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Phaius tankervilleae and *P. wallichii* (Orchidaceae), a pair of confused species

Phillip Cribb¹, Mei Sun² & Gloria Barretto²

Summary. *Phaius tankervilleae* (Banks ex Aiton) Blume, a terrestrial orchid widespread from India and China to the SW Pacific Islands, is shown to include two distinct taxa, *P. tankervilleae sensu stricto* and *P. wallichii* Lindl. The recently described Chinese species *P. magniflorus* Z. H. Tsi & S. C. Chen is conspecific with the latter.

Introduction

Phaius tankervilleae (alternatively but wrongly spelt “*tancarvilliae*” and “*tankervilliae*” (see Seidenfaden 1986)) is a well-known and widespread species, but one that has caused considerable taxonomic confusion over the years. Widespread and variable species often acquire names from various parts of their range that analysis of the entire variation can show to be synonyms or regional variants. A plant of Chinese origin was first flowered and named by Joseph Banks as *Limodorum tankervilleae*, a name subsequently validated by Aiton in 1757. Carl Blume transferred it to the present genus in 1856. Many authors followed Hooker (1894) in accepting a morphologically variable species for which he used the name *P. wallichii*, with the earlier names *Limodorum tankervilleae* and *Phaius grandiflorus* in synonymy. *Phaius wallichii* was discovered in Sylhet by Nathaniel Wallich and was described by John Lindley in 1831. Most recent authors (Kataki 1986; Chowdhery 1998; Pearce & Cribb 2001) have followed Seidenfaden (1986) in recognising the priority of the name *P. tankervilleae*. Seidenfaden recognised *P. tankervilleae* as a morphologically variable species distributed from India and Sri Lanka to Taiwan, the Philippines, the Malaya Archipelago, SW Pacific and eastern Australia.

This paper originates from the discovery of two morphologically quite distinct, large *Phaius* species in Hong Kong. One of them, which has been known for many years in Hong Kong, matches well the type material of *P. tankervilleae*, but the other, a recent discovery there, is quite distinct in its floral

morphology. The former, originally described from Chinese material, has sub-nutant flowers with sepals and petals that are tan-brown within and white outside, a trumpet-shaped lip with a broad purple margin and blunt apex and a short spur less than 9 mm long. The other has larger flowers with more spreading, ochre-coloured sepals and petals and a conical, acute lip which is predominantly white with a yellow and a purple band in the throat and a spur up to 20 mm long (see Table 1). The latter has been referred to in Hong Kong as the “Kadoorie” *Phaius* (it was first found growing on the estate of the Kadoorie Botanic Garden and Experimental Farm in the New Territories) and clearly does not fall within the variation of *P. tankervilleae* as usually understood. A similar plant, illustrated in colour by Chen *et al.* (1999), was described as *P. magniflorus* by Tsi & Chen (1994). However, in its floral morphology the latter matches closely the species described from the Himalayas as *P. wallichii* and from Sri Lanka as *P. bicolor*.

Materials and methods

Living plants and recently collected herbarium and spirit collections of the two Hong Kong taxa have been studied and compared with herbarium and spirit material from elsewhere in mainland south and southeast Asia and Sri Lanka in the herbaria of Beijing, Kew, Leiden, the Natural History Museum, Paris and Singapore. A list of selected collections examined can be found in the taxonomic account that follows.

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¹ Herbarium, Royal Botanic Gardens, Kew, Richmond, Surrey, TW9 3AB, U.K.

² c/o “Girassol”, Taiipo Kau, New Territories, Hong Kong.

Table 1. Morphological comparison of *Phaius tankervilleae*, *P. wallichii* and the "Kadoorie" *Phaius*.

| | <i>Phaius tankervilleae</i> | "Kadoorie" <i>Phaius</i> | <i>Phaius wallichii</i> |
|--------------------|---|---|---|
| Pseudobulbs | ovoid to obliquely ovoid, 3–4 × 3–3.5 cm | ovoid, oblong-ovoid or oblong-ellipsoidal, 5–9 × 3–6 cm | ovoid, fusiform to subcylindrical, 10–14.5 × 4.5–5.7 cm |
| Leaves | 5–6, elliptic, 19–55 × 3.5–10 cm | 3–4, elliptic-lanceolate, 25–90 × 8–15 cm | 4, elliptic, 49–70 × 15–24 cm |
| Leaf venation | shallow | deep, well-defined | deep, well-defined |
| Scape | basal | emerging from middle, near apex of pseudobulb | emerging from middle of pseudobulb |
| Sheathing bracts | 7–8, glabrous | many, slightly pilose | many, slightly pilose |
| Buds | white | pale greenish-yellow | pale green |
| Floral bracts | 4–5 cm long | 2.8–5 cm long | 3–5 cm long |
| Flowers | somewhat nutant | spreading | spreading |
| Rhachis | 10–20 or more-flowered | 8–15-flowered | 4–15-flowered |
| Pediceal and ovary | 4.5–4.9 cm long | 5 cm long | 4–5.5 cm long |
| Dorsal sepal | up to 5 × 1.4 cm, acuminate | 6.5–7 × 1.3–1.4 cm, long-acuminate | up to 7 × 1.5 cm, acuminate |
| Lateral sepals | ovate-elliptic, acuminate, up to 6.5 × 1.2 cm | elliptic-lanceolate, long acuminate, 6–7 × 1.3–1.4 cm | elliptic-lanceolate, long acuminate, 4.6–6.8 × 1.2–1.4 cm |
| Sepal colour | chestnut-brown to cinnamon-brown within, white without | pale yellow overlaid with chestnut-brown or reddish-brown, pale yellow with a greenish tinge on outer surface | pale yellowish green tinged with red or brown, yellowish green on outer surface |
| Petals | elliptic, acute, 4–4.5 × 1.2–1.3 cm | obliquely elliptic-lanceolate, acuminate, 6 × 1.2 cm | oblong- to elliptic-lanceolate, acuminate, 6.3 × 1.2 cm |
| Lip | 3.5–4.3 × 1.2–2 cm | 5–6.5 × 4–4.5 cm | 4.5–6.5 × 2.7–5.3 cm |
| Lip colour | dull purple with darker venation and a pinkish mauve apical rim | white to pale lavender with two streaks of lavender-blue from disc to apex with bright yellow and crimson-lake on disc, base deep yellow flushed with dull purple | white with a red disc and yellow veins |
| Lip mid-lobe | 2–2.5 cm wide, broadly oblong-ovate, obtuse | 2.5–3 cm wide, ovate, apiculate | 2.5–3 cm wide, ovate, cuspidate |
| Spur | 3–6 mm long, slightly cleft at apex | 15–20 mm long, cleft at apex | 11–20 mm long, cleft at apex |
| Column | 2–2.2 cm long, apex winged, sparsely pilose on back | 1.5–2.4 cm long, with two fleshy bidenticulate wings | 1.6–1.8 cm long |
| Column colour | white streaked with purple at the base | yellow | yellowish-green |
| Stigma | obovate, 4 mm long and wide | broadly oblong, 5.5 × 4–5 mm | broadly oblong, 5.5 × 4–5 mm |

Results

In the living state and in the herbarium, two distinct taxa can be readily distinguished in southern and eastern Asia. *Phaius tankervilleae* has smaller, rather pendent flowers with a blunt lip and short spur, usually 3–6 mm long. The other species, *P. wallichii*, has larger flowers that are spreading rather than pendent, and an apiculate lip with a longer spur, usually 10–20 mm long. Living flowers of the two taxa are quite easily

distinguished on the above characters and also by their flower colour. The two taxa are compared in Table 1 alongside the enigmatic "Kadoorie" *Phaius* from Hong Kong. It agrees well in most respects with *P. wallichii*. Thus, the two *Phaius* species in Hong Kong can be confidently assigned to *P. tankervilleae* and *P. wallichii*, respectively. The synonymy of each is complex and is summarised here. Only mainland Asiatic and Sri Lankan names are considered:

Key to the species

- Flowers nutant or subnutant; tepals rather blunt with brown inner surfaces and white outer surfaces; lip deep purple or purple with a white fringe and small, blunt, not deflexed midlobe (flowers rarely white with a yellowish lip); spur short, 4 – 8 mm long, obtuse **P. tankervilleae**
- Flowers spreading; tepals ochre-coloured, acuminate; lip with a yellow and purple-marked throat and a large, white, cuspidate, deflexed midlobe; spur slender, 11 – 20 mm long, distinctly bifid at the tip . . . **P. wallichii**

Phaius tankervilleae (*Banks ex Aiton*) Blume, Mus. Lugd.-Bat. 2: 177 (1856). Type: ex China, cult. Banks (holotype BM!).

Limodorum tankervilleae Banks ex Aiton, Hort. Kew. ed. 1: 3, t. 12 (1787); L'Herit., Sert. Angl.: 28 (1789).

Phaius grandiflorus Lour., Fl. Cochinchin. 2: 529 (1791). Types: Cochinchina and China, *Loureiro* s.n. (not located).

L. incarvillei Pers., Syn. Pl. 2: 520 (1805), nom. superfl. pro *L. tankervilleae*.

Pachygyne spectabilis Salisb., Trans. Hort. Soc. London 1: 299 (1812), nom. superfl. pro *L. tankervilleae*.

Bletia tankervilleae (Banks ex Aiton) R. Br., Hort. Kew. ed. 2: 5, 207 (1813).

Phaius blumei Lindl., Gen. Sp. Orchid. Pl. 127 (1831). Type: based on *Limodorum incarvillei* Blume, Bijdr.: 374 (1825), non Pers.

Tankervillea cantonensis Link, Handb. 1: 251 (1829), nom. superfl. pro *L. tankervilleae*.

Phaius grandiflorus var. *superbus* van Houtte, Fl. des Serres Jard. 7: 259, t. 758 (1851–2). Type: t. 758 in Fl. des Serres Jard. 7 (1851–2) lectotype **selected here**.

P. blumei Lindl. var. *assamicus* Rchb. f., Gard. Chron. 1882, i: 558 (1882). Types: Assam, *Griffith* s.n., *Staur* s.n. Burma: *Griffith* s.n., *Parish* s.n. (syn. W).

P. tankervilleae var. *mairesii* Rchb. f., Gard. Chron., ser. 2, 17: 588 (1882). Type: Hort. Veitch (holotype W).

P. wallichii Lindl. var. *assamicus* (Rchb. f.) King & Pantl., Ann. Roy. Bot. Gard. (Calcutta) 8: t. 151 (1898).

P. blumei var. *pulcher* King & Pantl., Ann. Roy. Bot. Gard. (Calcutta) 8: 109, t. 151 (1898). Type: Sikkim, *Pantling* 139 (holotype K!).

P. incarvillei var. *speciosus* (Viell.) Guillaumin, Notul. Syst (Paris) 10 (2): 72 (1941).

Calanthe bachmaensis Gagnep., Bull. Mus. Hist. Nat. (Paris) ser. 2, 22 (4): 509 (1950). Type: Annam, Nui Bach-ma, *Poilane* 29.735 (holotype P!).

Phaius tankervilleae var. *superbum* (van Houtte) S. Y. Hu, Quart. J. Taiwan Mus. 27 (3–4): 465 (1974).

P. tankervilleae var. *veronicae* S. Y. Hu, Chung Chi J. 13 (2): 25 (1976). Type: Hong Kong, S. Y. Hu 13145A (holotype K!, isotype CUH).

DISTRIBUTION. India, Bhutan, Burma, S China, Taiwan, Thailand, Indo-china, Malaysia, Indonesia, the Philippines, New Guinea, SW Pacific islands and E

Australia. Also introduced in some Pacific Islands e.g. Hawaii.

COLLECTIONS EXAMINED. INDIA: *Gamble* 675A & 3976A; *Griffith* 5197 & s.n.; *Koelz* 22430; *Mooney* 129; *Parry* 208; *Thakur Rup Chand* 8370; *Wallich* 3746. **BURMA:** *Griffith* 5292; *Kingdon Ward* 6629; *Parish* 363. **CHINA:** *Forrest* 7664; *Henry* 13045; *B. K. Lim* 1558; *McClure* 1650. **HONG KONG:** S. Y. Hu 7645 & 11844; *Urquart* s.n.; *Wilford* 419; *Wright* 519. **TAIWAN:** *Oldham* 556; *Price* 340 & 1425. **THAILAND:** *Kerr* 18, 0164 & s.n. **CAMBODIA:** *Pierre* s.n. **JAVA:** *Lobb* s.n.

ILLUSTRATIONS. The illustration in the first edition of *Hortus Kewensis* (1789) is certainly the widespread plant we know so well. The illustration by Blume (1858) of *Phaius blumei* is typical of *P. tankervilleae*. The illustrations of *P. tankervilleae* in Andrews (1805); *P. wallichii* var. *assamicus* in King & Pantling (1898); and *P. tankervilleae* in Seidenfaden & Wood (1992) and Comber (2001) are all typical of the species. Figs. 1 & 2.

Phaius wallichii Lindl. in Wallich, Pl. Asiat. Rar. 2: 46, t. 158 (June 1831). Type: India, Sylhet, *Wallich* 3747 (holotype K-LINDL!, isotype K!).

P. bicolor Lindl., Gen. Sp. Orchid. Pl.: 128 (August 1831). Type: Ceylon [Sri Lanka], *Macrae* s.n. (holotype K-LINDL!).

P. sanderi Hort., Gard. Chron. n.s.: 598 (1892), **synon. nov.** Type: cult. Sander (holotype K!).

P. longicornu Guillaumin, Bull. Mus. Hist. Nat. (Paris) ser. 2, 29 (4): 348 (1959). Type: Annam [Vietnam], Dalat Reg., *C.R.S.T.* 211 (holotype P!).

P. magniflorus Z. H. Tsi & S. C. Chen, Acta Phytotax. Sin. 32 (6): 560, t. 1, figs. 13–17 (1994), **synon. nov.** Type: China, Yunnan, Mengla, Z. H. Tsi 91-564 (holotype PE!).

DISTRIBUTION. India, Bhutan, Sri Lanka, Burma, Thailand, Indo-china, S China, ? Sumatra.

COLLECTIONS EXAMINED. INDIA: *Clarke* 35502, 43922 & 46459; *Griffith* s.n.; *J. D. Hooker* 2164; *J. D. Hooker & Thomson* 878; *A. Mann* s.n.; *Mark* s.n. *Pantling* 120; *Wallich* 3747; *Wight* 2967. **SRI LANKA:** *Gardner* 805; *Macrae* 24 & 204; *Naigath* s.n.; *G. Thomson* s.n.; *Thwaites* 2368. **CHINA:** *Henry* 13813. **HONG KONG:** *Barretto* 146. Hort. R.B.G. Kew, 8 May 1888; Hort. Sander, Jan. 1890 & Aug. 1892.



Fig. 1. *Phaius tankervilleae*. **A** habit, showing 5 years' growth of pseudobulbs, the flower scape and the erect leaves; **B** scape bearing flowers with the dorsal sepal and lateral sepals ovate-elliptic acute, petals elliptic acute, the trumpet-like lip with shortly recurved apical portion and the short cleft spur; **C** flower, front view; **D** flower, back view; **E** capsule. DRAWN FROM PLANT CULTIVATED AT KADOORIE BOTANIC GARDEN BY PAULINE LAI.

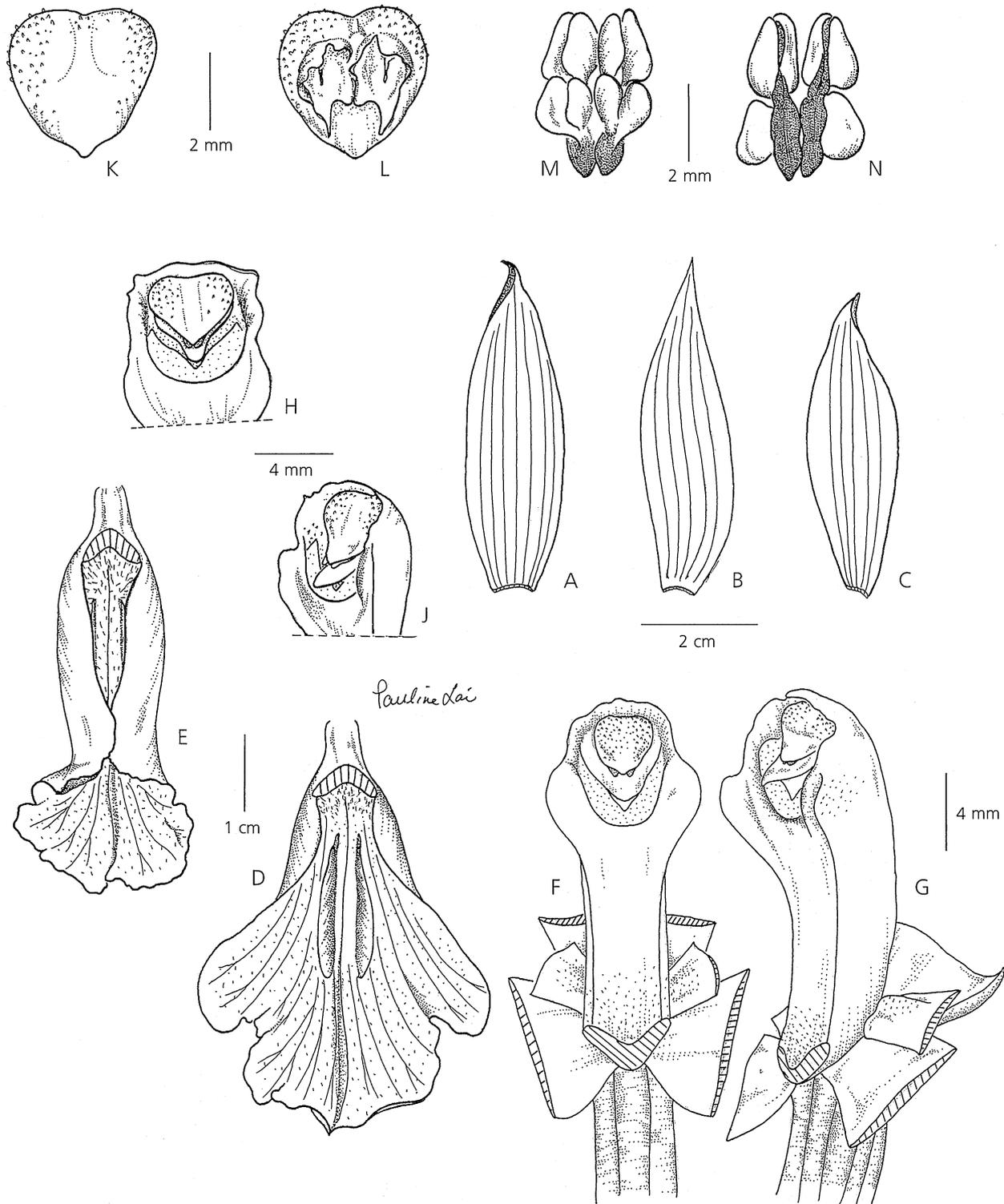


Fig. 2. *Phaius tankervilleae*. **A** dorsal sepal; **B** lateral sepal; **C** petal; **D** lip, with column removed, showing the broad paired keels and ruffled margin; **E** lip, front view, with column removed, showing the deeply enfolded lateral lobes and the short spread of the apical portion; **F** column, front view, showing the broad wings, the anther, rostellum and stigma; **G** as **F**, lateral view; **H** column, apical portion, showing anther, rostellum and stigma; **J** column, lateral view; **K** anther, subglobose, deeply papillose; **L** anther, within, with pollinia removed; **M** pollinia, front view, 8 in 4 pairs; **N** pollinia, back view, showing the spongy tissue. DRAWN FROM PLANT CULTIVATED AT KADOORIE BOTANIC GARDEN BY PAULINE LAI.



Fig. 3. *Phaius wallichii*. **A** habit, showing 4 years' growth of pseudobulbs, the broad curving leaves, a sheath without blade, and lower portion of flower scape; **B** scape bearing flowers widely extended, showing perianth segments lanceolate, long acuminate, and the long tubular lip, the broad recurving apical portion, the acumen, and the long spur; **C** flower, lateral view; **D** flower, back view; **E** flower, front view, with lip removed, showing column and spur; **F** capsule. DRAWN FROM PLANT CULTIVATED AT KADOORIE BOTANIC GARDEN BY PAULINE LAI.

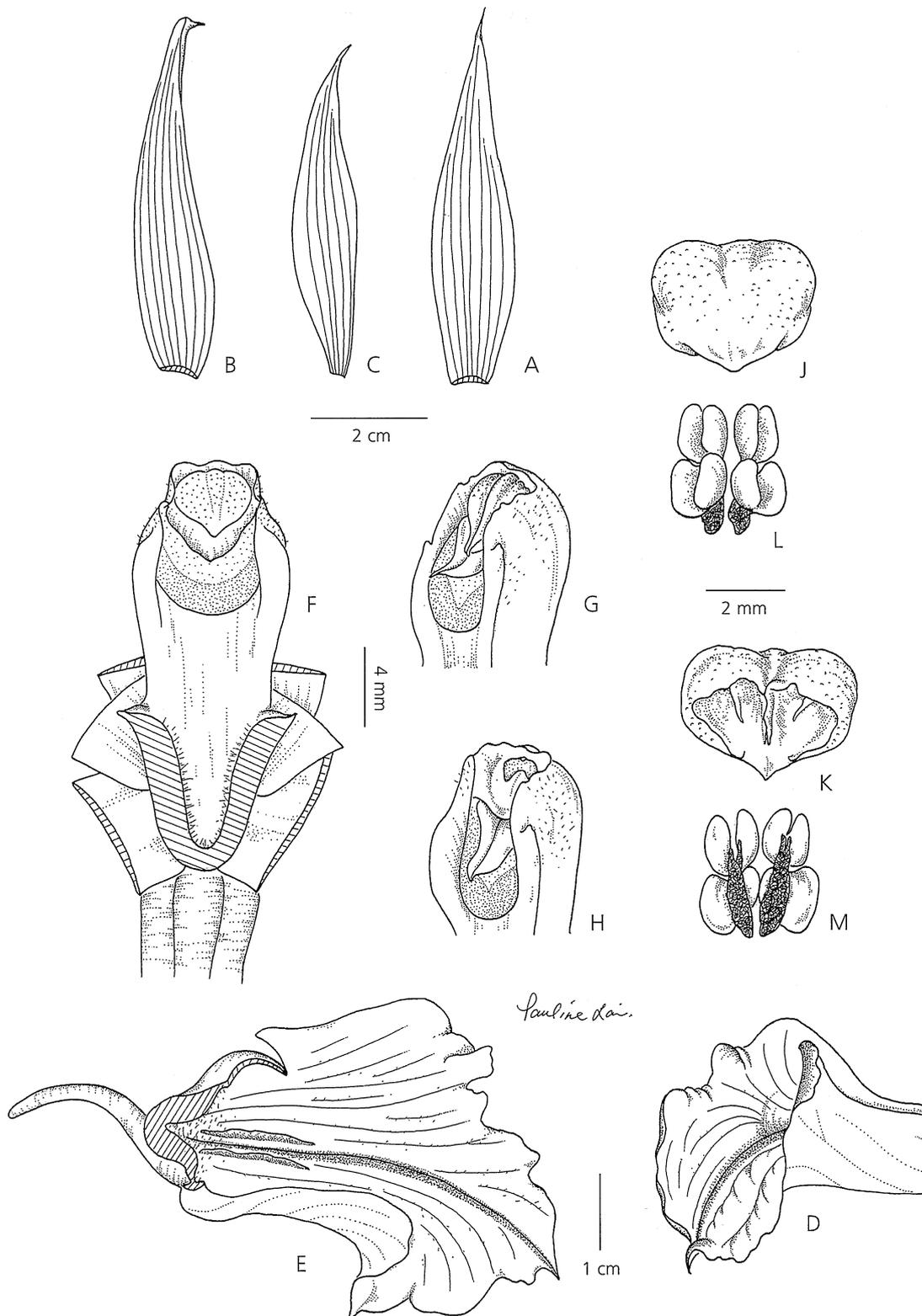


Fig. 4. *Phaius wallichii*. **A** dorsal sepal; **B** lateral sepal; **C** petal; **D** lip, showing the broad recurved midlobe and long acumen, the margins fluted; **E** lip, with column removed, showing spread of midlobe, paired keels on disc, the broad median band of colour running to apex and the long spur; **F** column, narrowly winged, the anther, rostellum and stigma; **G** detail of column; **H** detail of column; **J** anther; **K** anther, within, with pollinia removed; **L** pollinia, front view, 8 in 2 groups of 4; **M** pollinia, back view, showing the spongy tissue. DRAWN FROM PLANT CULTIVATED AT KADOORIE BOTANIC GARDEN BY PAULINE LAI.

ILLUSTRATIONS. Excellent colour illustrations of this species can be found in Wallich (1831), Lindley (1838, as *P. bicolor*) and Hooker (1888). The lip in the Lindley painting, based on a drawing by Mrs Walker made in Ceylon (K), is pink. In the others the ground colour of the lip is white with yellow and red markings. Figs. 3 & 4.

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