

# TAXONOMIC REVISION OF THE GENUS ACANTHEPHIPIUM (ORCHIDACEAE)

S. A. THOMAS

Royal Botanic Gardens, Kew, Richmond, Surrey, TW9 3AB, England  
(Drawings by the author)

## SUMMARY

This is a revision of the genus *Acanthephippium* Blume. Eleven species are recognised. Seven names are here for the first time reduced to synonymy (*A. lycaste*, *A. odoratum*, *A. papuanum*, *A. pictum*, *A. simplex*, *A. sinense*, and *A. thailandicum*).

## INTRODUCTION

*Acanthephippium* is a genus of eleven species distributed in Southeast Asia from Sri Lanka to Nepal and north to Japan, all over the Malesian Archipelago and in many islands in the Pacific. The genus was established by Blume in 1825 with one species, *Acanthephippium javanicum*.

The generic name is derived from two Greek roots: *acantha* (thorn) and *ephippion* (saddle), the former referring to the long slender column, and the latter to the saddle-shaped lip. Blume (1825) first published the generic name as *Acanthophippium*, an orthographical error which he corrected in the preface of his *Flora Javæ* (1828). The older spelling was followed by several authors. I have followed Sprague (1928) who stated: "Since the spelling *Acanthophippium* contains a definite (and apparently unintentional) orthographic error, namely the missing of the initial letter of ehippium (a saddle) and the alteration to *Acanthephippium* involves no risk of confusion or error, the latter spelling should be adopted."

The plants are pseudobulbous terrestrials, with large plicate leaves. The inflorescence is lateral from the new year's growth, and much shorter than the leaves so that the flowers are mostly displayed low down on the plant. The flowers are large and fleshy, usually 3–4 cm long. The sepals are to a greater or lesser extent fused into a cylindrical-urceolate bowl or cup, which completely encloses the petals and column, and partially encloses the lip. When the flower is viewed from the side the midlobe of the lip can sometimes just be seen emerging from the sepaline tube. From the front of the flower the lip is better visible because the free apices of the sepals are recurved.

The habit is fairly uniform throughout the genus, and most of the diagnostic features are present in the flowers. Flowers of *Acanthephippium* are very fleshy, and they make poor herbarium specimens. On rehydration, the shape of the lip and keels can appear markedly different from those of flowers in a living state, or preserved in spirit (see note under *A. gougahense*). Soaking the flowers in ammonia solution for 24 hours to some extent restores the tissue to the original three-dimensional shape. The shapes of the callus, mentum

and anther-cap are considered the most important diagnostic features, especially the shape and number of keels on the disc of the lip. However, in some species generally regarded as having five keels, some specimens appear to have only three keels because the lateral keels could be interpreted as double-crested or partly dissected along their length. For this reason the callus structure has not been avoided in the early dichotomies of the key.

*Acanthephippium* is similar in habit to *Phaius* and *Calanthe*, but the floral structure seems closer to *Tainia*. This latter relationship needs further investigation. *Acanthephippium* is easily distinguishable from all other genera by its very characteristic jug-shaped flowers, hence the common name often applied to species of *Acanthephippium*, 'Jug orchids'.

Lindley (1833) placed *Acanthephippium* in the tribe *Vandaeae*. Pfitzer, in Engler & Prantl (1889) assigned *Acanthephippium* to subtribe *Phajinae* of the subfamily *Monandreae*, along with *Phaius*, *Calanthe* and *Spathoglottis*. From there on the classification of the genus has remained stable, being maintained by Schlechter (1912) and Senghas (1984), but Senghas used the name *Bletiinae* rather than *Phajinae* for reasons of nomenclatural priority. Dressler (1981) also placed *Acanthephippium* in the subtribe *Bletiinae* in an alliance with *Ancistrochilus*, *Anthogonium*, *Aulostylis*, *Bletia*, *Bletilla*, *Calanthe*, *Cephalantheropsis*, *Eleorchis*, *Gastrochris*, *Hexalectris*, *Ipsa*, *Pachystoma*, *Phaius*, and *Spathoglottis*.

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#### ACANTHEPHIPIUM

*Acanthephippium* Blume, *Bijdr.* (1825) 353, t. 47 ('*Acanthophippium*'); Lindley, *Gen. Sp. Orch. Pl.* (1833) 177; Hassk., *Cat. Hort. Bog.* (1844) 43; *Rchb. f.*, *Bonplandia* 4 (1856) 328; Blume, *Fl. Javae* (1859) 132, pl. 49; Lindley, *J. Linn. Soc.* 3 (1859) 21; *Miq.*, *Fl. Ind. Bat.* 3 (1859) 706; *Rchb. f.*, *Walp. Ann.* 6 (1861) 461; Beer, *Beitr. Morph. Biol. Fam. Orch.* (1863) 184; *Rchb. f.*, *Gard. Chron.* n.s. 15 (1881) t. 169; Ridley, *J. Bot.* 24 (1886) 354; Hook. f., *Fl. Brit. India* 5 (1890) 815; Ridley, *J. Linn. Soc.* 31 (1895) 285; J.J. Smith, *Nat. Tijd. Ned. Indië* 53 (1898) t. 5; King & Pantl., *Ann. Roy. Bot. Gard. Calc.* 8 (1898) 122, pl. 155; Trimen, *Handb. Fl. Ceylon* 4 (1898) 164; J.J. Smith, *Orch. Java* (1905) 215; *Fig.-Atlas* 2 (1909) 158; *Nova Guinea* 8, 1 (1909) 25; Ames, *Philipp. J. Sc.*,

Bot. 6 (1911) 50; Schltr., Bot. Jahrb. 45, Beibl. 104 (1911) 28; Ridley, Sarawak Mus. J. I, 2 (1912) 35; Schltr. in Fedde, Rep., Beih. 1 (1912) 371; Haniff, Gard. Bull. Str. Settl. 1, 6 (1913) 197; J.J. Smith, Bull. Jard. Bot. Buitenzorg II, 9 (1913) 33; Rolfe, Kew Bull. (1913) 142; Ames, Orch. 5 (1915) 93; J.J. Smith, Res. Sc. Nova Guinea 12, 3 (1915) 214; Schltr., Die Orchideen, ed. 1 (1915) 302; J.J. Smith in Fedde, Rep. 32 (1933) 242; Hsieh, Quart. J. Taiwan Mus. 8 (1955) 213; Holttum, Orch. Malaya (1957) 148; Seidenf. & Smitinand, Orch. Thailand (1961) 327; Backer & Bakh. f., Fl. Java 3 (1968) 331; Hu, Quart. J. Taiwan Mus. 25 (1972) 41; Garay & Sweet, Orch. South. Ryukyu Is. (1974) 130; Seidenf., Contr. Rev. Orch. Fl. Camb., Laos & Vietnam 5 (1975) 4, 5; Senghas in Schltr., Die Orchideen ed. 3 (1984) 867; Seidenf., Opera Bot. 89 (1986) 50; Aver., Prelim. List Vietn. Orch. 1 (1988) 8; Bot. J. (Leningr.) 73, 5 (1988) 720. — Type species: *Acanthephippium javanicum* Blume.

Terrestrial herbs. Roots few, short, unbranched. *Rhizome* short. *Pseudobulbs* closely approximate conical to cylindrical with few internodes and few leaves, more or less covered by persistent sheath fibres, upper half covered by leaf-sheaths. *Leaf* articulate, plicate, ovate to lanceolate-ovate to obovate; petioles sheathing, long or short. *New shoot* sprouting from the base of the mature pseudobulb, entirely covered by sheaths which become progressively larger towards the apex of the shoot. *Inflorescence* lateral from a lower node on the new shoot or from a lower node on the old pseudobulb, erect, short, peduncle more or less hidden by sheaths, few-flowered; floral bracts foliaceous, cymbiform, often pale purple. *Flower* large, resupinate, fleshy, the sepals connate at the base forming an obliquely urceolate body, free at the top. *Dorsal sepal* oblong to obovate, concave; apex rounded to obtuse. *Lateral sepals* obliquely oblong; apex recurved and obtuse. *Petals* elliptic to spatulate, free, appressed to the sepaline tube. *Lip* more or less mobile, articulate on the apex of the long column-foot, 3-lobed or in *A. eburneum* indistinctly 3-lobed; lateral lobes usually hatchet-shaped, erect; midlobe triangular to oblong, usually reflexed from the middle; disc with a varying number of longitudinal keels or thickening of the veins. *Mentum* formed by the lateral sepals and the column-foot, globose or spur-like. *Column* straight, broad, sometimes narrowly winged at the margin towards the apex; column-foot long, inflexed in the middle and slightly recurved towards the apex. *Stigma* broadly obovate to obovate; anther 2-celled, often with a rounded elevation, front margin drawn out in a flap, margin often erose, truncate or apiculate. *Pollinia* 8, ellipsoid, in two groups of 4, two of these larger, and two smaller. *Ovary* grooved, often sparsely and finely pubescent. *Fruit* held on long, erect stalks, ellipsoid, ridged.

Distribution — India, Sri Lanka, Nepal, Bangladesh, Burma, southern China, Taiwan, southern Japan, Hong Kong, the Ryukyu Islands, Thailand, Vietnam, Malay Peninsula, Sumatra, Java, Lesser Sunda Islands, Borneo, Celebes, the Philippines, New Guinea, Solomon Islands, Vanuatu, Fiji, Tonga, Horne Islands, New Caledonia.

Habitat & Ecology — Terrestrial under heavy shade on the forest floor in deep leaf litter, often near river or stream banks; altitude 500–1400 m.

#### ARTIFICIAL KEY TO THE SPECIES OF ACANTHEPHIPIUM

- 1a. Lip entire or indistinctly 3-lobed, with thickened nerves but no prominent keels . . . . . **3. *A. eburneum***
- b. Lip distinctly 3-lobed, with 1–5 prominent keels . . . . . 2
- 2a. Mentum spur-like . . . . . 3
- b. Mentum not spur-like . . . . . 4

- 3a. Lip with 1 prominent keel, midlobe smaller than sidelobes ..... 10. **A. striatum**
- b. Lip with 5 keels, midlobe larger than sidelobes ..... 2. **A. curtisii**
- 4a. Dorsal sepal 18–22 mm long ..... 5
- b. Dorsal sepal 25–39 mm long ..... 6
- 5a. Lateral keels low and rounded, midlobe smaller than sidelobes .. 4. **A. gougahense**
- b. Lateral keels rectangular, midlobe subequal to sidelobes ..... 8. **A. parviflorum**
- 6a. Lateral keels double-crested ..... 10
- b. Lateral keels not double-crested ..... 7
- 7a. Keels mucronate, rounded and even ..... 7. **A. mantinianum**
- b. Keels on lip toothed, uneven or dissected ..... 8
- 8a. Median and lateral keels subequal, triangular in cross section ..... 1. **A. bicolor**
- b. Median keel reduced, much shorter than lateral keels ..... 9
- 9a. Lateral keels dissected into raised, sometimes forked appendages. Flowers yellow and red ..... 5. **A. javanicum**
- b. Lateral keels somewhat dissected and irregular at apical end but not with forked appendages. Flowers ochre and lilac ..... 6. **A. lilacinum**
- 10a. Mentum longer than column. Anther with truncate, erose front margin and a central cuspidate point ..... 11. **A. sylhetense**
- b. Mentum equal in length to column. Front margin of anther drawn out into an acute, triangular flap ..... 9. **A. splendidum**

### 1. *Acanthephippium bicolor* Lindley — Fig. 56

*Acanthephippium bicolor* Lindley, Bot. Reg. 20 (1835) t. 1730; Maund, Botanist 4 (1840) t. 200; Lemaire, Hort. Univ. 2 (1841) 130; Beer, Beitr. Morph. Biol. Fam. Orch. (1863) 184; Hook. f., Fl. Brit. India 5 (1890) 815; Trimen, Handb. Fl. Ceylon 4 (1898) 164; Fyson, Fl. S. Indian Hill Stat. (1932) 570; Fischer in Gamble, Fl. Pres. Madras Rep. ed. 3 (1957) 997; Rao, Orch. Rev. 86, 1023 (1978) 275; Pradhan, Indian Orch. 2 (1979) 700; Dassan. & Fosberg, Rev. Handb. Fl. Ceylon (1981) 145; Mathew, Fl. Tamilnadu Carnatic (1983) 1572; Joseph, Orch. Nilgiris (1987) 32. — Type: *Watson s.n.* (K), Sri Lanka.

Terrestrial herb to 1 m tall. Roots few, to 12 cm long, 3–4 mm diam. *Pseudobulb* 2- or 3-leaved, ovoid to fusiform, with about six nodes, 5–17 cm high by 1.5–5 cm diam., lower half more or less covered by persistent sheath fibres, upper half sheathed by leaf-petioles. *Leaf* lanceolate to ovate, 5 prominent veins on underside, 20–40 by 4–13.5 cm, acuminate or acute; petioles sheathing, long or short, 2–10 by 0.5–0.8 cm. *Inflorescence* lateral from new shoot, arising from axil of lower sheaths, 3–7-flowered; peduncle more or less hidden by leaf-sheaths, 3–4 cm long; rhachis 1–3 cm long; floral bracts cymbiform, pale purple, foliaceous, ovate-lanceolate, acute, 9–11-veined, 28–35 by 20–35 mm. *Flower* fleshy. *Dorsal sepal* oblong, obtuse, minutely pubescent at the base, adnate to lateral sepals for approximately the basal 2/3, 7-veined, 25–32 by 11–26 mm. *Lateral sepals* obliquely oblong, 7-veined, recurved and obtuse at the apex, 44–46 by 20–22 mm. *Petals* obovate to spatulate, fleshy, 5-veined, 30–31 by 14–15 mm. *Lip* 3-lobed; midlobe linear 4–6 by 5–8 mm, thick, tongue-like, dilated at the apex, strongly reflexed about the middle, surface uneven with lateral grooves in apical half; sidelobes 8 by 6–8 mm, hatchet-shaped, arising 2–3 mm from the base of the lip; disc 4–6 by 5–8 mm; callus on disc consisting of 3 keels, lateral keels asymmetrically triangular in cross section, c. 6 mm long, central keel

slightly shorter and lower, triangular in cross section, keels toothed at each end, the apices often bearing a few minute, acute projections. *Mentum* obtuse at the apex, shorter than the dorsal sepal; column-foot 40–45 mm, inflexed more or less in the middle through an angle of c. 45°, slightly recurved towards the apex, united to the lateral sepals for about 1/2 of its length. *Column* straight, 14–15 mm long, 5–7 mm diam., narrowly winged at margin towards apex; stigma broadly obovate, c. 4 mm long; anther c. 4 by 4 mm, with a short rounded attachment on adaxial side, the front margin drawn out, slightly erose, truncate apart from a central cuspidate point. *Pollinia* 8, the larger pollinia c. 2.6 by 1.2 mm, the smaller pollinia c. 1.4 by 1 mm. *Ovary* grooved, sparsely and finely pubescent, together with pedicel 35–40 mm long. *Fruit* to 9 cm long.

Collectors' notes — Flowers yellow, the sepals tipped or blotched with dark red at the apex.

Distribution — India (11 coll.), Sri Lanka (3). Material seen from AMES, BM, BR, C, K, P, PDA, W (microfiche).

Habitat & Ecology — Tropical wet evergreen forest, growing in clumps in deep shade. Fl. May–June and Oct.–Nov., rarely April or Aug. Altitude 500–1200 m.

## 2. *Acanthephippium curtisii* Rchb. f. — Fig. 57; Plate 5c

*Acanthephippium curtisii* Rchb. f., Gard. Chron. n.s. 15 (1881) t. 169; Lückel, Die Orchidee 29 (1978) 193. — Type: via J. Veitch, Malayan Archipelago, *Reichenbach f. herb no. 38908* (W).

Terrestrial herb to 60 cm high. Roots few, to 15 cm long, 3–4 mm diam. *Pseudobulb* 2- or 3-leaved, ovoid to fusiform, with 4–6 nodes, to 12 cm high, 1 cm diam., more or less covered by persistent sheath fibres. *Leaf* broadly lanceolate to elliptic, 5–7 prominent veins on underside, 36–46 by 13–14 cm, acute; petioles sheathing, long, 6–15 cm by 0.5–0.8 cm diam. *Inflorescence* lateral, arising from a lower node on the new shoot, flowers up to six; peduncle 15 cm long, bearing 2 or 3 sterile bracts 3–3.7 cm long; rachis 5 cm long; floral bracts cymbiform, pale purple, foliaceous, ovate-lanceolate, acute, 3 by 1.5 cm. *Flower* fleshy. *Dorsal sepal* oblong, apex rounded, minutely and sparsely pubescent at the base, connate to the lateral sepals for the basal c. 2/3, 7-veined, 38 by 15 mm. *Lateral sepals* obliquely oblong, minutely and sparsely pubescent at the base, 7-veined, obtuse and strongly recurved at the apex, 45 by 20 mm. *Petals* spatulate, fleshy, minutely and sparsely pubescent at the base, 5-veined, 30–31 by 14–15 mm. *Lip* 3-lobed; midlobe broadly obovate, spreading, margin minutely undulate, reflexed about the middle, 19 by 10 mm; sidelobes hatchet-shaped, their proximal edges arising 2 mm from the base of the lip, erect, 7 by 5 mm; disc 5 by 5 mm; callus on the disc consisting of 5 crenulate keels, the central keel low, indistinct, extending beyond the lateral keels, 4 mm long, the lateral keels partly folded over and obscuring the central keel, the outermost keel extending the furthest towards the base of the disc, 4 mm long, the innermost keel slightly shorter. *Mentum* longer than the column, restricted at the end to form a short, blunt spur. *Column* straight, 12 mm long, 5 mm diam.; stigma broadly obovate, c. 4 mm long; anther c. 4 by 4 mm, the front margin drawn out, minutely erose, truncate apart from a central cuspidate point; column-foot 40 mm, inflexed more or less in the middle through an angle of c. 30°, slightly recurved towards the apex, united to the lateral sepals for about 2/3 of its length. *Pollinia* not seen. *Ovary* grooved, sparsely and finely pubescent, together with pedicel 25–30 mm long. *Fruit* to 9 cm long.

Collectors' notes — Flowers with a pale creamy-pink base colour, the sepals and petals abaxially striped with red along the veins, adaxially spotted with red in the basal half and strongly blotched or completely red in the apical 1/4, the column white, the lip yellow with dark red markings.

Distribution — Malaysia: Sarawak, 1 collection: R. George in Lamb AL 266/86 (K). [Malayan Archipelago, Reichenbach f. herb no. 38908 (W) seen on microfiche.]

Note — This species can be distinguished by the 5 keels on the disc, the broadly spreading midlobe of the lip, and the short blunt spur.

### 3. *Acanthephippium eburneum* Kraenzl. — Fig. 58

*Acanthephippium eburneum* Kraenzl., Gard. Chron. ser. 3, 20 (1896) 266; J.J. Smith, Bull. Jard. Bot. Buitenzorg III, 2 (1930) t. 44; in Fedde, Rep. 32 (1933) 242; Blumea 5 (1945) 728. — Type: cult. Wolter (B, probably lost), isotypes not located.

*Acanthephippium lycaste* Ridley, Sarawak Mus. J. 1, 2 (1912) 35. — Type: Ridley *s.n.* (K), Sarawak, Kuching, June 1911.

Terrestrial herb to c. 70 cm high. Roots few, to 6 cm long, 3–4 mm diam. *Pseudobulb* 2- or 3-leaved, ovoid to fusiform, with 4–6 nodes, 5–15 cm high by 1 cm diam., more or less covered by persistent sheath fibres. *Leaves* elliptic to broadly elliptical, 5 prominent veins on underside, 30–40 by 12–14 cm, apex acute to apiculate; petioles sheathing, ribbed, long, 8–11 cm. *Inflorescence* lateral, arising from basal node on the new growth, 3 or 4 flowers; peduncle short, stout 5–10 cm long, 5 mm diam., bearing 2 or 3 sterile bracts 1–2.5 cm long; rachis 3 cm long; floral bracts cymbiform, foliaceous, ovate-lanceolate, apex acute, 2.1–2.5 by 1.7–2.4 cm. *Flower* fleshy. *Dorsal sepal* lanceolate-oblong, rounded, obtuse, adnate to lateral sepals for the basal 1/3, 5–7-veined, 24–25 by 10–11 mm. *Lateral sepals* obliquely oblong, 6- or 7-veined, apex rounded and strongly recurved, 27–30 by 13–15 mm. *Petals* lanceolate, obtuse, fleshy, free, mid-nerve adnate to the margin of the dorsal sepal and lateral sepal in basal half, 3-veined, 18 by 6 mm. *Lip* fleshy, entire or indistinctly 3-lobed, fleshy with thickened margins, 12–14 by 8–9 mm, one low, indistinct median keel extends the central third of the lip, sometimes with a slight thickening of lateral nerves. *Mentum* forming an obtuse, geniculate spur as long as the ovary, spur becomes less geniculate as the flower matures. *Column* straight, 10–12 mm long, 4–5 mm diam.; stigma broadly obovate to heart-shaped, c. 5 mm long; anther 4.6 by 3.4 mm, with a rounded attachment on the adaxial side, the front margin drawn out, acuminate. *Pollinia* 8, the larger pollinia 2.5 by 1 mm, the smaller pollinia 1.5 by 1 mm. *Ovary* grooved, sparsely and finely pubescent, together with pedicel 30–40 mm long. *Fruit* not seen.

Collectors' notes — Flowers white with dark crimson-red markings on the inside of the sepals and petals; lip white with yellow and crimson-red markings; column white, yellow at the base with crimson-red markings.

Distribution — Sumatra, 3 collections: cult. Hort. Buitenzorg 1891 (L), cult. Hort. Buitenzorg det. J.J. Smith (L), *Toroës 131* (AMES). Malaysia: Sarawak, 1 collection: Ridley *s.n.* (K).

Notes — 1. *Acanthephippium lycaste* has here been reduced to synonymy for the first time.

2. *Acanthephippium eburneum* can be distinguished by its entire or indistinctly 3-lobed lip and slightly geniculate spur-like mentum.

3. A specimen at BR from the herbarium of Alfred Cogniaux is labelled *Acanthephippium leontoglossum* Rolfe. This name appears to be unpublished. The material is poor, consisting only of a single flower, and there are no locality notes. The lip, anther-cap and pollinia agree well with those of *A. eburneum*.

#### 4. *Acanthephippium gougahense* (Guillaumin) Seidenf. — Fig. 59

*Acanthephippium gougahense* (Guillaumin) Seidenf., Contr. Rev. Orch. Fl. Camb., Laos & Vietnam 4 (1975) Seidenf., Contr. Rev. Orch. Fl. Camb., Laos & Vietnam 5 (1975) 4. — *Calanthe gougahensis* Guillaumin, Bull. Mus. Nat. Hist. Nat., sér. 2, 26 (1954) 537; Aver., Ident. Guide Vietn. Orch. (1994) 114. — Type: C. R. S. T. 226 (holo P), Annam, Dalat, Gougah.

*Acanthephippium sinense* auct. non Rolfe: Schltr. in Fedde, Rep. 4 (1919) 229; Hu, Quart. J. Taiwan Mus. 25 (1972) 41; Gen. Orch. Hong Kong (1977) 90; Walden, Wild Fl. of Hong Kong (1977) 44; Barretto & Saye, Hong Kong Orch. (1980) 14; Isaac-Williams, Intr. Orch. Asia (1988) 11.

*Acanthephippium thailandica* Seidenf., Bot. Tidsskr. 66 (1971) 335; Opera Bot. 89 (1986) 53, f. 25. — Type: *Smitinand s.n.* (holo C), Thailand, Phu Krading, Loei, 1300 m.

*Acanthephippium odoratum* Aver., Ident. Guide Vietn. Orch. (1994) 112, f. 5. — Type: *Averyanov et al. N 323*, 17-06-1989 (holo LE; iso HN), Vietnam.

Terrestrial herb to 50 cm high. Roots few, to 7 cm long, 3–4 mm diam. *Pseudobulb* 2-leaved, rarely 1-leaved, ovoid cylindrical with c. 4 nodes, to 7 cm long, 1–1.5 cm diam., lower half more or less covered by persistent sheath fibres, upper half sheathed by leaf petioles. *Leaf* elliptic to oblong-elliptic, 3 prominent veins on the underside, 19–32 by 7–8 cm, acute; petioles sheathing, long or short, 2–16 cm. *Inflorescence* lateral from new shoot, arising from axil of lower sheaths, 3–6-flowered; peduncle partially hidden by leaf-sheaths, 10 cm long; floral bracts cymbiform, foliaceous, ovate lanceolate, to 30 by 10 mm. *Flower* fleshy. *Dorsal sepal* oblong, obtuse, adnate to lateral sepals for the basal 2–4 mm, 3–5-veined, 18–22 by 7–10 mm. *Lateral sepals* oblong to obliquely oblong, 5-veined, recurved and obtuse at the apex, 24–28 by 13–15 mm. *Petals* oblong to oblong-lanceolate, fleshy, 5-veined, 18–22 by 6–10 mm. *Lip* 3-lobed; midlobe fleshy, linear to triangular, strongly reflexed about the middle, surface uneven with slight lateral grooves, 4–5 by 2–3 mm; sidelobes hatchet-shaped, not constricted, arising from the articulated base of the lip, erect, 5–8 by 5–8 mm; disc 3 by 4 mm; callus on disc consisting of 3 keels, the lateral keels rounded and well developed, median keel less significant and only developed at the distal end of the disc, rarely small dissections or teeth at the apical end. *Mentum* obtuse at apex, about equal in length to the dorsal sepal. *Column* straight, 10–12 mm long; stigma broadly obovate; column-foot 22–26 cm long, inflexed more or less in the middle through an angle of c. 60°; anther: front margin drawn out into a flap, erose, truncate with a tiny, central apiculate tip. *Pollinia* 8, the larger pollinia c. 1.5 by 1 mm; the smaller ones c. 1 by 1 mm. *Ovary* grooved, together with pedicel 2–3 cm long. *Fruit* not seen.

Collectors' notes — Flowers creamy white with faint red veins on the outside and red striations on the apical inner sides of the sepals and petals; lip white with a yellow midlobe, and some purple on the margins of the sidelobes.

Distribution — China, Hong Kong (3 coll.), Vietnam (3), Thailand (2). Material seen from AMES, C, HK, K, L, P.

Ecology — Flowers April or May.

Notes — 1. Having carefully compared material of *A. gougahense*, *A. thailandicum* and *A. sinense* auct. non. Rolfe (see note under *A. striatum*) it can be concluded that they all

belong to the same species. In the Kew collection we have both herbarium and spirit material of *Hu 10166* sent to Kew from Hong Kong via Mrs Barretto and named as *A. sinense*. On examination of the spirit material it seemed to match Seidenfaden's drawing of *A. thailandicum* (1986). On rehydrating a flower from the herbarium material of the same specimen the callus appeared quite different, and matched Seidenfaden's drawing of *A. gougahense* (1975). The state of preservation of the fleshy flowers has a marked effect on the appearance of the callus, and this may have caused previous authors to recognise too many species. A flower that Mrs Barretto sent to Seidenfaden, and that I have seen, does not perfectly match the type material of *A. thailandicum* as it has a slight angularity to the keels at the basal end of the disc, however in all other respects, especially the shape of the mentum and anther-cap, it appears the same. *Acanthephippium gougahense* was reduced to a synonym of *A. bicolor* by Pradhan (1979). Having examined type material of both species I believe them to be clearly distinct. The pencil drawing on the type sheet of *A. gougahense* is inaccurate, showing rounded sidelobes, very constricted at the base.

2. Averyanov (1994) has recently described *Acanthephippium odoratum*, distinguishing it from *A. gougahense* on the denticulate nature of the callus. This would appear to be a similar identification problem as that described above. Averyanov's description and drawing show a plant which I would consider to fall within the variation acceptable for *A. gougahense*. Indeed, with his description Averyanov cites illustrations in Hu (1977) and Barretto & Saye (1980) (*Acanthephippium sinense* auct. non Rolfe, see note under *A. striatum*); these drawings differ a little from Averyanov's but still appear to be *A. gougahense*. I have not seen the type of *A. odoratum* but the evidence seems to suggest it is better placed in synonymy.

### 5. *Acanthephippium javanicum* Blume — Fig. 60; Plate 5d

*Acanthephippium javanicum* Blume, Bijdr. (1825) 353, t. 47; Lindley, Gen. Sp. Orch. Pl. (1831) 177; Hassk., Tijdschr. Nat. Gesch. Phys. 9 (1842) 141; Cat. Hort. Bog. (1844) 43; Lindley, Bot. Reg. 32 (1846) t. 47; Hassk., Pl. Jav. Rar. (1848) 127; Moore, Ill. Orch. Pl. (1850) t. 1; Moore & Ayres, Mag. Bot. 1 (1850) 192; Rchb. f., Bot. Mag. 47 (1850) 4492; Bonplandia 4 (1856) 328; Blume, Fl. Javae (1858) 132, pl. 49; Miq., Fl. Ind. Bat. 3 (1859) 706; Beer, Beitr. Morph. Biol. Fam. Orch. (1863) 184; Stein, Orchideenbuch (1892) 53; J.J. Smith, Teysmannia 4 (1893) 648, t. 3; Kerch., Livre Orch. (1894) 123; Linden, Orch. Exot. (1894) 568; Ridley, J. Linn. Soc. 31 (1895) 285; J.J. Smith, Nat. Tijdschr. Ned.-Indië 53 (1898) t. 5; Orch. Java (1905) 214; Fig.-Atlas 2 (1909) f. 158; Koord., Exk. fl. Java 1 (1911) 371; Bailey, Stand. Cycl. Hort. (1916) 2387; Burkill, Gard. Bull. Str. Settl. 2 (1918) 44; Ames, Orch. 6 (1920) 157; Ridley, Fl. Mal. Pen. 4 (1924) 116; J.J. Smith, Mitt. Inst. Allg. Bot. Hamburg 7 (1927) 40; in Fedde, Rep. 32 (1933) 243; Holttum, Orch. Malaya (1957) 148; Backer & Bakh. f., Fl. Java 3 (1968) 331; Senghas in Schltr., Die Orchideen, ed. 3 (1984) 867; Comber, Orch. Java (1990) 89. — Type: *Blume s.n.*, Java (not located).

*Acanthephippium curtisii* auct. non Rchb. f.: Fowlie, Orchid Dig. 49, 2 (1985) 49.

Terrestrial herb to 30–60 cm high. Roots few, to 7 cm long, 3–4 mm diam. *Pseudobulb* 2- or 3-leaved, ovoid to fusiform, with about 3 nodes, 5–17 cm high by 1.5–2 cm diam., lower half more or less covered by persistent sheath fibres, upper half sheathed by leaf-petioles. *Leaf* obovate-lanceolate, 5 prominent veins on underside, 16–60 by 6–17 cm, acute; petioles sheathing, short. *Inflorescence* lateral from lower node of pseudobulb, 3- or 4-flowered; peduncle more or less hidden by leaf sheaths, 3–7 cm long bearing sterile bract remains in upper half; rhachis 1–3 cm long; floral bracts cymbiform, pale purple, foliace-

ous, narrowly ovate-lanceolate, acute, 9–11-veined, 25–40 by 17–23 mm. *Flower* fleshy. *Dorsal sepal* oblong, obtuse, adnate to lateral sepals for the basal c. 2/3, 7-veined, 24–39 by 16–26 mm. *Lateral sepals* obliquely oblong, 5–7-veined, recurved and obtuse at the apex, 35–39 by 16–22 mm. *Petals* obovate to spatulate, fleshy, 5-veined, 30–32 by 14–16 mm. *Lip* 3-lobed; midlobe linear, thick, tongue-like, dilated at the apex, strongly reflexed about the middle, surface uneven with lateral grooves in apical half, 6–7 by 5–8 mm; sidelobes hatchet-shaped, erect, 8–10 by 7–10 mm; disc rectangular, 7 by 5 mm; callus on the disc of 3 or 5 very dissected keels, the median keel high at the base, the lateral keels highest in the centre of the disc and dissected into several raised, forked, often minutely papillose appendages. *Mentum* obtuse at the apex, shorter than the dorsal sepal. *Column* straight, 14–15 mm long, 5–7 mm diam., narrowly winged at margin towards apex; column-foot 40–45 mm long, 8–10 mm diam. at widest point, inflexed more or less in the middle through an angle of c. 50°, slightly recurved towards the apex, united to the lateral sepals for about 1/2 of its length; stigma broadly obovate, c. 5 by 2 mm; anther c. 4 by 4 mm, the front margin drawn out, erose and emarginate with a central cuspidate point. *Pollinia* 8, the larger pollinia c. 2.5 by 1.2 mm, the smaller pollinia c. 1 by 0.8 mm. *Ovary* grooved, sparsely and finely pubescent, together with the pedicel 35–40 mm long. *Fruit* to 7 cm long.

Collectors' notes — Flowers with the sepals and petals pale yellow with light red veins, adaxially heavily veined with red, the lip bright yellow with dark red markings at the apex.

Distribution — Malay Peninsula (fide Holttum, 1957), Sumatra (2 coll.), Java (7), Sabah (9), Sarawak (1), Lesser Sunda Islands (Flores) (1). Collections seen from AMES, BM, G, K, L, P.

Ecology — Flowers February to April. Altitude 200–1500 m.

## 6. *Acanthephippium lilacinum* J.J. Wood & C.L. Chan — Fig. 61

*Acanthephippium lilacinum* J.J. Wood & C.L. Chan in Orch. Borneo 1 (1994) 53, f. 1. — Type: Lamb K51 (K), Sabah, Crocker Range, Sinsuran Road.

Terrestrial herb to 50 cm high. Roots few, to 10 cm long, 3–4 mm diam. *Pseudobulb* 2- or 3-leaved at the apex, ovoid to cylindrical, with 4–6 nodes, 11–15 cm long, 1.5 cm diam., more or less covered by persistent sheath fibres. *Leaf* elliptic, 5 prominent veins on underside, 36–50 by 13–14 cm, acute to subacuminate; petioles sheathing, long, 6–10 cm. *Inflouescence* lateral, arising from one of the lower nodes on the new shoot, 3–10 flowers; peduncle to 11 cm long, bearing 2 or 3 sterile bracts 2.7–3.1 cm long; floral bracts cymbiform, foliaceous, ovate-lanceolate, apex acute, 2.6–3 by 1.5–2 cm. *Flower* fleshy. *Dorsal sepal* oblong-lanceolate, rounded and recurved slightly at the apex, adnate to lateral sepals for the basal c. 3/4, 5-veined, 30–34 by 14–16 mm. *Lateral sepals* obliquely oblong-triangular, minutely and sparsely pubescent at base, 5-veined, apex rounded and strongly recurved, 32–40 by 18–22 mm. *Petals* spatulate to subrhombic, fleshy, 5–7-veined, 28–30 by 14–16 mm. *Lip* 3-lobed; midlobe 5–6 by 5–6 mm, oblong-lanceolate, strongly reflexed, surface uneven, covered in low crenulate ridges, apex obtuse; sidelobes erect, hatchet-shaped, their proximal edges arising at the base of the lip, top margins strongly inflexed, 5–6 by 7–8 mm; disc rectangular, 7 by 5 mm; callus on disc consisting of 2 keels extending the length of the disc with rounded projections at each end, sometimes the apical end dissected into several projections, the keels wider at the basal end and narrowing towards

the apex, with a small rounded projection at the base of the disc between the keels, and also a small projection at the apex of the disc between the keels. *Mentum* longer than the column, broad, obscurely bilobed, saccate. *Column* straight, 10–15 mm long, 4–5 mm diam.; stigma broadly obovate, 5 mm long; column-foot 45 by 6 mm, inflexed more or less in the middle through an angle of c. 50°, slightly recurved towards the apex, united to the lateral sepals for about 1/2 of its length; anther 3 by 4 mm, conical, the front margin drawn out, minutely erose, emarginate with a central cuspidate point. *Pollinia* 8, large pollinia 1.4 by 0.8 mm, small pollinia 0.7 by 0.8 mm. *Ovary* grooved, sparsely and finely pubescent, together with pedicel 3–4 cm long. *Fruit* 4–6 by 2 cm.

Collectors' notes — Flowers with a pale ochre base colour, the sepals and petals pale lilac adaxially, the sepals adnate to form a gibbous tube; lip white spotted lilac on lobes; column white.

Distribution — Sabah, 3 collections: *Lamb K51* (K), *239/85* (K), *Collenette 33* (BM).

Ecology — Terrestrial in deep leaf litter in montane primary forest. Altitude 900–1300 m.

Note — Very near to *A.javanicum*; however, the latter has more forked teeth on the keels, and has generally larger, more robust flowers of very different coloration. In other respects the two species are similar and further collections are needed to see if the distinguishing characters overlap.

## 7. *Acanthephippium mantinianum* Linden & Cogn. — Fig. 62

*Acanthephippium mantinianum* Linden & Cogn., J. Orch. 7 (1896) 138; Linden, Icon. Orch. (1896) 19; *Lindenia* 12 (1896) t. 536; Ames, Philipp. J. Sc., Bot. 6 (1911) 50; Orch. 5 (1915) 93; Enum. Philipp. Apost. & Orch. (1925) 330; Quisumb., Philipp. Orch. Rev. 1, 2 (1948) 153; Davies & Steiner, Philipp. Orch. (1952) 37, phot.; Katoh, Mitsuharu & Futakuchi, Orch. in Colour (1974) pl. 69; Kramer, Orch. Fl. Rom. Myst. (1975) 153; Valmayor, Orch. Philipp. 1 (1984) 84; 2 (1984) phot. 1. — Type: Philippines, cult. M.G. Mantin (holo BR).

Terrestrial herb to 50 cm high. Roots few, to 10 cm long, 3–4 mm diam. *Pseudobulb* 2- or 3-leaved, ovoid-cylindrical, with about 6 nodes, to 17 cm long, 1.5–3 cm diam., lower half more or less covered by persistent sheath fibres, upper half sheathed by leaf-petioles. *Leaf* elliptic to oblong-elliptic, 5 prominent veins on underside, 25–40 by 7–12 cm, acuminate or acute; petioles sheathing, long or short, 5–10 cm. *Inflorescence* lateral from new shoot, arising from axil of lower sheaths, 3–6-flowered; peduncle 3–9 cm long; rhachis 1–3 cm long; the floral bracts cymbiform, pale purple, foliaceous, ovate-lanceolate, acute, 9–11-veined, 22–33 by 17–22 mm. *Flower* fleshy. *Dorsal sepal* oblong, obtuse, adnate to lateral sepals for c. 3/4 length, 5-veined, 25–30 by 12–15 mm. *Lateral sepals* obliquely oblong, 5-veined, recurved and obtuse at the apex, 30–38 by 17–19 mm. *Petals* obovate to subquadrate, fleshy, 5-veined, 22–27 by 14–15 mm. *Lip* 3-lobed; midlobe 6–8 by 4–5 mm, linear, thick, tongue-like, dilated at the apex, strongly reflexed about the middle, surface uneven with lateral grooves in apical half; sidelobes hatchet-shaped, proximal edge arising 1–2 mm from the base of lip, erect, 7–8 by 5–6 mm; disc 5 by 9 mm; callus on disc consisting of 5 rounded keels, median keel low and indistinct, most prominent towards apical end of disc, lateral keels slightly more pronounced, outer keels short and apical. *Mentum* obtuse at apex, slightly constricted in the middle, as long as the dorsal sepal. *Column* straight, 13–14 mm long, 5–7 mm diam.; stigma broadly obovate, c. 5 mm long; column-foot 40–45 mm, inflexed more or less in the middle through an angle of c. 35°,

slightly recurved towards the apex, united to the lateral sepals for about 1/2 of its length; anther 4 by 3 mm, with a short rounded attachment on the adaxial side, the front margin drawn out, slightly erose, truncate apart from a central cuspidate point. *Pollinia* 8, the larger *pollinia* c. 2 by 1 mm; smaller *pollinia* c. 1 by 1 mm. *Ovary* grooved, sparsely and finely pubescent, together with pedicel 3–4 cm long. *Fruit* to 6 cm long.

Collectors' notes — Flowers yellow-orange with a few small dark red dots; sepals and petals striated with dark red at the apex; lip cream with yellow callus ridges and a few small red dots; column yellow.

Distribution — Philippines (8 coll.). Material seen from AMES, BR, K, L, P.

Ecology — Flowers during May and June. Altitude 500–1300 m.

Note — This species is similar to *A. sylhetense* but differs as it has rounded callus keels and a shorter mentum.

## 8. *Acanthephippium parviflorum* Hassk. — Fig. 63; Plate 6a

*Acanthephippium parviflorum* Hassk., Cat. Hort. Bog. (1844) 43; Miq., Fl. Ind. Bat. 3 (1859) 706; Rchb. f., Walp. Ann. 6 (1861) 461; J.J. Smith, Orch. Java (1905) 215; Fig.-Atlas (1909) f. 159; Koord., Exk.-fl. Java 1 (1911) 371; Backer & Bakh.f., Fl. Java 3 (1968) 332; Comber, Orch. Java (1990) 89. — Type: Hortus Bogoriensis, not located.

Terrestrial herb to c. 40 cm high. Roots few, to 13 cm long, 3–4 mm diam. *Pseudobulb* 2-leaved, ovoid to fusiform, with 4–6 nodes, to 10 cm high, 2 cm diam., more or less covered by persistent sheath fibres. *Leaf* elliptic to broadly elliptic, apex acute, 18–30 by 7–10 cm, 5 prominent veins on underside, acute to apiculate; petioles sheathing, long or short, 3–11 cm. *Inflorescence* lateral, arising from the lowest node on the new pseudobulb, 3–5 flowers; peduncle slender, 3–5 cm long; floral bracts cymbiform, foliaceous, ovate-lanceolate, apex acute, 1.5–2.2 by 1–1.5 cm. *Flower* fleshy. *Dorsal sepal* oblong, rounded, adnate to lateral sepals for the basal 1/2, 7-veined, 19–22 by 6–10 mm. *Lateral sepals* somewhat oblique, oblong, 5–7-veined, rounded and slightly recurved at the apex, 20–27 by 10–14 mm. *Petals* ovate, fleshy, 5–7-veined, 17–20 by 7–9 mm. *Lip* 3-lobed; midlobe fleshy, oblong, strongly reflexed, surface uneven, covered in low crenulate ridges, obtuse at the apex, 6 by 4 mm; sidelobes erect, hatchet-shaped, their proximal edges arising 1–2 mm from the base of the lip, upper and back margins strongly inflexed, constricted along the base, 7 by 6 mm; disc rectangular, 5 by 4 mm; callus on disc consisting of 3 keels; median keel low, rounded in cross section, slightly shorter than lateral keels, the lateral keels high, approximately rectangular in sideview. *Mentum* shorter or equal in length to the column, broad, globose. *Column* straight, 7–10 mm long, 3–4 mm diam.; stigma broadly obovate, c. 3 mm long; column-foot 45 mm, inflexed more or less in the middle to an angle of c. 50°, slightly recurved towards the apex, united to the lateral sepals for about 1/2 of its length; anther c. 3 by 4.5 mm, with a conical tip, front margin drawn out, acuminate. *Pollinia* not seen. *Ovary* grooved, sparsely and finely pubescent, together with pedicel 20–30 mm long. *Fruit* not seen.

Collectors' notes — Flowers cream to pale yellow; sepals and petals heavily subadnate with red in the apical 1/3; lip yellow.

Distribution — Sumatra, 1 collection: *van Steenis 3452* (L). Java, 1 coll.: *Winckel s.n.*, Oct. 1917 (L).

Ecology — Flowers Oct. Altitude 500–600 m.

## 9. *Acanthephippium splendidum* J.J. Smith — Fig. 64; Plate 6b

*Acanthephippium splendidum* J.J. Smith, Nat. Tijdschr. Ned.-Indië 63 (1898) 360, t. 5, f. 1–4; Orch. Ambon (1905) 24; Nova Guinea 8, 1 (1909) 25; *ibid.* 12, 3 (1915) 214; Ridley, Trans. Linn. Soc. Bot. 9, 2 (1916) 203; Rendle, J. Bot. 61 (1923) 55; J.J. Smith, Bot. Jahrb. 65 (1933) 471. — Type: Hort. Bot. Bogor cult. (Koorders) 328c (BO).

*Acanthephippium javanicum* auct. non Blume: Ridley, J. Bot. 24 (1886) 354.

*Acanthephippium papuanum* Schltr. in Fedde, Rep., Beih. 1 (1912) 371; *ibid.* 21 (1928) 494, t. 131; Miller, Orch. Papua New Guinea (1978) 75; Blaxell, Cont. N.S.W. Nat. Herb. 4 (1973) 459; Schltr. in Fedde, Rep. 21 (1926) 175, pl. 131; Kores, Allertonia 5 (1989) 136; Lewis & Cribb, Orch. Vanuatu (1989) 50; Orch. Solomon Is. & Bougainville (1991) 69. — Type: *Schlechter 16864* (holo B, lost; iso L, NSW, S).

*Acanthephippium vitiense* L.O. Williams, Sargentia 1 (1940) 9; Amer. Orch. Soc. Bull. 10 (1941) 169; Parham, Pl. Fiji Is. rev. ed. (1972) 378; Hallé, Fl. Nouvelle-Calédonie 8 (1977) 216. — Type: *Degener 14605* (AMES), Viti Levu, Navwanga, Tholo North, March 1941.

Terrestrial herb to 80 cm high. Roots few, to 26 cm long, 3–4 mm diam. *Pseudobulb* 2- or 3-leaved, ovoid to fusiform, with 4–6 nodes, to 12 cm high by 1 cm diam., more or less covered by persistent sheath fibres. *Leaf* (broadly) obovate, 5 prominent veins on underside, 30–46 by 10–14 cm, acute to apiculate; petioles sheathing, long, 6–8 cm. *Inflorescence* lateral, arising from the lowest node on the new growth, 3–5-flowered; peduncle 13–16 cm long, c. 5 mm diam.; rhachis 3–5 cm long; floral bracts cymbiform, foliaceous, narrowly ovate-lanceolate, acute, 3.8–4.2 by 3.7–3.9 cm. *Flower* fleshy. *Dorsal sepal* oblong, rounded, minutely and sparsely pubescent at base, adnate to lateral sepals for c. 1/2 their length, 5-veined, 38–37 by 15–16 mm. *Lateral sepals* obliquely oblong, minutely and sparsely pubescent at base, 5-veined, rounded and strongly recurved at the apex, 35–39 by 20–22 mm. *Petals* spatulate, fleshy, minutely and sparsely pubescent at base, mid-nerve adnate to the margin of the dorsal sepal and lateral sepal in basal half, 5–7-veined, 31–34 by 16–17 mm. *Lip* 3-lobed; midlobe oblong-lanceolate, strongly reflexed, surface uneven, covered in low crenulate ridges, apex obtuse, 6–10 by 6–7 mm; sidelobes erect, hatchet-shaped, their proximal edges arising 2–3 mm from the base of the lip, upper margins strongly inflexed, 5–8 by 5–6 mm; disc 6.5–7 by 5–6 mm; callus on disc consisting of 3–5 crenulate keels, the median keel rounded and low at the base of the disc, low and indistinct at the centre of the disc, rising at the distal end of the disc into a small rounded point, and then continuing as a low crenulate keel along 1/2 the length of the midlobe, the lateral keels more distinct than median keel, more or less oblique in cross section at the base and sometimes very oblique in cross section at the apex of the disc, crest double-keeled, lateral keels low at the base but rising towards the apex of the disc, ending in rounded projections or flaps. *Mentum* longer than the column, globose. *Column* straight, 10 mm long, 4–5 mm diam.; stigma broadly obovate, c. 5 mm long; column-foot 45 mm, inflexed more or less in the middle through an angle of c. 30°, slightly recurved towards the apex, united to the lateral sepals for about 1/2 of its length; anther 3.5–4.5 by 3.5–4 mm, the front margin drawn out into an acute triangular flap. *Pollinia* 8, the large pollinia 2.5 by 1 mm, the smaller 1.5 by 1 mm. *Ovary* grooved, sparsely and finely pubescent, together with pedicel 40 mm long. *Fruit* held on long stalks to 25 cm long, 4–6 by 2 cm.

Collectors' notes — Flowers with a yellow-orange base colour, the sepals striped with red along the veins, heavily spotted with red in the apical 1/4, the petals yellow with faint red-orange markings, the column white, the lip yellow with dark red-orange markings.

Distribution — Celebes (1 coll.), Ambon, Papua New Guinea (27), Fiji (10), Vanuatu (1), Solomon Islands (1), New Caledonia (5), Tonga, Horne Islands. Material seen from AMES, BO, BM, G, K, L.

Ecology — Altitude 0–1300 m.

Notes — 1. *Acanthephippium vitiense* was reduced to synonymy by Kores (1989) after examining the type material and spirit collections held at Kew. Kores also suggested that future studies might result in a reduction of *A. papuanum* to *A. splendidum*.

2. Comparison of spirit material of *A. splendidum* from Bogor determined by J.J. Smith with spirit material of *A. papuanum* from Kew and Leiden, and study of J.J. Smith's original drawings has shown *A. splendidum* and *A. papuanum* to be conspecific. Schlechter (1912) described *A. papuanum* without having seen material of *A. splendidum*, and he based his distinctions solely on J.J. Smith's (1898) written description.

3. *Acanthephippium splendidum* is a widespread species and there is variation in the size of the flowers and the degree to which the callus is developed. The number of keels on the disc could be interpreted as 3 or 5 because the crest of the lateral keel is more or less double. The keels differ from specimen to specimen, and there is also a noticeable variation between different flowers on the same plant.

## 10. *Acanthephippium striatum* Lindley — Fig. 65; Plate 6c

*Acanthephippium striatum* Lindley, Bot. Reg. 24 (1838) misc. 45; Rchb. f., Walp. Ann. 6 (1862) 460; Hook. f., Fl. Brit. India 5 (1890) 816; Ann. Roy. Bot. Gard. Calc. 5 (1895) 22, pl. 33; King & Pantl., Ann. Roy. Bot. Gard. Calc. 8 (1898) 122, pl. 155; Prain, Bengal Plants (1903) 762; J.J. Smith, Bull. Jard. Bot. Buitenzorg II, 9 (1913) 33; Schltr., Die Orchideen, ed. 1 (1915) 302; Ridley, J. Nat. Hist. Soc. Siam 4, 3 (1921) 117; Haines, Bot. Bihar & Orissa 6 (1924) 1168; J.J. Smith, Bull. Jard. Bot. Buitenzorg III, 6 (1924) t. 21; Holttum, Orch. Malaya (1957) 148; Tiwari & Mahesh., Ind. For. 89 (1963) 427; Seidenf. & Smitinand, Orch. Thailand (1965) 792, pl. 37; Backer & Bakh.f., Fl. Java 3 (1968) 331; Mehra & Vij, Taxon 19 (1970) 106; Tuyama, Univ. Mus. Tokyo Bull. 2 (1971) 176; Pradhan, Amer. Orch. Soc. Bull. 41 (1972) 511; Phamk., Ill. Fl. S. Vietnam 2 (1972) 1040, f. 5091; Orch. Digest 37, 4 (1973) 133; Seidenf., Contr. Rev. Orch. Fl. Camb., Laos & Vietnam 5 (1975) 5; Pradhan, Florida Orch. 19 (1976) 28; Ying, Col. Ill. Ind. Orch. Taiwan 1 (1977) 417; Pradhan, Indian Orch. 2 (1979) 246; Bose & Bhattacharjee, Orch. India (1980) 52; Pradhan, Orch. Rev. 89, 1057 (1981) 360; Hegde, Orch. Arunachal Pradesh (1984) 43, f. 44; Senghas in Schltr., Die Orchideen, ed. 3 (1984) 867; Seidenf., Opera Bot. 89 (1986) 50, f. 23, pl. 4B; Lin, Nat. Orch. Taiwan (1987) 24; Aver., Prelim. List Vietn. Orch. 1 (1988) 8; Bot. J. (Leningrad) 73, 5 (1988) 720; Comber, Orch. Java (1990) 90; Aver., Ident. Guide Vietn. Orch. (1994) 112. — Type: said to be from Nepal via Bateman, cult. Kew (holo K).

*Acanthephippium sinense* Rolfe, Kew Bull. (1913) 142. — Type: *S.T. Dunn s.n.* (holo HK), China, Swatow Distr., E Kwangtung, collected on the Han Expedition, April 1909.

*Acanthephippium unguiculatum* (Hayata) Fukuy., Bot. Mag. Tokyo 48 (1934) 301; Hsieh, Quart. J. Taiwan Mus. 8 (1955) 213; Hu, Quart. J. Taiwan Mus. 25 (1972) 41; Su, Nat. Orch. Taiwan (1974) 97; Mae-kawa, J. Jap. Bot. 50 (1975) 256; Cheng, Formosan Orch. (?1979) 6; Isaac-Williams, Intr. Orch. Asia (1988) 11. — *Tainia unguiculata* Hayata, Icon. Pl. Formosa 4 (1914) 61, f. 28; Schltr. in Fedde, Rep. 4 (1919) 176. — Type: Taiwan, cult. in Seminario, Taihoku (TI).

*Acanthephippium simplex* Aver., Ident. Guide Vietn. Orch. (1994) 109, f. 4. — Type: LX-VN 23.01. 1988, s.n. (LE).

Terrestrial herb to 50 cm high. Roots few, to 20 cm long, 3 mm diam. *Pseudobulb* 1- or 2-leaved, ovoid to cylindrical, with 3–5 nodes, to 15 cm high by 2.5 cm diam., more or less covered by persistent sheath fibres. *Leaf* elliptical to obovate (broadly ovate), with 3–5

prominent veins on underside, 19–25(–30) by 6–10(–16) cm, acute; petioles sheathing, ribbed, 3–6 cm. *Inflorescence(s)* lateral, arising from the lowest node on the new growth, 3–10-flowered, sometimes with two inflorescences arising simultaneously from the same node; peduncle 7–10 cm long, bearing many membranous ovate sterile bracts, clustered towards the apex, 2.5–5.1 cm long; rhachis 5 cm long; floral bracts foliaceous, ovate-lanceolate, acute, 1.5–2.6 by 2.0–2.6 cm. *Flower* thinner in texture than usual in the genus. *Dorsal sepal* oblong, rounded, adnate to lateral sepals for the basal 1/2, 5-veined, 15–29 by 10–14 mm. *Lateral sepals* obliquely oblong, 5–7-veined, rounded and strongly recurved at the apex, 30–38 by 15–20 mm. *Petals* obovate to oblong, fleshy, minutely and sparsely pubescent at base, 7-veined, 23–29 by 8–11 mm. *Lip* membranous, 3-lobed; midlobe small, triangular, 6 by 4 mm; sidelobes erect, rounded, their proximal edges arising 2–3 mm from the base of the lip, 8–9 by 10–11 mm; disc rectangular, 4 by 8 mm; callus on disc consisting of one low median keel starting 2–4 mm from the base of the lip and ending 2 mm from the apex, rounded in cross section. *Mentum* formed by lateral sepals and column-foot, longer than the column, narrow, spur-like, extinctiform. *Column* straight, 10–14 mm long, 4–5 mm diam.; column-foot c. 40 mm, inflexed more or less in the middle through an angle of 30–40°, slightly recurved towards the apex, united to the lateral sepals for about 1/2 of its length; stigma broadly obovate, c. 4 mm long; rostellum rounded, broadly obovate, 2 by 3 mm; anther 3 by 4 mm, with a long rounded attachment on the adaxial side, the front margin drawn out into an acute triangular flap. *Pollinia* 8, the large pollinia 2.4 by 1.6 mm, the small pollinia 1.6 by 0.6 mm. *Ovary* grooved, sparsely and finely pubescent, together with pedicel 3–4 cm long. *Fruit* not seen.

Collectors' notes — Flowers cream or white with red parallel venation; floral bracts with similar coloration.

Distribution — India (5 coll.), China (1), Thailand (4), Vietnam (2), Malaya, Java, Lesser Sunda Islands (1), Taiwan (4). Material seen from AMES, BM, BR, C, HK, K, L, P, TI.

Ecology — Flowers April–July. Altitude 800–1400 m.

Notes — 1. This is a very variable species, especially in flower size. The flower is far more membranous than any other species in the genus. Distinguished by the spur-like mentum and small midlobe of the lip. A specimen from Tonkin, *Pételot 5416* (P), has leaves which are broadly obovate, measurements are given in brackets in the description.

2. *Acanthephippium sinense* Rolfe is here reduced to synonymy. The type material is poor, but it is apparent that the lip has only one keel and a small midlobe and that the mentum is spur-like. The type is very different from specimens that all subsequent authors have referred to *A. sinense* (Schlechter, 1919; Hu, 1977; Barretto et al., 1980; Isaac-Williams, 1988). Therefore, *A. sinense* of Rolfe is a synonym of *A. striatum* while *A. sinense* auct. non Rolfe should be referred to *A. gougahense* (Guillaumin) Seidenf. (see note under *A. gougahense*). Specimens of *Acanthephippium* from Hong Kong have been incorrectly referred to *A. sinense* and should now be called *A. gougahense*.

3. Rolfe's original description compares *A. sinense* with '*A. striatum* Griff.'. However, *A. striatum* was described by Lindley. Griffith described only one species in the genus, namely *A. ringiflorum* (a synonym of *A. sylhetense* Lindley). It seems likely from the diagnosis that Rolfe confused the two.

4. *Acanthephippium unguiculatum* was reduced to synonymy by Tsan-Piao Lin (1987).

5. *Acanthephippium simplex* Aver. is here reduced to synonymy. Averyanov distinguishes *A. simplex* from *A. striatum* as the pseudobulb is diphyllous, not monophyllous,

and the lip had a single keel, as opposed to three. However, specimens seen of *A. striatum* have 1- or 2-leaved pseudobulbs. I have seen glasshouse specimens from the same clone exhibiting either one or two leaves. A good characteristic of *A. striatum* is that it has only one prominent keel. In some specimens the lateral nerves are minutely thickened and this is so exaggerated upon drying and rehydration it may be interpreted as keels causing some confusion. The illustration of *A. striatum* in Seidenfaden (1986) is misleading as it shows three very distinct keels. The interpretation of keel numbers has continued to cause problems and confusion within this genus. This is exasperated by the fleshy floral features becoming distorted upon drying. It has led to the erroneous descriptions of new species. I have not seen the type species of *A. simplex*. However, from the description, drawings, and diagnosis, I have no doubt that it is synonymous with *A. striatum*.

## 11. *Acanthephippium sylhetense* Lindley — Fig. 66; Plate 6a

*Acanthephippium sylhetense* Lindley, Gen. & Sp. Orch. (1833) 177; J. Linn. Soc. 3 (1859) 21; Hook. f., Fl. Br. India 5 (1890) 815; King & Pantl., Ann. Roy. Bot. Gard. Calc. 8 (1898) 111, pl. 154; Haniff, Gard. Bull. Str. Settl. 1, 6 (1913) 197; Schltr., Die Orchideen, ed. 1 (1915) 302; Burkill, Gard. Bull. Str. Settl. 2 (1921) 443; Rec. Bot. Surv. India 10, 2 (1925) 377; Gagnep. in Lecomte, Fl. Gén. Indo-China 6 (1934) 334, f. 29; Holttum, Orch. Malaya (1957) 148; Seidenf. & Smitinand, Orch. Thailand (1961) 327; Mehra & Vij, Taxon 19 (1970) 106; Naczej., Enum. Orch. Ryukyus 2 (1971) 114, pl. 45; Pradhan, Amer. Orch. Soc. Bull. 42 (1973) 879; Orch. Digest 37, 4 (1973) 133; Ying, Col. Ill. Ind. Orch. Taiwan 1 (1977) 417; Liu & Su in Li et al., Fl. Taiwan 5 (1978) 867; Pradhan, Indian Orch. 2 (1979) 246; Hegde, Arunachal Forest News 3, 3 (1980) 3; Misra, Bull. Bot. Surv. India 22 (1980) 149; Hegde, Orch. Arunachal Pradesh (1984) 43, f. 17; Senghas in Schltr., Die Orchideen, ed. 3 (1984) 867; Seidenf., Opera Bot. 89 (1986) 52, f. 24. — Type: *Hooker & Thomson 198* (K), India, Sylhet.

*Acanthephippium ringiflorum* Griff., Not. 3 (1851) 374; Ic. Pl. Asiat. (1851) t. 325. — Type: *Griffith s.n.*, not located.

*Acanthephippium curtisii* Rchb. f. var. *albidum* Linden, Lindenia 13 (1897) t. 619. — Type: not located.

*Acanthephippium yamamotoi* Hayata, Icon. Pl. Formosa 6 (1917) 73; Schltr. in Fedde, Rep. 4 (1919) 229; Hsieh, Quart. J. Taiwan Mus. 8 (1955) 213; Naczej., Enum. Orch. Ryukyus 1 (1971) 47; Hu, Quart. J. Taiwan Mus. 25 (1972) 41; Cheng, Formosan Orch. (?1979) 7. — Type: *Yamamoto s.n.* (TI), Taiwan, Uraisha.

*Acanthephippium pictum* Fukuy., Bot. Mag. Tokyo 49 (1935) 666; Hsieh, Quart. J. Taiwan Mus. 8 (1955) 213; Masam., Sc. Rep. Kanazawa Univ. 9 (1964) 135; Hatusima & Amano, Fl. Okinawa rev. ed. (1967) 163; Masam., Col. Ill. Fl. Nippon 8 (1969) 238; Hu, Quart. J. Taiwan Mus. 25 (1972) 41; Garay & Sweet, Orch. South. Ryukyu Is. (1974) 130; Walker, Fl. Okinawa & South. Ryukyu Is. (1976) 367; Sha, Bot. World 86 (1977) 1997; Liu & Su in Li et al., Fl. Taiwan 5 (1978) 867. — *Acanthephippium sylhetense* Lindley var. *pictum* (Fukuy.) Hashim., Ann. Tsukuba Bot. Gard. 3 (1985) 11. — Type: *Fukuyama 4679* (herb. Fukuyama), Taiwan, Kôtsôsyô, July 1934.

*Acanthephippium parviflorum* auct. non. Hassk.: Cumberlege, Hist. Bull. Siam Soc. 20, 3 (1963) 155.

Terrestrial herb to 50 cm high. Roots few, to 12 cm long, 3–4 mm diam. *Pseudobulb* 2- or 3-leaved, ovoid-cylindrical, with c. 6 nodes, to 17 cm long, 1.5–3 cm diam., lower half more or less covered by persistent sheath fibres, upper half sheathed by leaf-petioles. *Leaf* elliptic to oblong-elliptic, 5 prominent veins on underside, 24–40 by 7–10 cm, acuminate or acute; petioles sheathing, long or short, 5–17 cm. *Inflorescence* lateral from new shoot, arising from axil of lower sheaths, 3–6-flowered; peduncle more or less hidden by leaf sheaths, 3–9 cm long; rhachis 1–3 cm long; floral bracts cymbiform, pale purple, foliaceous, ovate-lanceolate, acute, 9–11-veined, 20–29 by 17–22 mm. *Flower* fleshy. *Dorsal sepal* oblong, obtuse, adnate to lateral sepals for about 3/4 length, 5-veined, 25–30 by 13–

15 mm. *Lateral sepals* obliquely oblong, 5-veined, recurved and obtuse at the apex, 38–45 by 18–20 mm. *Petals* obovate, fleshy, 5-veined, 27–31 by 14–15 mm. *Lip* 3-lobed; mid-lobe linear, thick, tongue-like, dilated at the apex, strongly reflexed about the middle, surface uneven with lateral grooves in apical half, 6–8 by 4–5 mm; sidelobes hatchet-shaped, slightly constricted, proximal edge arising 3–4 mm from the base of lip, erect, 7–8 by 5–6 mm; disc 5 by 6 mm; callus on disc consisting of 3 or 5 keels clearly toothed at each end, lateral keels broadly triangular in cross section, c. 6 mm long, central keel slightly shorter and lower, narrowly triangular in cross section. *Mentum* obtuse at apex, as long as the dorsal sepal. *Column* straight, 13–14 mm long, 5–7 mm diam.; column-foot 40–45 mm, inflexed more or less in the middle through an angle of c. 35°, slightly recurved towards the apex, united to the lateral sepals for about 1/2 of its length; stigma broadly obovate, c. 5 mm long; anther c. 4 by 3 mm, with a short rounded attachment on the adaxial side, the front margin drawn out, slightly erose, truncate apart from a central cuspidate point. *Pollinia* 8, the larger pollinia c. 2 by 1 mm; the smaller pollinia c. 1 by 1 mm. *Ovary* grooved, sparsely and finely pubescent, together with pedicel 3–4 cm long. *Fruit* to 6 cm long.

Collectors' notes — Flowers yellow, the sepals speckled or subadnate with red at apex, the lip bright yellow. Flowers richly scented.

Distribution — India (5 coll.), Bangladesh, Burma (1), Thailand (5), China (1), Taiwan (5), Japan (1). Material seen from AMES, AUU, BM, BR, C, K, L, P, TI.

Ecology — Flowers April–Oct. Altitude 500–1300 m.

Notes — 1. The number of keels on the disc might be interpreted as 3 or 5, because the crest of the lateral keel is double. The keels differ from specimen to specimen, and there is also a noticeable variation between different flowers on the same plant.

2. *Acanthephippium sylhetense* is very close to *A. bicolor* and further collections may show them to be synonymous. The keels on the latter are very evenly triangular in cross section, and the crest of the lateral keels is never double. The colours are also different. It is difficult to distinguish these two species from herbarium material alone.

3. *Acanthephippium yamamotoi* was reduced to synonym by Nackejima (1971).

4. *Acanthephippium pictum* was reduced to synonym by Tsan-Piao Lin (1987).

5. *Acanthephippium curtisii* var. *albidum* is here reduced to *A. sylhetense*.

#### INSUFFICIENTLY KNOWN SPECIES

##### *Acanthephippium chrysoglossum* Schltr.

*Acanthephippium chrysoglossum* Schltr., Bot. Jahrb. 45, Beibl. 104 (1911) 28; J.J. Smith in Fedde, Rep. 32 (1933) 242. — Type: *Schlechter 16027* (holo B), Sumatra, Kampong-Tengah, c. 800 m alt.

Note — No material of this species has been traced. The type was destroyed in Berlin. Possibly conspecific with *A. parviflorum*.