don) Spreng.

*Aeschynanthus maculatus* var. *stenophyllus* C.B.Clarke in A.DC. & C.DC., Monogr. Phan. 5(1): 24 (1883). – Type: India, Meghalaya, Khasia, *J.D. Hooker*, *T. Thomson* s.n. (lecto K, designated here; iso BM, GH, K, MEL, S, US, W).

*Aeschynanthus maculatus* var. *sikkimensis* C.B.Clarke in A.DC. & C.DC., Monogr. Phan. 5(1): 24 (1883). – *Aeschynanthus sikkimensis* (C.B.Clarke) Stapf, Bot. Mag. 148: t.8938 (1922); Hilliard, Fl. Bhutan 2(3): 1303 (2001). – Type: India, Sikkim, Balasun, *J.D. Hooker* s.n. (lecto K, designated here).

*Aeschynanthus consobrinus* Kraenzl., Repert. Spec. Nov. Regni Veg. 24 (1928). – Type: Without locality information, *Unknown collector* s.n. (*ex Herb. Vindobonensi*) (holo W).

*Aeschynanthus hosseusii* auct. non Pellegr.: Barnett, Fl. Siam. 3(3): 200 (1962), *pro parte*.

Epiphyte with arching to pendulous stems, stems glabrous. *Leaves* opposite; petiole 4–17 mm long, glabrous; blade coriaceous to very fleshy, green above and beneath, not marbled, elliptic, sometimes narrowly so, 3.4–19 × 0.9–5 cm, 2.2–12.5 times as long as wide, apex acuminate to caudate, base acute to cuneate, glabrous above and beneath, margin entire or very weakly dentate, 4–5 pairs of secondary veins, these weakly visible or obscure, tertiary venation obscure. *Inflorescences* axillary or terminal, 1–7-flowered; peduncle absent; bracts linear, 3.5–11 mm long; pedicels 7–16 mm long, purple or yellow-green, glabrous, sparsely minutely papillose or sparsely glandular puberulent. *Calyx* green or yellow-green, often flushed red, orange or purple, especially on lobes, fused into a tube at base, glabrous (to sparsely minutely papillose or with sparse glandular and/or eglandular hairs outside Thailand), 5–14 mm long; tube 2.1–6 mm long which is 24–63% of total length, 2.3–6 mm wide at top of tube; lobes narrowly triangular or triangular, erect, 2.2–8.5 × 1–3 mm, apex acute to acuminate. *Corolla* 25–38 mm long, tube quite narrow at base, externally tube orange to bright red, sometimes paler on ventral surface, with darker lines starting on lobes running down to top of tube, lobes bright red to orange-red with darker lines, hairs red, internally tube pale red to yellowish, lobes orange or red with red midline; upper lobes squarish, orbicular or ovate, not spreading or reflexed, 2.1–4.7 × 2.2–4.9 mm, sinus 2–4.2 mm deep, apex flat or rounded; lateral lobes oblong, ovate or deltoid, sometimes reflexed or spreading, 2–4.7 × 3.6–6.4 mm, apex obtuse or rounded; lower lobe orbicular, oblong or elliptic, reflexed or not, 3.6–6.4 × 2.3–5.7 mm, apex rounded; outside sparsely to densely glandular puberulent all over or with glandular hairs only around the top of tube and lobes or in rows down the tube, inside glabrous or with small sparse scattered glandular hairs, sessile glands present inside tube. *Stamens* long exserted or slightly exserted, fused in 2 pairs, filaments white at base and red or purple higher up, glabrous or with glandular hairs, anthers purple, grey or grey-green, pollen pale yellow, greenish-yellow or grey; anterior filaments inserted at 12–25 mm from corolla base which is 43–60% of corolla length, filaments 17–31 mm long, anthers 2.1–3.4 × 1–1.4 mm; posterior filaments inserted at 16–26.5 mm from corolla base which is 46–67% of corolla length, filaments 14–26 mm long, anthers 1.5–2.2 × 0.7–1.2 mm;

staminode 0.6–3 mm long. *Disk* 0.5–1.8 mm high, 5-crenate or a simple annular ring. *Pistil* 34–47 mm long; stipe 4–11 mm long, with few sessile glands or glabrous; ovary green, 15–22 mm long, glabrous, with sessile glands or minutely papillose; style white, 12–26 mm long, sparsely to densely glandular pubescent; stigma pink or purple, 1.3–2.4 mm across. *Capsule* 16.2–38 cm long, 2.4–4 mm wide. *Seed* grain 0.7–1.3 × 0.2–0.5 mm, grain warty, bubble cells absent, appendages papillose; apical appendage a filiform hair, 10–35 mm long; hilar appendages two filiform hairs, 10–27 mm long; appendages papillose.

*Distribution.* Northeastern India, Nepal, Sikkim, Bhutan, southern China, Burma, Thailand, Vietnam.

*Habitat and ecology.* In primary or degraded evergreen or scrub forest at 650–2100 m altitude.

*Proposed IUCN conservation status.* Least Concern (LC). This species is common and widespread in Thailand and neighbouring countries.

*Chromosome number.* Reported as  $2n = 32$  under the names *Aeschynanthus parviflorus* and *A. sikkimensis* (see Rashid *et al.*, 2001).

*Nomenclatural note.* *Aeschynanthus ramosissimus* was described by Wallich without any reference to the earlier publication of *Trichosporum parviflorus* by Don although they are both clearly based on Wallich's own collections from Nepal. They have both been lectotypified with the same specimen here.

*Specimens examined.* THAILAND. **Chiang Mai:** Doi Inthanon, 24 v 1990, *J.F. Maxwell* 90-555 (A, E, L, MO); *ibid.*, 24 v 1996, *W. Nanakorn* 6603 (E). **Kampaeng Phet:** Mae Wong National Park, Klong Lan, 20 viii 1997, *M.v.d. Bult* 19 (BKF). **Kanchanaburi:** Nong Phrue, Chalerm Rattanokosin National Park, Khao Kamphaeng, 26 ix 2001, *M.v.d. Bult* 487 (BKF). **Nakhon Nayok:** Khao Yai National Park, 26 ix 1994, *P.C. Boyce* 1044 (K); *ibid.*, 6 x 1962, *T. Smitinand* 7490 (BKF); *ibid.* and grown on in cultivation, *G. Smith* C7605 (E); *ibid.*, 9 x 1979, *T. Shimizu et al.* T-18104 (BKF); *ibid.*, 9 x 1979, *T. Shimizu et al.* T-18118 (BKF); *ibid.*, 8 x 1979, *T. Shimizu et al.* T-19550 (BKF, L); *ibid.*, 9 x 1979, *T. Shimizu et al.* T-19688 (BKF); Khao Yai National Park, Khao Khieo, 7 vii 1966, *K. Larsen et al.* 50 (BKF); *ibid.*, 11 viii 1974, *J.F. Maxwell* 74-781 (BK, L); *ibid.*, 29 viii 1963, *T. Smitinand, H.O. Sleumer* 8382 (BKF, L); *ibid.*, 26 ix 1982, *F. Konta et al.* T-29576 (A [2]); *ibid.*, 16 i 1985, *F. Konta et al.* T-49088 (A); Khao Yai National Park, Khao Lom, 30 x 1970, *C. Charoenphol, K. Larsen, E. Warncke* 4270 (E); Nang Rong Falls, 13 viii 1968, *K. Larsen et al.* 3360 (BKF, E); Wang Ta Krai, 3 ix 1955, *K. Suvatabundha s.n.* (BK). **Nakhon Ratchasima:** Khao Yai National Park, 6 vii 1963, *Pradit* 277 (BK); *ibid.*, 17 x 1969, *C.F.v. Beusekom, C. Charoenphol* 1660 (BKF, E, L, P); Khao Yai National Park, Haew Suwat Falls, 13 x 1973, *T. Santisuk* 507 (BKF); Khao Yai National Park, Khao Rom, 3 xii 1983, *N. Fukuoka, M. Ito* T-34608 (BKF, L). **Nakhon Sawan:** Khao Pado, 4 vi 1922, *A.F.G. Kerr* 6062 (BM, K). **Nakhon Sri Thammarat:** Khao Luang National Park, 4 vii 1926, *A.F.G. Kerr* 10825 (BM, K); *ibid.*, 5 vii 1926, *A.F.G. Kerr* 10825A (BM, K). **Phitsanulok:** Phu Hin Rong Kla, 9 vi 1999, *P. Suksathan* 1742 (E).

This is a very widespread and variable species, especially in calyx characters. The calyx can be very variable even within an individual plant. In Thailand the calyx

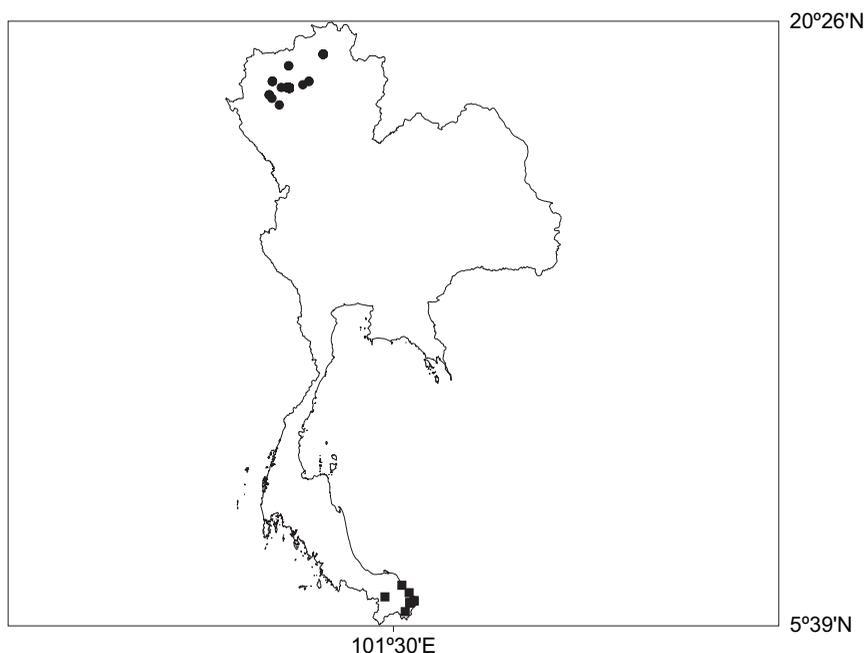
tends towards the larger end of the dimensions given. The lobes are generally also at the larger end of the variation and the apex is acute. Some of the specimens from Khao Yai National Park are at the most extreme of this variation and appear really very different from those with a much smaller calyx and much smaller lobes from the Himalayas but nowhere along the spectrum is there a satisfactory cut off between potential taxa.

**15. *Aeschynanthus persimilis*** Craib, Bull. Misc. Inform. Kew 1911: 430 (1911); Pellegrin, Bull. Soc. Bot. France 72: 823 (1926 [‘1925’]); Pellegrin, Fl. Indo-Chine 4: 498 (1930); Burtt, Thai Forest Bull. (Bot.) 29: 84 (2001). – *Trichosporum persimile* (Craib) Cockerell, Torreya 29: 162 (1929). – Type: Thailand, Chiang Mai, Doi Sutep, *A.F.G. Kerr* 515 (lecto K, designated here; isolecto BM, K, P, TCD). **Map 11.**

*Aeschynanthus hosseusianus* Kraenzl., Repert. Spec. Nov. Regni Veg. 24 (1928); Pellegrin, Fl. Indo-Chine 4: 496 (1930); Barnett, Fl. Siam. 3(3): 200 (1962); Burtt, Thai Forest Bull. (Bot.) 29: 83 (2001). – Type: Thailand, Chiang Mai, Doi Sutep, *C.C. Hosseus* 197 (holo W; iso BM, C, E, G, K, L, M, P).

*Aeschynanthus humilis* auct. non Hemsl.: Pellegrin, Fl. Indo-Chine 4: 497 (1930), *pro parte*.

*Aeschynanthus hildebrandii* auct. non Hemsl. ex Hook.f.: Barnett, Dansk Bot. Ark. 20: 199 (1962), *pro parte*.



MAP 11. Thai distribution of *Aeschynanthus persimilis* Craib (●) and *Aeschynanthus pulcher* (Blume) G. Don (■).

Epiphyte with erect stems, roots buried deep into host tree's bark; branches green or grey, densely to sparsely puberulent. *Leaves* opposite, subopposite or densely clustered at stem apex, rarely in whorls of 3; petiole 1.5–15 mm long, densely to sparsely puberulent; blade coriaceous to papery, dark green above, pale green beneath, not marbled, obovate to elliptic,  $0.7\text{--}5.3 \times 0.4\text{--}2$  cm, 1.2–6.7 times as long as wide, apex acuminate to obtuse, base cuneate, glabrous to sparsely puberulent all over or only on midrib above, glabrous or sparsely to densely puberulent all over or only on midrib beneath, margin entire, secondary veins weakly visible or obscure, 4–6 pairs, tertiary venation obscure. *Inflorescences* axillary or terminal with 1–10 flowers; peduncles 0–0.5 mm long; bracts linear, 1–1.5 mm long; pedicels 6–13 mm long, green, sparsely to densely eglandular puberulent. *Calyx* fused for part of length, green, green with maroon tips of lobes, or dull pale reddish, sparsely eglandular puberulent or densely eglandular puberulent, 3–5.2 mm long; tube 0.6–2.6 mm long which is 20–50% of total length, 2.3–2.5 mm wide at top of tube; lobes triangular to linear, erect,  $1.5\text{--}2.9 \times 0.9\text{--}1.7$  mm, apex acute to acuminate. *Corolla* 24–38 mm long, tube narrow at base, externally bright red or orange-red with darker lines on tube and bright red or orange-red with darker lines on lower 3 lobes, internally orange-red or pale orangish with darker red veins in tube and orange-red in lobes; upper lobes elliptic, squarish or ovate, not spreading or reflexed,  $1.2\text{--}3 \times 1.4\text{--}3$  mm, sinus 2.1–3.3 mm deep, apex rounded; lateral lobes deltoid, not spreading or reflexed,  $1.6\text{--}3.2 \times 3\text{--}7$  mm, apex rounded or obtuse; lower lobe elliptic or oblong, pointing forwards, slightly spreading or weakly reflexed,  $3.6\text{--}6 \times 1.3\text{--}2.9$  mm, apex rounded; sparsely puberulent outside and with few scattered glandular hairs or only near base inside. *Stamens* long exserted, fused in 2 pairs; filaments purple or pale purple, sparsely glandular pubescent, sometimes extremely sparsely so, anthers yellow or grey; anterior filaments inserted in tube at 8.5–16 mm from corolla base which is 34–53% of corolla length, filaments 26–34 mm long, anthers  $1.7\text{--}2.5 \times 0.7\text{--}1$  mm; posterior filaments inserted at 12–21 mm from corolla base which is 48–62% of corolla length, filaments 20–29 mm long, anthers  $1.5\text{--}1.6 \times 0.7\text{--}0.9$  mm; staminode 1.5–2.5 mm long. *Disk* 0.5–1.2 mm high, 5-dentate or strongly 5-lobed. *Pistil* 42–48 mm long; stipe 1–5 mm long, glabrous; ovary 6–10 mm long, glabrous; style pale purple, 33–38 mm long, sparsely glandular pubescent or with just the occasional glandular hair. *Capsule* 4–10.5 cm long, 1.7–3 mm wide. *Seed* grain  $1.6\text{--}2 \times 0.5\text{--}0.6$  mm, smooth, bubble cells absent; apical appendage a filiform hair, 19–23 mm long; hilar appendage a single filiform hair, 12–21 mm long; appendages papillose.

*Distribution.* So far endemic to Thailand but likely to be found in Burma and northern Laos.

*Habitat and ecology.* In primary or degraded evergreen, deciduous or pine forest at 800–2030 m altitude.

*Proposed IUCN conservation status.* Least Concern (LC). This species is common and widespread in northern Thailand.

*Chromosome number.* Jaidee (2004) reports  $2n = 28$  for *Aeschynanthus andersonii*, a name which has frequently been wrongly used for *A. persimilis*. I have not seen a voucher but all species of this group studied were found to be  $2n = 28$ .

*Specimens examined.* THAILAND. **Chiang Mai:** Changkien, 28 x 1975, *Sadakorn* 594 (BKF); Doi Chiang Dao, 10 ix 1995, *J.F. Maxwell* 95-640 (BKF, L); Chom Thong, 22 xi 1964, *K. Bunchuai* 1399 (BKF); Doi Inthanon, 7 xii 1969, *C.F.v. Beusekom*, *C. Phengklai* 2380 (AAU, BKF, L); *ibid.*, 2 x 1971, *G. Murata et al.* T-15711 (L); Doi Sutep, 24 xi 1912, *A.F.G. Kerr* s.n. (ABD); *ibid.*, 14 x 1921, *B. Hayata* s.n. (TI); *ibid.*, 24 xi 1912, *A.F.G. Kerr* s.n. (BM, UC); *ibid.*, 22 ix 1949, *Native collector* 37 (A); *ibid.*, 22 ix 1949, *P. Suvanakoses* 37 (BKF); *ibid.*, 6 x 1990, *P. Chantharanonthai et al.* 90/585 (K); *ibid.*, *C.C. Hosseus* 197 (BM, C, E, G, K, L, M, P, W – type of *Aeschynanthus hosseusianus*); *ibid.*, 16 ii 1989, *J.F. Maxwell* 89-208 (L); *ibid.*, 27 x 1948, *Soradet* 291 (BKF, E); *ibid.*, 27 x 1948, *Native collector* S291 (A, BKF); *ibid.*, *A.F.G. Kerr* 515 (BM, K, P, TCD – type of *Aeschynanthus persimilis*); *ibid.*, 16 xii 1992, *J.F. Maxwell* 92-836 (L, P); *ibid.*, 9 ii 1958, *T. Sorensen et al.* 950 (ABD, C); *ibid.*, 3 x 1987, *J.F. Maxwell* 87-1105 (BKF, L); *ibid.*, 4 xi 1923, *Winit* 1167 (ABD, BKF); *ibid.*, 6 xii 1957, *T. Smitinand* 3921 (BKF, E); *ibid.*, 9 x 1958, *T. Sorensen et al.* 5540 (BKF, C); *ibid.*, 1 xi 1967, *B.L. Burt* 5593 (E); *ibid.*, 2 xii 1959, *L.B. Abbe et al.* 9296 (A, BKF, E, K, L, NY); *ibid.*, 11 xi 1973, *T. Smitinand* 11838 (BKF); *ibid.*, 27 xi 1993, *K. Larsen et al.* 44925 (AAU); *ibid.*, 19 ix 1995, *K. Larsen et al.* 46693A (AAU); *ibid.*, 6 xii 1957, *T. Tuyama* T-57195 (TI); Doi Sutep, Soan Kuu, 26 xii 1997, *W. Nanakorn et al.* 10301 (E); Mataeng, Huey Nam Dang – Sammuen Road, 28 xi 1991, *R. Pooma* 600 (BKF); Muang Chiang Mai, Doi Sutep-Doi Pui National Park, 19 xii 1976, *E.F. Anderson* 4100 (MO, UC); Pha Mon, 29 x 1962, *T. Smitinand et al.* 7611 (BKF). **Chiang Rai:** Doi Langka, Doi Pacho, 27 xii 1965, *K. Iwatsuki*, *N. Fukuoka* T-3650 (BKF, E); Doi Nang Ka, 2 xi 1930, *N. Put* 3314 (ABD, BM); Wiengbahbao, Khun Chae National Park, Doi Langgah, 22 xi 1997, *J.F. Maxwell* 97-1402 (A, BKF, L). **Lampang:** Muang Bahn, Chae Son, Summit ridge of Doi Lohn/Doi Mawn Lahn, 3 iii 1997, *J.F. Maxwell* 97-176 (A, BKF, L). **Mae Hong Son:** Muang Mae Hong Son, Doi Pui, 19 xi 1996, *O. Petrmitr* 13A (L); *ibid.*, 2 xii 2002, *I. Schanzer* N02-24 (KEP); *ibid.*, 8 i 1969, *H.P. Nooteboom*, *C. Phengklai* 638 (BKF, C, K, L); *ibid.*, *Unknown* 1289 (BKF); *ibid.*, 28 xi 1965, *E. Hennipman* 3146 (BKF, C, K, L); *ibid.*, vii 1984, *M. Still* C7891 (E); *ibid.*, 14 x 1979, *T. Shimizu et al.* T-18615 (AAU, BKF, C, K, L, P).

See discussion under *Aeschynanthus andersonii*. *Aeschynanthus persimilis* is particularly common on Doi Sutep in Chiang Mai.

**16. *Aeschynanthus pulcher*** (Blume) G.Don, *Gen. Syst.* 4: 656 (1838); A.DC., *Prodr.* 9: 262 (1845); Zollinger, *Syst. Verz.* 3: 56 (1855); Miquel, *Fl. Ned. Ind.* 2: 721 (1858); Clarke in A.DC. & C.DC., *Monogr. Phan.* 5(1): 43 (1883). – *Trichosporum pulchrum* Blume, *Bijdr.* 764 (1826). – Type: Indonesia, Java, *C.L. Blume* s.n. (lecto L [Leiden accession number 903,307-167], designated here). **Map 11.**

*Aeschynanthus parvifolius* R.Br., *Cyrtandreae* 115 (1839); Brown in Bennett, *Pl. Jav. Rar.* 115 (1840); A.DC., *Prodr.* 9: 262 (1845); Miquel, *Fl. Ned. Ind.* 2: 720 (1858); Clarke in A.DC. & C.DC., *Monogr. Phan.* 5(1): 42 (1883); Ridley, *Fl. Malay Penin.* 2: 500 (1923); Henderson, *Malay. Wild. Fl. Dicot.* 342 (1959); Chin, *Gard. Bull. Singapore* 32: 147 (1979); Stone, *Fed. Mus. J.*, n.s. 26(1): 98 (1981); Turner, *Gard. Bull. Singapore* 45: 92 (1993); Turner, *Gard. Bull. Singapore* 47(1): 243 (1997 [‘1995’]); Smitinand, *Thai Pl. Names* ed. 2, 15 (2001). – *Trichosporum*

*parvifolium* (R.Br.) Kuntze, Revis. Gen. Pl. 478 (1891). – Type: Indonesia, Sumatra, Banca, 1813, *T. Horsfield* s.n. (lecto BM, designated here).

*Aeschynanthus lanceolatus* Ridl., J. Bot. 62: 299 (1924); Ridley, Fl. Malay Penin. 5: 324 (1925); Turner, Gard. Bull. Singapore 47(1): 243 (1997 [‘1995’]). – Type: Malaysia, Pahang, Fraser’s Hill, 16 ix 1922, *H.M. Burkill*, *R.E. Holttum* 8418 (holo K).

*Aeschynanthus lampongus* var. *parvifolius* Ridl., Fl. Malay Penin. 5: 324 (1925); Turner, Gard. Bull. Singapore 47(1): 243 (1997 [‘1995’]). – Type: Malaysia, Pahang, Puku, Kuala Teku, 20 xii 1920, *E. Seimund* s.n. (lecto K, designated here; iso SING).

Epiphytic and hanging to lithophytic and creeping or even epiphytic and climbing by adventitious roots on the stem; stems green to dark purple, sparsely puberulent to glabrous. *Leaves* opposite; petiole 2–6 mm long, glabrous or sparsely puberulent; blade slightly fleshy or coriaceous, dark to pale green or purplish above and beneath, not marbled, elliptic or ovate, 0.9–5.9 × 0.25–2.1 cm, 1.3–5.5 times as long as wide, apex rounded to acuminate, base subcordate to cuneate; glabrous above, glabrous to very sparsely puberulent all over beneath, margin entire; secondary veins weakly visible or obscure, c.3 pairs, tertiary venation obscure. *Inflorescences* terminal or axillary, 1–2-flowered; peduncle 0–9 mm long, bracts elliptic or ovate, c.3–6 × 2 mm; pedicels 7–13 mm long, green, sparsely puberulent to densely long hairy. *Calyx* with a tube for most of length and free lobes, dark red to purplish or purplish-brown, mostly sparsely eglandular puberulent, more rarely densely puberulent, glabrous or with a few hairs only on very tips, 11.5–35 mm long; tube 10–30 mm long which is 83–96% of total length, 6–21 mm wide at top of tube; lobes triangular, semi-circular or merely a weak curve of the upper rim, slightly spreading or erect, 1–5 × 4–7 mm, apex rounded or obtuse. *Corolla* 42–65 mm long, inflated at base, externally tube dark or bright red, often white at extreme base inside calyx tube, lobes bright red, internally lobes bright red with cream and dark markings on lower 3 lobes; upper lobes oblong or ovate, spreading or not, 5.7–12 × 1.9–6.5 mm, sinus 2.2–4.1 mm deep, apex rounded; lateral lobes deltoid or ovate, spreading or not, 6.1–12 × 6.5–12 mm, apex rounded; lower lobe elliptic or ovate, spreading or not, 7.6–10.5 × 5.5–10 mm, apex rounded; outside sparsely to densely puberulent, inside glabrous or with scattered papillae or small glandular hairs which are denser in the upper half, sessile glands below lobes. *Stamens* reaching end of corolla or slightly exerted, fused in 2 pairs, filaments red, glabrous or with very few sessile glands or papillose; anterior filaments inserted at 29–47 mm from corolla base which is 54–68% of corolla length, filaments 21–27 mm long, anthers 2.4–3.3 × 0.8–1.6 mm; posterior filaments inserted at 33.5–41 mm from corolla base which is 60–70% of corolla length, filaments 17.5–21 mm long, anthers 2.3–2.9 × 0.8–1.9 mm; staminode 0.5–1.6 mm long. *Disk* 0.8–1.5 mm high, strongly 5-lobed or a simple annular ring or 5-crenate. *Pistil* 37–58 mm long; stipe 16–27 mm long, puberulent; ovary pale yellow, 14–30 mm long, minutely papillose or with sessile glands; style pale yellow,

4.5–14 mm long, densely pubescent. *Capsule* 20.5–40 cm long, 3.5–4 mm wide. *Seed* grain 0.6–0.9 × 0.2–0.3 mm, papillose; bubble cells present at base of hilar appendage; apical appendage a filiform hair, 7–8 mm long; hilar appendage a single filiform hair, 6–9 mm long; appendages not papillose.

*Distribution.* Western Malesia, the far south of Thailand and the far south of Vietnam.

*Habitat and ecology.* In a wide variety of habitats, epiphytic in trees or creeping over mossy boulders and bases of tree trunks. The altitude has not been recorded in the Thai material but elsewhere it has been collected from 100–2100 m altitude.

*Proposed IUCN conservation status.* Least Concern (LC). Although this species is very local in Thailand it is common and widespread in western Malesia.

*Chromosome number.* Reported as  $n = 32$  and  $2n = 30, 32$  and  $64$  under the names *Aeschynanthus parvifolius* and *A. pulcher* (see Rashid *et al.*, 2001).

*Specimens examined.* THAILAND. **Narathiwat:** Bacho, Huay Pa-Cho, 9 vi 1961, *Bunnak* 196 (BKF); Muang Narathiwat, Nak, Khao Sam, 22 vi 2001, *C. Niyomdham*, *P. Puudjaa* 6555 (BKF); Sukhirin, Khlong Suan Mon, 16 vi 1997, *P. Puudjaa* 391 (BKF); Sungei Padi, Ban Yuang Yang, 21 vi 1987, *J.F. Maxwell* 87-587 (BKF, L, PSU); Tak Bai, Ban Bang Toy, 2 vii 1983, *C. Niyomdham* 586 (BKF); Tak Bai, Khok Dan peat swamp forest, 8 i 1986, *C. Niyomdham* 1092 (AAU, BKF, C, K, L, P); Tak Bai, Phlu Nam Bang, 15 ix 1985, *C. Niyomdham* 999 (AAU). **Pattani:** Panchor Hill, 10 vii 1930, *Kiah* SFN24296 (KEP). **Yala:** Khao Pok Yok, 16 vi 1992, *K. Larsen et al.* 42925 (AAU).

See discussion under *Aeschynanthus radicans*.

Although this species is known in Thailand only from a handful of specimens it is the most commonly collected species in neighbouring Peninsular Malaysia where it is extremely variable. The description given here is only for the species as it is found in Thailand and Peninsular Malaysia. The name *Aeschynanthus parvifolius* has mostly been used for this species in this region but there are no substantive differences between *A. parvifolius* and *A. pulcher* and the two must be synonymized. In particular, material from Peninsular Malaysia and Thailand, generally called *Aeschynanthus parvifolius*, is as variable in calyx size and shape and indumentum on external parts as material from Java, generally called *A. pulcher*, and the degree of variability from both areas, and from Sumatra from where *A. parvifolius* was first described, overlaps entirely in these and other characters. In addition this species possibly has many more synonyms in western Malesia than here listed. There would appear to be more names in the complex that includes *Aeschynanthus pulcher* than actual species although the elucidation of that complex will have no bearing on the name used here. It will, however, possibly lead to a more variable species description, longer synonymy and wider distribution for the species when it is eventually revised in the whole of western Malesia.

**17. *Aeschynanthus radicans*** Jack, Trans. Linn. Soc. London 14: 43 (1823); Brown, *Cyrtandreae* 115 (1839); Steudel, *Nomencl. Bot.* ed. 2, 1: 32 (1840); Brown in

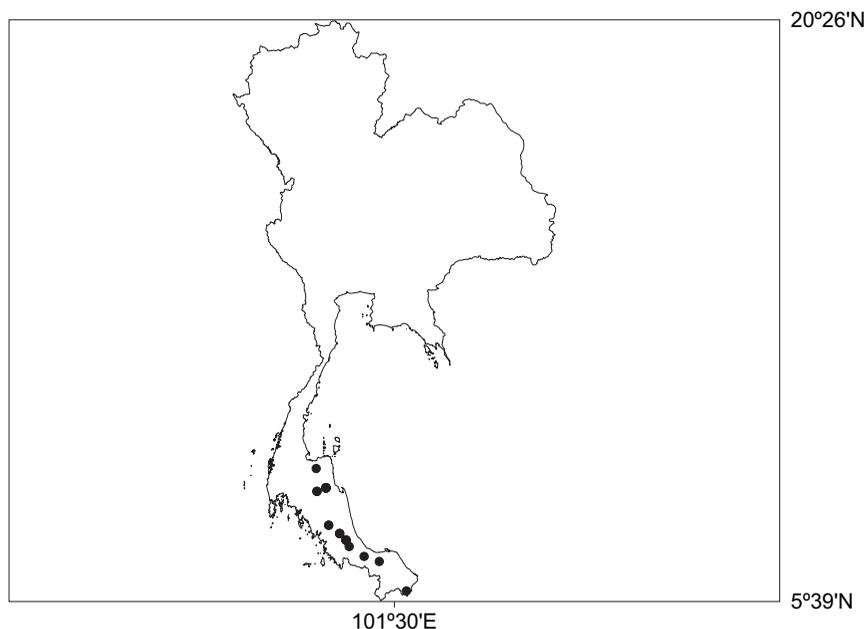
Bennett, Pl. Jav. Rar. 115 (1840); A.DC., Prodr. 9: 262 (1845); Zollinger, Syst. Verz. 3: 56 (1855); Miquel, Fl. Ned. Ind. 2: 720 (1858); Clarke in A.DC. & C.DC., Monogr. Phan. 5(1): 41 (1883); Clarke in Hooker, Fl. Brit. Ind. 4: 343 (1884); Ridley, J. Linn. Soc. Bot. 32: 501 (1896); Ridley, J. Asiat. Soc. Bengal 74(2): 736 (1909); Ridley, Fl. Malay Penin. 2: 500 (1923); Bakhuizen van den Brink, Blumea 6: 395 (1950); Merrill, J. Arnold Arbor. 33: 214 (1952); Barnett, Fl. Siam. 3(3): 202 (1962); Backer & Bakhuizen van den Brink, Fl. Java 2: 524 (1965); Chin, Gard. Bull. Singapore 32: 148 (1979); Turner, Gard. Bull. Singapore 45: 92 (1993); Turner, Gard. Bull. Singapore 47(1): 244 (1997 ['1995']); Smitinand, Thai Pl. Names ed. 2, 15 (2001); Burtt, Thai Forest Bull. (Bot.) 29: 84 (2001). – *Trichosporum radicans* (Jack) Nees, Flora 8 (1825). – Type: Indonesia, Sumatra, Bencoolen, *W. Jack* (not traced). Neotype: Indonesia, Sumatra, Lampung, Gunung Rati Telanggaran, 14 xi 1921, *Iboet* 57 (neo L, designated here). **Fig. 9, Map 12.**

*Trichosporum ovatum* D.Don ex C.B.Clarke in A.DC. & C.DC., Monogr. Phan. 5(1): 41 (1883), *nom. inval.* (in synonymy of *A. radicans*).

Epiphytic and hanging to lithophytic and creeping or even epiphytic and climbing by adventitious roots on the stem; stems sparsely to densely puberulent or with longer hairs. *Leaves* opposite; petiole 1–4.5 mm long, sparsely to densely puberulent; blade slightly fleshy, ovate, mostly green above and beneath, not marbled, orbicular or elliptic, 1–5 × 0.8–2.6 cm, 1.3–2.6 times as long as wide, apex rounded and apiculate or acute to acuminate, base subcordate to obtuse; glabrous to sparsely puberulent all over above, sparsely to densely puberulent all over beneath, margin entire; secondary veins obscure, tertiary venation obscure. *Inflorescences* axillary, generally 1-flowered; peduncle 0–3 mm long, bracts elliptic to ovate, 5–6 mm long; pedicels 7–14 mm long, sparsely to densely puberulent or with longer hairs. *Calyx* with a tube for most of length and free lobes, rarely slightly zygomorphic, purple, green with red veins, or green, puberulent, sometimes with quite long hairs, 19.5–26 mm long; tube 13–20 mm long which is 65–91% of total length, 8–9 mm wide at top of tube; lobes narrowly triangular, ovate or oblong, erect, 2–8 × 3–5 mm, apex rounded. *Corolla* 47.5–58 mm long, inflated at base, externally tube bright red, lobes bright red, internally tube yellowish, lobes red with yellowish at base and darker red markings on lower 3 lobes; upper lobes oblong or ovate, slightly spreading or not, 6.5–10 × 2–4 mm, sinus 2.4–6.7 mm deep, apex rounded; lateral lobes ovate or deltoid, slightly spreading or not, 7–10 × 6.2–7.5 mm, apex rounded; lower lobe elliptic or oblong, slightly spreading or not, 6.5–10.7 × 5.6–7.7 mm, apex rounded, outside densely puberulent, inside glabrous or with sessile glands and short stalked glandular hairs throughout, sessile glands below lobes. *Stamens* reaching to end of upper corolla lobes or slightly exerted, fused in 2 pairs, filaments with very few glandular hairs or sessile glands; anterior filaments inserted at 27–36 mm from corolla base which is 52–63% of corolla length, filaments 22–24 mm long, anthers 2.1–2.5 × 1.5 mm; posterior filaments inserted at 31–38.5 mm from corolla base which is



FIG. 9. *Aeschynanthus radicans* Jack. A, habit; B, calyx opened up; C, flower dissection; D, pistil; E, fruit; F, seed; G, seed grain with part of appendages. A, E–G from Charoenphol *et al.* 3905 (AAU); B–D from Mendum s.n. (E). Drawn by Anna Dorward. Scale bars: A–F, 1 cm; G, 1 mm.



MAP 12. Thai distribution of *Aeschynanthus radicans* Jack.

59–70% of corolla length, filaments 15.5–21 mm long, anthers  $2.1\text{--}2.2 \times 1.2\text{--}1.3$  mm; staminode 0.5–5 mm long. *Disk* 1–8 mm high, a simple annular ring. *Pistil* 45.5–61 mm long; stipe 18–28 mm long, densely puberulent, often with a mix of glandular and eglandular hairs; ovary 14–28 mm long, densely puberulent, often with a mix of glandular and eglandular hairs; style 6–15 mm long, densely puberulent, often with a mix of glandular and eglandular hairs. *Capsule* 19–35 mm long, 2.5–3 mm wide. *Seed* grain  $0.8\text{--}0.9 \times 0.15\text{--}0.3$  mm, papillose; bubble cells present at base of hilar appendage; apical appendage a filiform hair, 7–8 mm long; hilar appendage a single filiform hair, 6–8 mm long; appendages not papillose.

*Distribution.* Western Malesia, southern Thailand.

*Habitat and ecology.* In evergreen forest, often along streams, at 100–900 m altitude.

*Proposed IUCN conservation status.* Least Concern (LC). This species is common and widespread in Thailand and neighbouring countries.

*Chromosome number.* Reported as  $n = 15$  and  $16$  and  $2n = 30$  and  $32$  (see Rashid *et al.*, 2001).

*Notes on typification.* Clarke (1883: 41) would seem to imply that he has seen a *Jack* specimen from Sumatra by listing it under *Aeschynanthus radicans* in his revision of the genus. This specimen was listed as being in ‘h. Delessert’, now in the general collection at G. However, no trace of this specimen can be found. Instead a specimen from Sumatra in Leiden is neotypified here.

*Specimens examined.* THAILAND. **Nakhon Sri Thammarat:** s.l., *B. Sangkhachand* 3029 (BKF); Chawang, *Sanai* 792 (BKF, E); Khao Luang National Park and grown on in cultivation, *M. Mendum* s.n. (E); Khao Luang National Park, 8 v 1955, *Sanan* 292 (BKF, E); *ibid.*, 21 v 1968, *C.F.v. Beusekom*, *C. Phengkklai* 915 (L); *ibid.*, 24 i 1966, *B. Hansen*, *T. Smitinand* 11796 (C); Khao Luang National Park, Karom Falls, 6 vii 1985, *J.F. Maxwell* 85-685 (BKF, L, PSU); Khao Luang National Park, Krung Ching Falls, 11 viii 1986, *J.F. Maxwell* 86-562 (A, BKF, L, PSU); Khiriwong, Khao Hoi Sang, 11 ix 1957, *Bunnak* 683 (BKF, E); Khiriwong, Tap Chang, 25 vii 1951, *T. Smitinand* 698 (BKF, E). **Narathiwat:** Waeng, 18 xi 1971, *Unknown* 211 (BKF). **Pattani:** Khao Kalakawi, 1 iv 1928, *A.F.G. Kerr* 14955 (BM). **Phatthalung:** Tha Mot, 5 x 1991, *K. Larsen et al.* 42152 (AAU, BKF, MO). **Songkhla:** Boriphat Falls National Park, *P. Siriruga* s.n. (PSU); *ibid.*, 13 ix 1990, *O. Griffin* 41 (TCD); *ibid.*, 19 ix 1984, *J.F. Maxwell* 84-226 (A, BKF, PSU); Khao Nam Kang, 20 x 1991, *K. Larsen et al.* 42425 (AAU); Ton Nga Chang, 2 ix 1979, *Hamilton*, *Congdon* 476 (PSU). **Surat Thani:** Ban Kawp Kiep, 8 viii 1927, *A.F.G. Kerr* 13213 (BM). **Trang:** Kachong, *Din* 329 (BKF, K).

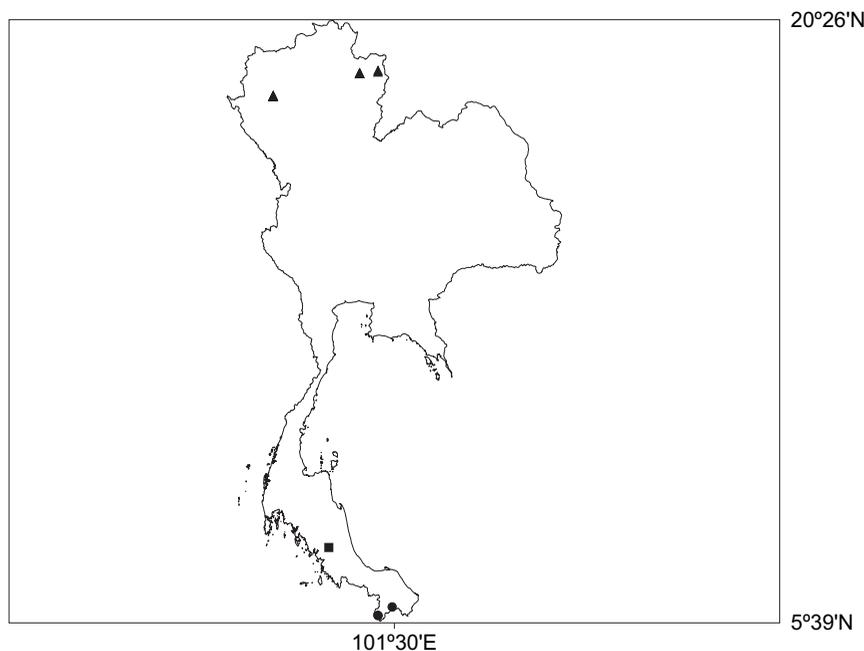
*Aeschynanthus radicans* and *Aeschynanthus pulcher* belong to a group of closely related species from Malesia for which these are the two oldest names. Further discussion can be found under *Aeschynanthus pulcher*. *Aeschynanthus radicans* and *A. pulcher* differ in the pubescence on the ovary: densely pubescent in *A. radicans* and with sessile glands in *A. pulcher*, these sometimes slightly larger so as to appear papillose but never pubescent. They also mostly differ in the pubescence on the underside of the leaves in *Aeschynanthus radicans* but this is also rarely present in *A. pulcher*.

**18. *Aeschynanthus rhododendron*** Ridl., J. Linn. Soc. Bot. 32: 500 (1896); Ridley, J. Straits Branch Roy. Asiat. Soc. 44: 15 (1905); Ridley, J. Asiat. Soc. Bengal 74(2): 735 (1909); Ridley, Fl. Malay Penin. 2: 499 (1923); Turner, Gard. Bull. Singapore 47(1): 244 (1997 [‘1995’]). – Type: Malaysia, Perak, Taiping, Gunung Hijau, 1892, *H.N. Ridley* s.n. (lecto SING, designated here). **Map 13.**

*Aeschynanthus longicalyx* Ridl., J. Straits Branch Roy. Asiat. Soc. 44: 16 (1905); Ridley, J. Asiat. Soc. Bengal 74(2): 735 (1909); Ridley, Fl. Malay Penin. 2: 499 (1923); Henderson, Malay. Wild. Fl. Dicot. 341 (1959); Turner, Gard. Bull. Singapore 47(1): 243 (1997 [‘1995’]). – Type: Malaysia, Selangor, Semangko Pass, ii 1904, *Burn-Murdoch* s.n. (lecto SING, designated here; iso K).

*Aeschynanthus longicalyx* var. *superbus* Ridl., J. Fed. Malay States Mus. 5: 43 (1914); Stone, Fed. Mus. J., n.s. 26(1): 98 (1981). – Type: Malaysia, Peninsular Malaysia, Selangor, Gunung Mengkuang Lebah, 4 ii 1913, *H.C. Robinson* s.n. (lecto SING, designated here).

Epiphyte with erect and arching stems; branchlets glabrous. *Leaves* opposite; petiole 3–12 mm long, glabrous; blade coriaceous to fleshy, mid to dark green above, paler beneath, not marbled, ovate or elliptic, 2.1–13 × 0.9–5.9 cm, 1.3–4.8 times as long as wide, apex acuminate, base cuneate to rounded, glabrous above and beneath, punctate or not beneath, margin entire, secondary veins obscure to clearly visible, 3–5 pairs, tertiary venation obscure or laxly reticulate. *Inflorescences* axillary or subterminal with 1–2 flowers; peduncle absent; bracts linear, c.2 mm long; pedicels 8–19 mm long, glabrous. *Calyx* with a tube and free lobes, rarely slightly



MAP 13. Thai distribution of *Aeschynanthus rhododendron* Ridl. (●), *Aeschynanthus speciosus* Hook. (■) and *Aeschynanthus superbus* C.B.Clarke (▲).

zygomorphic, red, sometimes with some green at base, glabrous or with a few hairs only on very tips of lobes, 16–65 mm long; tube 11–34 mm long which is 45–88% of total length, 7.5–25 mm wide at top of tube; lobes triangular or narrowly triangular, erect,  $2.3\text{--}32 \times 1.8\text{--}11$  mm, apex acuminate or acute. *Corolla* 54–102 mm long, tube curved, narrow at base, externally bright red on tube and lobes, internally red with darker markings on lower 3 lobes and pale orange at base of lobes and in tube; upper lobes oblong, slightly spreading to reflexed,  $9\text{--}22 \times 8.5\text{--}12$  mm, sinus 5–11 mm deep, apex rounded; lateral lobes ovate or orbicular, reflexed,  $7\text{--}18 \times 7\text{--}16$  mm, apex rounded; lower lobe oblong or obovate, spreading or reflexed,  $9\text{--}21 \times 8.5\text{--}12$  mm, apex rounded; glabrous to sparsely eglandular puberulent outside, sometimes only around top, inside with scattered glandular hairs throughout except at base and becoming more dense in throat, sessile glands inside tube present. *Stamens* not exerted or extremely slightly exerted beyond upper lobes, fused in 2 pairs; filaments bright red, with glandular hairs; anterior filaments inserted in tube at 40–50.5 mm from corolla base which is 48–59% of corolla length, filaments 32–41 mm long, anthers  $3.6\text{--}5 \times 1.4\text{--}2.5$  mm; posterior filaments inserted in tube at 51–56 mm from corolla base which is 62–69% of corolla length, filaments 20–25 mm long, anthers  $3\text{--}4.5 \times 1.1\text{--}2.3$  mm; staminode 0.7–4 mm long. *Disk* 0.8–1.5 mm high, a simple annular ring or 5-crenate. *Pistil* 56–84 mm long; stipe 18–33 mm long, glabrous; ovary 20–50 mm long, glabrous; style 7–22 mm long, densely glandular and eglandular

pubescent. *Capsule* 11–22 cm long, 4–6 mm wide. *Seed* grain 0.8–1.5 × 0.2–0.4 mm, papillose, bubble cells absent; apical appendage short and stout, 0.7–1.2 mm long; hilar appendage a single stout appendage, 0.7–1.1 mm long; appendages not papillose.

*Distribution.* Southern Thailand, Peninsular Malaysia, Sumatra.

*Habitat and ecology.* In montane forest at 1400–1540 m altitude.

*Proposed IUCN conservation status.* Least Concern (LC). Although this species is known in Thailand only from very few specimens it is common in neighbouring Malaysia.

*Chromosome number.* Reported as  $2n = 32$  (see Rashid *et al.*, 2001).

*Specimens examined.* THAILAND. **Yala:** Betong, 23 ii 2000, *C. Niyomdham et al.* 6070 (BKF), 6071 (BKF); Betong, Hala-Bala Wildlife Sanctuary, 23 v 2005, *D.J. Middleton et al.* 3635 (E).

*Aeschynanthus rhododendron* is known in Thailand only from a few collections from Yala. It is otherwise widely distributed in Peninsular Malaysia. It is one of only two species in Thailand from *Aeschynanthus* sect. *Microtrichium* (the other being *Aeschynanthus garrettii*). In Malaysia there is considerable variation in the form of the calyx, sometimes even within a single individual with respect to size (but less so with respect to shape). As the Thai representatives are few the description given here reflects the variation of the species as a whole. In Thailand the calyx tends to be at the narrower end of the spectrum with small lobes as is typical for the species from Perak in Malaysia. In Thailand both the calyx and corolla dimensions for the few specimens known are in the lower half of the ranges given.

One of the syntypes of *Aeschynanthus longicalyx*, *Scortechini* 36a (SING), is rather *A. pulcher*.

**19. *Aeschynanthus speciosus*** Hook., Bot. Mag. 73: t.4320 (1847); Miquel, Fl. Ned. Ind. 2: 718 (1858); Clarke in A.DC. & C.DC., Monogr. Phan. 5(1): 33 (1883); Ridley, J. Linn. Soc. Bot. 32: 499 (1896); Ridley, J. Straits Branch Roy. Asiat. Soc. 44: 14 (1905); Ridley, J. Asiat. Soc. Bengal 74(2): 733 (1909); Ridley, Fl. Malay Penin. 2: 498 (1923); Turner, Gard. Bull. Singapore 47(1): 244 (1997 [‘1995’]); Smitinand, Thai Pl. Names ed. 2, 15 (2001); Burt, Thai Forest Bull. (Bot.) 29: 84 (2001). – *Trichosporum speciosum* (Hook.) Kuntze, Revis. Gen. Pl. 478 (1891). – Type: Indonesia, Java, Jawa Barat, Mt Asapan, *T. Lobb* s.n. (lecto K, designated here). **Map 13.**

*Aeschynanthus aucklandiae* Low, Sarawak 386 (1848). – Type: Malaysia, Sarawak, *H. Low* s.n. (holo CGE).

Epiphyte with erect, arching and pendulous stems; branches glabrous. *Leaves* in whorls of 3–6; petiole generally wide and flat, sometimes slightly winged, 2–12 mm long, glabrous; blade coriaceous or slightly fleshy, mid to dark green above, paler beneath, not marbled, elliptic or ovate, 3.8–15.3 × 1.2–5.5 cm, 2.3–6.1 times as long

as wide, apex acuminate to caudate, base cuneate to rounded, glabrous above and beneath, not punctate beneath, margin dentate to entire, often strongly undulate, secondary veins obscure to weakly visible, c.7–8 pairs, tertiary venation obscure. *Inflorescences* terminal with 4–12 flowers; peduncle absent; bracts linear, 5–13 mm long; pedicels 7–14.5 mm long, glabrous or sparsely eglandular puberulent. *Calyx* of separate lobes free to the base, pale green, yellowish or dark reddish-brown and then often flushed with one of the other colours, glabrous to densely eglandular or glandular puberulent; lobes narrowly triangular or linear, erect,  $6.5\text{--}23 \times 1\text{--}2.4$  mm, apex acute or acuminate. *Corolla* 54–118 mm long, tube narrow at base, externally yellow or orangish on basal half to two-thirds of tube and bright red above, more rarely bright red all over, lobes orange-red to bright red, internally light yellowish in tube and red or orangish on upper 2 lobes and red or orangish with darker W-shaped markings on lower 3 lobes and paler at the base; upper lobes oblong, not spreading or reflexed,  $4.5\text{--}11 \times 3.6\text{--}6.8$  mm, sinus 4–8 mm deep, apex rounded; lateral lobes oblong, deltoid or ovate, spreading,  $5.7\text{--}14 \times 5.7\text{--}12.5$  mm, apex rounded; lower lobe oblong or elliptic, spreading or reflexed,  $7\text{--}15 \times 4.5\text{--}10$  mm, apex retuse to rounded; outside glabrous, slightly papillose or sparsely glandular puberulent, sometimes only on ciliate lobes, inside with sparse sessile glands. *Stamens* long exerted, fused in 2 pairs; filaments bright red or white, with glandular hairs, anthers grey, pale brown or purple-black; anterior filaments inserted at 50–96 mm from corolla base which is 67–81% of corolla length, filaments 29–43 mm long, anthers  $3.9\text{--}5 \times 1.3\text{--}1.8$  mm; posterior filaments inserted at 53–100 mm from corolla base which is 72–85% of corolla length, filaments 21–35 mm long, anthers  $2.6\text{--}5 \times 1.2\text{--}1.5$  mm; staminode 0.3–4 mm long. *Disk* 1.2–2.5 mm high, 5-dentate or 5-crenate. *Pistil* 83–130 mm long; stipe 20–30 mm long, with few sessile glands or glabrous; ovary 27–44 mm long, with sessile glands, these sometimes very few; style yellow or green, 14–65 mm long, glandular pubescent, especially in upper half. *Capsule* 20–45 cm long, 2.3–3.6 mm wide. *Seed* grain  $0.9\text{--}1.3 \times 0.3\text{--}0.4$  mm, warty, bubble cells absent; apical appendage a filiform hair, 15–22 mm long; hilar appendage a single filiform hair, 15.5–23 mm long; appendages papillose.

*Distribution.* Southern Thailand, Peninsular Malaysia, Sumatra, Java, Borneo.

*Habitat and ecology.* In Thailand recorded only from open scrub at 1240 m altitude. Elsewhere recorded from a wide variety of forest habitats at 150–1900 m altitude.

*Proposed IUCN conservation status.* Least Concern (LC). Although this species is known in Thailand from only one specimen it is widespread in Malaysia and Sumatra.

*Chromosome number.* Reported as  $2n = 32$  (see Rashid *et al.*, 2001).

*Specimens examined.* THAILAND. **Pattani:** 1893, *Unknown* s.n. (SING). **Trang:** Nayong, Khao Banthat Mountains, Phu Pha Mek, 7 iv 2003, *D.J. Middleton et al.* 2006 (BKF).

This is the most readily recognizable species in Thailand due to its verticillate leaves with often slightly crenate margins, and large flowers in terminal inflorescences.

It has been collected only twice in Thailand, once in 1893 from an unreadable locality by an unreadable collector in Pattani (although the limits of the province have changed since then), and deposited only in SING, and once recently from the Khao Banthat Range in Trang Province.

**20. *Aeschynanthus superbus*** C.B.Clarke, Commelyn. Cyrtandr. Bengal. t.46 (1874); Clarke in A.DC. & C.DC., Monogr. Phan. 5(1): 32 (1883); Clarke in Hooker, Fl. Brit. Ind. 4: 342 (1884); Barnett, Fl. Siam. 3(3): 203 (1962); Wang, Phytologia 45: 310 (1980); Li, Acta Bot. Yunnan. 5(1): 28 (1983); Wang, Fl. Reipubl. Popularis Sin. 69: 507 (1990); Wang et al., Fl. China 18: 379 (1998); Hilliard, Fl. Bhutan 2(3): 1301 (2001); Smitinand, Thai Pl. Names ed. 2, 15 (2001); Burtt, Thai Forest Bull. (Bot.) 29: 84 (2001); Kress et al., Checkl. Myanmar 262 (2003). – *Trichosporum superbum* (C.B.Clarke) Kuntze, Revis. Gen. Pl. 478 (1891). – *Aeschynanthus longiflorus* Wall., Num. List 795 (1829), *nom. nud.*; Steudel, Nomencl. Bot. ed. 2, 1: 32 (1840), *nom. nud.*; Miquel, Fl. Ned. Ind. 2: 722 (1858), *non* (Blume) A.DC. (1845). – Type: India, Pundua, *N. Wallich* 795 (lecto BM, designated here; iso K-W, M, P, S). **Map 13.**

*Aeschynanthus bracteatus* auct. *non* Wall. ex A.DC.: Pooma, Threatened Pl. Thailand 70 (2005).

Epiphyte with arching and pendulous stems, glabrous. *Leaves* opposite; petiole 6–18 mm long, glabrous; blade coriaceous or fleshy, green above and beneath, not marbled, elliptic, 8–22.4 × (1.3–)1.9–10.6 cm, 1.6–4.2(–7.1) times as long as wide, apex acuminate, base cuneate to obtuse; glabrous above and beneath, not punctate beneath, margin entire, 4–12 pairs of secondary veins, these usually at least weakly visible, tertiary venation parallel to secondary veins or obscure. *Inflorescences* terminal or axillary; peduncle 12–42 mm long; bracts red, ovate or elliptic, 38–60 × 18–48 mm; pedicels 7–13 mm long, glabrous. *Calyx* of separate lobes free to base, red, glabrous; lobes elliptic to obovate, erect, 14–39 × 5.4–13 mm, apex obtuse to rounded. *Corolla* 60–85 mm long; externally bright red with darker lines, internally red with dark red markings on lobes; upper lobes orbicular, oblong or ovate, reflexed or spreading, 11.5–20 × 8.5–12 mm, sinus 5.5–8 mm deep, apex rounded; lateral lobes elliptic, orbicular or ovate, reflexed, 10–20 × 11–14 mm, apex rounded; lower lobe ovate or orbicular, spreading, 10–16 × 9–12 mm, apex rounded; corolla glabrous externally, internally with glandular hairs on base of lobes and in throat and sparse glandular hairs throughout. *Stamens* exerted, fused in 2 pairs; filaments with few glandular hairs at top or all way along; anterior filaments inserted at 29–39.5 mm from corolla base which is 43–56% of corolla length, filaments 37–41 mm long, anthers 3–4 × 1.4–2.1 mm; posterior filaments inserted at 37–45 mm from corolla base which is 54–63% of corolla length, filaments 25–32 mm long, anthers 3–3.5 × 1.6–1.9 mm; staminode 1.4–4 mm long. *Disk* 1.2–1.6 mm high, 5-crenate or a simple annular ring. *Pistil* 63–78 mm long; stipe 19–34 mm long, glabrous to glandular puberulent; ovary 15–44 mm long, glandular pubescent or

with sessile glands; style 8–18 mm long, glandular pubescent. *Capsule* 33–44 cm long, 1.5–3.1 mm wide. *Seed* grain 0.8–1 × 0.15–0.2 mm, papillose, bubble cells absent; apical appendage a filiform hair, 4.5–7.5 mm long; hilar appendage a single filiform hair, 4.5–6.4 mm long; appendages not papillose.

*Distribution.* Northeastern India, Bhutan, Burma, southern China (Yunnan), northern Thailand.

*Habitat and ecology.* In evergreen hill forest at 900–1700 m altitude.

*Proposed IUCN conservation status.* Least Concern (LC). This species is common and widespread in Thailand and neighbouring countries.

*Specimens examined.* THAILAND. **Chiang Mai:** Doi Inthanon, 14 ix 1927, *H.B.G. Garrett* 450 (K, L, P); *ibid.*, 18 vi 1934, *H.B.G. Garrett* 865 (BKF, E, K, L, P, TCD); *ibid.*, 21 xii 1998, *F. Konta et al.* 5005 (BKF); *ibid.*, 2 x 1971, *G. Murata et al.* T-15760 (K, L, MO); *ibid.*, 4 x 1971, *G. Murata et al.* T-15804 (L); Doi Inthanon, NW of Ban Pha Mon Village, 4 ii 1998, *F. Konta, C. Phengklai* 3953 (BKF); near Ban Ta Fang, 4 x 1971, *J.E. Vidal* 5383 (P). **Nan:** Doi Phu Kha National Park, 16 ix 1999, *P. Srisanga, C. Puff* 1077 (E); *ibid.*, 22 ix 1996, *R. Pooma* 1376 (BKF); Doi Wao, 10 ix 1995, *K. Larsen et al.* 46295 (K, L, NY, SING).

This species is rather variable in the indumentum of the gynoeceium, rather unusually so for the genus as a whole. The variation manifests as: a style with glandular hairs, ovary with sessile glands and stipe glabrous; or a style with glandular hairs, ovary with sessile glands and stipe with glandular hairs; or glandular hairs throughout.

#### EXCLUDED SPECIES

*Aeschynanthus mannii* Kurz is included in Smitinand (2001: 15) with the Thai name of *Kafak ko ta mu* from Chiang Mai. This species does not occur in Thailand and I have not been able to find any material that cites the Thai name to find out what species this actually refers to. *Aeschynanthus mannii* is related to *A. humilis*, *A. andersonii* and *A. persimilis* and it is likely to be one of these. Only the latter two have been recorded from Chiang Mai.

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#### APPENDIX

***Aeschynanthus dischidioides* (Ridl.) D.J.Middleton, comb. nov.**

*Micraeschynanthus dischidioides* Ridl., Fl. Malay Penin. 5: 325 (1925). – Type: Peninsular Malaysia, Pahang, Gunong Tahan, H.N. Ridley 16122 (lecto K, designated here; iso SING).

*Aeschynanthus myrmecophilus* P.Woods, Notes Roy. Bot. Gard. Edinburgh 33: 483 (1975); Turner, Gard. Bull. Singapore 47(1): 243 (1997 [‘1995’]). – Type: Malaysia,

Pahang, Cameron Highlands, Robinson's Falls, 16 iv 1968, *P.J.B. Woods* 616 (holo E).

*Aeschynanthus hildebrandii* auct. non Hemsl. ex Hook.f.: Ridley, J. Linn. Soc. Bot. 32: 502 (1896); Ridley, J. Straits Branch Roy. Asiat. Soc. 44: 15 (1905); Ridley, J. Asiat. Soc. Bengal 74(2): 734 (1909); Ridley, Fl. Malay Penin. 2: 499 (1923).

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*Aeschynanthus acuminatus* var. *chinensis* (Gardner & Champ.) C.B.Clarke (1)

*Aeschynanthus andersonii* C.B.Clarke (2)

*Aeschynanthus angustifolius* (Blume) Steud. (gen)

*Aeschynanthus aucklandiae* Low (19)

*Aeschynanthus bracteatus* sensu Bentham (1)

*Aeschynanthus bracteatus* sensu Pooma (20)

*Aeschynanthus breviflorus* Ridl. (3)

*Aeschynanthus chinensis* Gardner & Champ. (1)

*Aeschynanthus chorisepalus* Orr (9)

*Aeschynanthus consobrinus* Kraenzl. (14)

***Aeschynanthus dischidioides*** (Ridl.) D.J.Middleton (app)

*Aeschynanthus evrardii* Pellegr. (4)

*Aeschynanthus fecundus* P.Woods (3)

*Aeschynanthus fulgens* Wall. ex R.Br. (4)

*Aeschynanthus garrettii* Craib (5)

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*Aeschynanthus hildebrandii* Hemsl. ex Hook.f. (2)  
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*Aeschynanthus hosseusianus* Kraenzl. (15)  
*Aeschynanthus hosseusii* Pellegr. (7)  
*Aeschynanthus hosseusii sensu* Barnett, *pro parte* (14)  
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*Aeschynanthus humilis sensu* Pellegrin, *pro parte* (15)  
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*Aeschynanthus lanceolatus* Ridl. (16)  
*Aeschynanthus lineatus* Craib (9)  
*Aeschynanthus longicalyx* Ridl. (18)  
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*Aeschynanthus longicaulis sensu* Pellegrin, *pro parte* (12)  
*Aeschynanthus longicaulis* Wall. ex R.Br. (10)  
*Aeschynanthus longiflorus* (Blume) A.DC. (11)  
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*Aeschynanthus macrocalyx* Hosseus (7)  
*Aeschynanthus maculatus* Lindl. (14)  
*Aeschynanthus maculatus* var. *sikkimensis* C.B.Clarke (14)  
*Aeschynanthus maculatus* var. *stenophyllus* C.B.Clarke (14)  
*Aeschynanthus mannii* Kurz (ex)  
*Aeschynanthus marmoratus* T.Moore (10)  
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***Aeschynanthus minutifolius*** D.J.Middleton (13)  
*Aeschynanthus myrmecophilus* P.Woods (app)  
*Aeschynanthus novogracilis* W.T.Wang (6)  
*Aeschynanthus oxychlamys* Mendum (gen)  
*Aeschynanthus papuanus* (Schltr.) B.L.Burt (gen)  
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*Aeschynanthus sp.* Barnett (9)  
*Aeschynanthus speciosus* Hook. (19)  
*Aeschynanthus stenosphonius* W.T.Wang (4)  
*Aeschynanthus superbus* C.B.Clarke (20)  
*Aeschynanthus volubilis* Jack (gen)  
*Aeschynanthus zebrinus* Van Houtte (10)  
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- Euthamnus papuanus* Schltr. (gen)  
*Hoya membranifolia* Costantin (12)  
*Lysionotus longiflorus* Blume (11)  
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*Rheitrophyllum* Hassk. (gen)  
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*Trichosporum andersonii* (C.B.Clarke) Kuntze (2)  
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*Trichosporum gracile* (Parish ex C.B.Clarke) Kuntze (6)  
*Trichosporum griffithii* (R.Br.) Kuntze (10)  
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