

Didymocarpus (Gesneriaceae) on Gunung Tahan, Malaysia

RUTH KIEW

Department of Biology, Universiti Pertanian Malaysia,
43400 UPM Serdang, Selangor, Malaysia

EFFECTIVE PUBLICATION DATE: 15 MAR 1990

Abstract

A checklist for the 20 *Didymocarpus* species on Gunung Tahan is given. Three new species, *D. codonion*, *D. polyanthoides* and *D. yongii* are described. The species Ridley called *D. kompsoboea* is renamed *D. lithophilus*. *D. filicifolius* is reduced to synonymy with *D. salicinus* and reasons for not recognising var. *montanus* of *D. flavobrunneus* are given.

Introduction

Botanical exploration of Gunung Tahan, the highest mountain in Peninsular Malaysia reaching 2,188 m a.s.l., has been confined to the Tahan valley, the lower reaches of the Teku Gorge, the ridge between the Tahan and Teku rivers and the *padang* vegetation on the summit (Fig. 1). The first botanical collections were made along the Tahan valley in 1891 by Ridley (who failed to ascend G. Tahan because of a shortage of supplies and the prevalence of malaria among the porters) and from G. Tahan by Robinson and Wray in 1905 and then by Ridley in 1911. These expeditions yielded a large number of botanical novelties, which were described by Ridley (1893, 1908, 1915).

Since the turn of the century most botanists working in Malaysia have visited G. Tahan following the same route pioneered by Skeat and by Robinson and Wray. Pre-war expeditions were made by boat up the Sungai Tahan to Kuala Teku. Because of the expense of hiring boats and boatmen, post-war expeditions are made overland following the east bank of the Sg. Tahan, which in fact is just as quick as the river journey, which is hampered by rapids and at some times of the year by shallow water.

The difficulty in mounting an expedition to G. Tahan has always been the portering of supplies. Carrying a full load, it takes about three days to reach Kuala Teku and another two to reach the summit. Most visits have of necessity been short and there has been little collecting away from the beaten track.

Burkill (1927) noted how thorough Ridley's collecting trips had been. Ridley recorded 17 species of *Didymocarpus* (including those species he included in *Paraboea* sect. *Campanulati*) from G. Tahan and the Tahan valley, of which 15 were new. Of these, eight are endemic to the G. Tahan area, viz. *D. ericiflorus*, *D. flavobrunneus*, *D. leucocodon*, *D. lilacinus*, *D. grandiflorus* (now called *D. ridleyanus*), *D. robinsonii*, *D. rubiginosus* and *D. salicinus*. No further species were described from the area until our expedition in 1987, when another three species were discovered of which *D. polyanthoides* and *D. yongii* are endemic to the Tahan valley. The third, *D. codonion*, has also been collected from Trengganu.

In total 20 species are now recorded from G. Tahan and its foothills representing about a quarter of the 85 odd species of *Didymocarpus* in Peninsular Malaysia. Only three of these species are widespread throughout Peninsular Malaysia (*D. crinitus*,

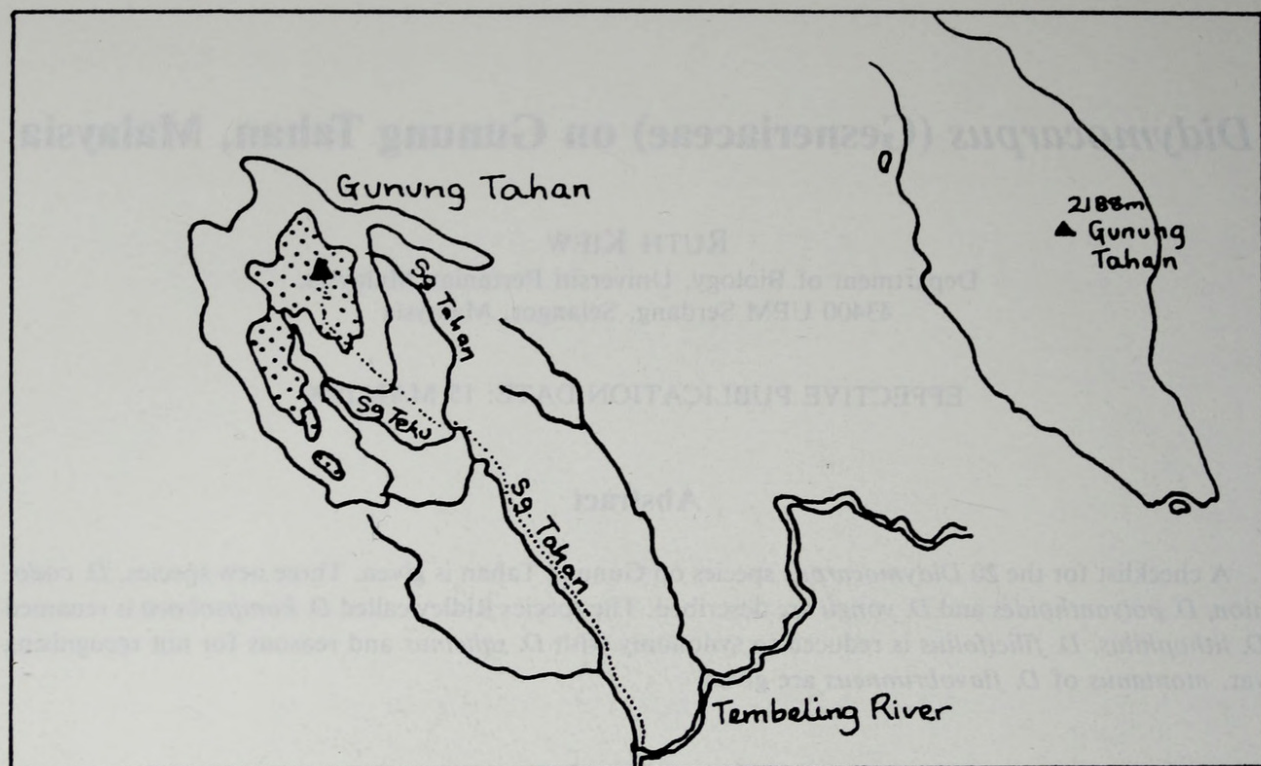


Fig. 1. Map of botanical collecting sites on Gunung Tahan, Peninsular Malaysia.

which is also known from Borneo and Sumatra; *D. platypus*, which also grows in Sumatra; and *D. quinquevulnerus*, a peninsula endemic). *D. fasciatus* and *D. lithophilus* are not so common but have a wide distribution in the peninsula excluding Johore. All five species belong to sect. *Heteroboaea* and it is very rare to find a lowland forest without at least one species of this section.

Ten species are endemic to the G. Tahan area. The other five have an easterly distribution and have not been collected from the Main Range. *D. atosanguineus*, *D. codonion* and *D. tahanicus* have been collected from central Pahang and Trengganu, while *D. heterophyllus* and *D. pyroliflorus* have also been collected further south from Johore. The majority of the endemic species are allied to species with an eastern distribution: *D. flavobrunneus* is closely related to *D. falcatus* Kiew from Johore; *D. lilacinus* to *D. corneri* Kiew from Trengganu and *D. niveus* (Kiew) Kiew from Johore; *D. salicinus* to *D. salicinoides* Kiew from southern Kelantan and Trengganu; and *D. polyanthoides* to *D. atosanguineus* Ridley. Only *D. robinsonii* and *D. ridleyanus*, both montane species, are related to species that grow on the Main Range: *D. robinsonii* to *D. hispidus* Ridley and *D. ridleyanus* to *D. flavescens* Ridley. (*D. ericiflorus*, *D. leucocodon*, *D. rubiginosus* and *D. yongii* do not show a close relationship with any other Malayan species).

The aim of our expedition was to collect complete material (including material preserved in spirit) and to make field notes on habitat, morphology and variation within populations. We also spent a day each along the Sg. Tahan and Sg. Teku and it was along the Sg. Teku that two new species were found.

It is unfortunate that the only expedition from the north, by Waterstradt in 1901, which was the first successful ascent of G. Tahan, was a zoological one and did not produce any herbarium specimens. Although orchids were collected they were abandoned on the descent (Waterstradt 1902). Today there is no trail to G. Tahan either from the north or from the west and these areas remain *terra incognita* to the botanist.

The majority of *Didymocarpus* species in the G. Tahan area are found in the shaded understorey of lowland forest. Species such as *D. platypus* and *D. quinquevulnerus* form dense patches that dominate the ground layer. On the banks of the Sg. Tahan several species are common on lightly shaded rocky or steep earth banks. *D. salicinus* is a rheophyte and grows down to the water's edge, *D. heterophyllus* and *D. pyroliflorus* grow higher up and are presumably less regularly subjected to flooding. *D. yongii* finds a foothold on the sloping edge of lightly shaded cliffs, while *D. lithophilus* clings to crevices in shaded rock faces along the tributaries.

In hill forest, *D. flavobrunneus* grows on the vertical faces of damp cliffs and large boulders, while *D. tahanicus* is common on steep slopes below the ridge at Wray's Camp. Along the ridges leading up to G. Tahan, *D. rubiginosus* grows in crevices on the vertical sides of dry scarps — an unusual habitat for *Didymocarpus* species, the majority of which cannot withstand exposed conditions. In upper montane forest *D. leucocodon* and *D. robinsonii* are common and *D. salicinus* persists along the Sg. Teku up to the edge of the *padang* giving it the widest altitudinal amplitude (70–1,700 m a.s.l.) of any species in the peninsula. *Didymocarpus* species are absent from the *padang*, a harsh environment for plant life where low stunted vegetation is scattered over exposed rock slopes, which are infilled with bleached silver sand.

The literature cited below gives that of the type description and those that involve nomenclatural changes, as well as Ridley's flora (1923), which remains the most recent complete account for Peninsular Malaysia. Only specimens collected from the National Park (Taman Negara) are cited.

Checklist of *Didymocarpus* species

1. *Didymocarpus atosanguineus* Ridley

Trans. Linn. Soc. 2nd Ser. 3 (1893) 328; Fl. Mal. Pen. 2 (1923) 518.

Lectotype: Ridley s. n. Tahan River (SING).

Distribution: Kelantan — Kuala Aring; Pahang — Tahan and Kenyam valleys; Trengganu — Batu Biwa, Sekayu F.R., Ulu Brang.

Habitat: In deeply shaded lowland forest, locally common.

Specimens examined: Tahan River Ridley s. n. (SING); Kuala Kenyam 1 Oct 1982 Kiew B.H. RK1211 (UPM), 6 Oct 1984 R. Kiew RK1458 (UPM).

Notes: *D. atosanguineus* is the only species in sect. *Heteroboea* with red flowers. The corolla is pale cream outside with blood-red lobes and inside the throat is yellow with two golden-yellow nectar guides aligned inwards from between the lower lobes. In addition, it differs from other species in this section in its particularly long capsule, which is 9–11 cm long.

There are two forms both of which are found within Taman Negara and which have identical flowers. One form has leaves tightly clustered at the top of the stem, the leaves are rather broad (9–10 cm wide), the margin is less jaggedly toothed and the indumentum is finely velvety. The other form has leaves spaced up to 2 cm apart, the leaves are narrower (6–8 cm), the margin is more jagged particularly towards the leaf base and the indumentum is hispid rather than velvety.

2. *Didymocarpus codonion* Kiew sp. nov.

Didymocarpus floribundus (M.R. Henderson) B.L. Burt et *D. heterophyllus* Ridley affinis sed petiolo longioribus et lamina basi anguste cuneatis differt.

Type: Kiew Bong Heang RK1204 (holo UPM: iso SING).

Stem woody c. 6 mm thick, to 17 cm tall, flowering at c. 5 cm tall. Leaves crowded at the top of the stem, spirally arranged, leaf bases persistent. Lamina oblanceolate, 11 by 4 cm to 19 by 8.5 cm, apex acute, base narrowly cuneate, glabrous above, in life upstanding and bullate, dark green above, young leaves pinkish or whitish at base, in dried state rough and minutely pustulate beneath, margin crenate. Midrib and veins plane above, prominent beneath, in life red, secondary veins 9–15 pairs, tertiary veins prominent beneath. Indumentum of stem apex, petioles and lower surface of midrib and veins densely matted with long uniseriate hairs, sparse on peduncle. Petiole 2.5–7 cm long, 1.5 mm thick.

Inflorescence a cymose panicle with 3–4 order branching and up to 14 flowers, peduncle slender (3–) 7–12 cm, branches 2.5–3 cm long. Pedicels slender 2–10 mm long. Bract pairs ligulate, 3–4 mm long. Calyx divided to base, lobes narrowly acute, 2–3 mm long, $\pm$ minutely hairy with few long hairs. Corolla narrowly campanulate, pale lilac or pink, tube 2.5–4 by 2 mm, lobes similar, oblong with slightly acute apex, 1.5 by 1 to 2 by 1.5 mm, reflexed, inner surface and margin densely papillose with minute glandular hairs. Stamens 2, filament 1 mm long, anthers enclosed within corolla tube, 2 by 1.5 mm, connivent. Ovary 2 by 0.8 mm long, style slender 3–4 mm long projecting beyond corolla, ovary and style minutely pubescent, stigma discoid 0.5 mm across, disc none. Capsule narrowly linear, straight, 14–18 mm long.

Distribution: Pahang — Tahan and Kenyam valleys; Trengganu — Batu Biwa.

Habitat: Lowland forest (below 200 m), locally common in deep shade on earth banks.

Specimens examined: Kuala Kenyam 30 Sept 1982 *Kiew B.H. RK1204* (UPM, SING); 2 Oct 1984 *R. Kiew RK1399* (K); 6 Oct 1984 *R. Kiew RK1457* (L); Batu Biwa 22 Oct 1986 *R. Kiew RK2301* (UPM); Tahan Valley 21 March 1987 *R. Kiew RK2419* (UPM).

Notes: This species is closely related to *D. heterophyllus* (see below) and *D. floribundus*, the latter has been collected only from the Bukit Kajang area in Kemaman, Trengganu. All three are similar in their leaves, which are oblanceolate, acute or rounded at the apex and are glabrous above, in the crenate margin and the pink or white colour of the unexpanded leaves, in their cymose inflorescences, small campanulate flowers 3–9 mm long in which the upper two lobes are reflexed and in the short fruits, which are 1–3 cm long. *D. heterophyllus* differs from the other two species in its few-flowered inflorescences and narrower leaf (Table 1). *D. codonion* and *D. floribundus* have cymose panicles more than twice branched and are generally more robust plants with larger leaves. Compared with *D. floribundus*, *D. codonion* has much smaller bracts and calyx lobes.

In addition, *D. codonion* differs from both *D. floribundus* and *D. heterophyllus* (Table 1) in its leaves, which in life are bullate above, in its leaf base, which is narrowly cuneate rather than rounded or cordate, and in its longer petioles and in its flowers which are much smaller and narrower (hence the epithet, which means little bell in Greek). Although both *D. codonion* and *D. heterophyllus* grow in the foothills of G. Tahan, they do not grow together as *D. codonion* is a plant of the shaded undergrowth while *D. heterophyllus* grows on lightly shaded river banks.

3. *Didymocarpus crinitus* Jack

Mal. Misc. I (2) (1820) 1; Ridley Fl. Mal. Pen. 2 (1923) 519, fig. 124.

Distribution: Johore — G. Pulai; Kedah — G. Jerai (Kedah Peak); Kelantan — Chaning, Kota Baru, K. Lebir; Negri Sembilan — Bk. Sulu, Sg. Ujung; Pahang —

Table 1
Diagnostic characters to distinguish
Didymocarpus codonion, *D. floribundus* and *D. heterophyllus*

	<i>D. codonion</i>	<i>D. floribundus</i>	<i>D. heterophyllus</i>
No. flowers/inflorescence	10-14	8-18*	2-4
Stem height (cm)	5-17	2-13	(0-) 3 (-7)
Lamina width (cm)	4-8.5	3.5-6	(2-) 2.5 (-4)
Lamina length (cm)	11-19	10-18	(5-) 8 (-13.5)
Lamina base	narrowly cuneate	rounded, ± cordate	rounded
Petiole length** (cm)	2.5-7	0.5-2	(0.5-) 1.5 (-3)
Peduncle length (cm)	(3-) 7-12	4.5-9	(2.5-) 5.5 (-8)
Calyx length (mm)	1-1.5	3-5	(1-) 2
Corolla length (mm)	2.5-4	7-9	3-4
Corolla width (mm)	2	4-5	3-4
Corolla colour	pink or pale lilac	pale-deep purple	purple-violet

* Henderson (1933) from cultivated plants.
** young leaves are sessile, measurement is from the oldest leaf.

Cameron Highlands, Sg. Tahan; Penang Hill; Perak — Thaiping Hills; Selangor — Kanching, G. Bidai; Trengganu — Bk. Kajang. Singapore, Borneo and Sumatra.

Habitat: Although it is frequently a plant of hill forest, in Taman Negara it has been collected only in the lowlands on shaded rocky stream banks at c. 70 m a.s.l..

Specimens examined: Sg. Tahan 27 July 1936 Kiah SFN31910 (K), 29 March 1987 R. Kiew RK2482 (UPM).

Notes: This is a distinctive species in its leaves, which are narrowly lanceolate and are deep purple beneath.

4. **Didymocarpus ericiflorus** Ridley

J. Fed. Mal. States Mus. 6 (1915) 166; Kiew *Blumea* (in press).

Synonym: *Codonoboea ericiflora* (Ridley) Ridley
Fl. Mal. Pen. 2 (1923) 533.

Type: Ridley 16283 G. Tahan (Wray's Camp) (holo K; iso SING).

Distribution: Endemic to G. Tahan.

Specimens examined: Wray's Camp July 1911 Ridley 16283 (K, SING), 29 August 1928 Holttum SFN20709 (SING).

Notes: This is a very rare species, which has only been collected twice. In spite of a search I was unable to refind it. Ridley (1923) included this species in his new genus, *Codonoboea*, on account of its epiphyllous flowers. This genus and its species are now returned to *Didymocarpus* (Kiew, in press).

Reference:

Kiew, R. *Blumea* (in press). Reassessment of the generic status of *Codonoboea* (Gesneriaceae) and its species.

5. ***Didymocarpus fasciatus* Ridley**

J. Roy. Asiatic Soc. Str. Br. 43 (1905) 50; Fl. Mal. Pen. 2 (1923) 520.

Lectotype: 1891 Ridley 2169 Tahan River (K).

Distribution: Kedah — Kedah Peak; Negri Sembilan — Bk. Tangga; Pahang — G. Tapis, Sg. Tahan.

Habitat: Rare and local, it grows on rocky banks well above the flood zone of Sg. Tahan.

Specimens examined: Sg. Tahan 10 June 1922 Md. Haniff & Md. Nur 8105 (K), Kiah SFN31910 (K).

Notes: This species most resembles *D. crinitus* in its narrow lanceolate leaves. It differs in its indumentum of persistent hair bases, which give the dried leaf the rough appearance of lizard skin; in its leaf margin, which is more finely toothed; and in leaf colour, which is malachite green with a broad central pale band. Not a common species, it nevertheless has a widespread distribution. Apparently rarely in flower, this may account for it being undercollected. Its leaf coloration renders it a striking plant even when sterile. Both *D. fasciatus* and *D. crinitus* have been collected from Sg. Tahan and Kedah Peak; otherwise their distribution does not overlap.

Ridley (1923) gives *D. crinitus* var. *tuberculatus* C.B. Clarke as a synonym for *D. fasciatus*, but this name was never published. Clarke did annotate a Sarawak specimen (Beccari PB 1557 from G. Matang, K, FI) as var. *tuberculatus*, but Clarke (1883) listed this specimen as *D. crinitus* var. *exasperatus*, which was characterised by '*pilis e tuberculo ortis exasperatis*'. Ridley (1905) noted his species 'is allied to a Bornean plant occurring on Mt. Matang [i.e. Beccari's specimen], which it much resembles'. Beccari's specimen is indeed similar in its rough indumentum and leaf coloration to the Malayan *D. fasciatus*. However, until a wider range of specimens of both these taxa is available, I hesitate to consider them conspecific.

6. ***Didymocarpus flavobrunneus* Ridley**

Trans. Linn. Soc. 2nd Ser. 3 (1893) 329; Fl. Mal. Pen. 2 (1923) 515.

Typus: Ridley 2163 Sg. Tahan (holo K, iso SING).

Synonym: *D. flavobrunneus* var. *montanus* Ridley

J. Fed. Mal. States Mus. 6 (1915) 167; Fl. Mal. Pen. 2 (1923) 515.

Type: Ridley 16384 Wray's Camp (holo K, iso SING).

Distribution: Endemic to Gunung Tahan area.

Habitat: It is confined to shaded low cliffs or large boulders from 300 m on Bk. Teresik to 1,200 m at Wray's Camp and beyond.

Specimens examined: Tahan Woods Nov 1891 Ridley 2163 (K); Wray's Camp 2 June 1905 Wray & Robinson 5367 (K), July 1911 Ridley 16384 (K), 10 June 1922 Md. Haniff & Md. Nur 8103 (K), 21 July 1936 Kiah SFN31754 (K), 23 March 1987 R. Kiew RK2428 (UPM), 28 March 1987 RK2476 (UPM).

Notes: This species is most closely related to *D. falcatus* Kiew from G. Janing, Johore. Both species grow on dry, shaded rock faces and produce a woody stem

with a tuft of soft, hairy leaves at the top. Their cymose inflorescences have long peduncles supporting a condensed cluster of flowers. They differ, amongst other characters (Kiew, 1987), in flower colour, which is white with yellow lines in the throat in *D. falcatus* and brownish-red with yellow lobes and a yellow throat with brownish-red lines in *D. flavobrunneus*.

According to Ridley, var. *montanus* differs from the typical lowland variety in its greater height, its more softly woolly leaves, and the colour of the corolla (var. *montanus* has broad red-brown bands in the throat compared with a few streaks in the typical variety). Examination of plants in the field and the wider range of herbarium specimens now available shows that var. *montanus* cannot be maintained because plants of both varieties grow to 30 cm tall, the majority of the montane plants have identical indumentum with the lowland plants i.e. they are sparsely hairy as opposed to velvety, and some lowland populations (e.g. at Bk. Teresik, 300 m) also have broad maroon lines in the throat. For these reasons, var. *montanus* is not recognised as a distinct taxon.

Reference:

Kiew, R. 1987. The herbaceous flora of Ulu Endau, Johore-Pahang, Malaysia, including taxonomic notes and descriptions of new species. *Mal. Nat. J.* 41: 201-234.

7. *Didymocarpus heterophyllus* Ridley

Trans. Linn. Soc. 2nd Ser. 3 (1893) 329; Fl. Mal. Pen. 2 (1923) 522.

Type: Ridley 2170 Tahan valley (SING).

Distribution: Johore, Bk. Pengantin (Labis), G. Janing, G. Lesong, Sg. Kinchin (Ulu Endau); Pahang, Bk. Cheras (Kuantan), Sg. Tahan.

Habitat: Lightly shaded stream banks in the lowlands, growing on rocks or vertical earth banks above the normal water level.

Specimens examined: Tahan valley Ridley 2170 (SING), 22 March 1987 R. Kiew RK2423 (UPM).

Notes: This is a common plant all along the steep banks of the Sg. Tahan, where it grows with *D. pyroliflorus*. Although it grows above the normal water level, it will nevertheless be subject to periodic flood waters.

8. *Didymocarpus leucocodon* (Ridley) Kiew *comb. nov.*

Synonym: *Paraboea leucocodon* Ridley

J. Fed. Mal. States Mus. 6 (1915) 167.

Codonoboea leucocodon (Ridley) Ridley

Fl. Mal. Pen. 2 (1923) 533.

Type: Ridley 16041 (holo K; iso SING).

Common name: The Bell of Tahan.

Distribution: Endemic to Gunung Tahan.

Habitat: This species grows along damp mossy ridges near Tangga Dua Belas and in gullies below the *padang* at about 1,500-1,700 m a.s.l., often with *Pentaphragma aurantiacum* Stapf (Pentaphragmataceae). The only other species of *Didymocarpus* that grows at this altitude is *D. robinsonii* (see below).

Specimens examined: G. Tahan July 1911 Ridley 16041 (K, SING), 30 Aug 1928 Md. Nur SFN20951 (SING), 25 March 1987 R. Kiew RK2448 (UPM).

Notes: *Didymocarpus leucocodon* is a strikingly beautiful species with pure white, large, bell-like flowers (codon = bell, Greek). Corner suggested its common name be The Bell of Tahan (Corner 1937, unpublished field notes). In March when I visited G. Tahan all plants were in bud. Flowering specimens have been collected in July and at the end of August and September, which suggests it might be a seasonally flowering species.

Ridley (1923) included this species in *Codonoboea* although it does not have epiphyllous flowers. For this reason, it is not included in sect. *Codonoboea* within *Didymocarpus* (Kiew, in press). It is not closely allied to any other Malayan species as it is unusual in possessing a corky bark, stiff fleshy leaves (which Corner described as like thin cardboard) with veins plane above and below, and a corolla with acute lobes and a matted indumentum outside.

Reference:

Kiew, R. *Blumea* (in press). Reassessment of the generic status of *Codonoboea* (Gesneriaceae) and its species.

9. ***Didymocarpus lilacinus* Ridley**

Trans. Linn. Soc. 2nd Ser. 3 (1893) 330; J. Roy. Asiatic Soc. Str. Br. 43 (1905) 56; Kiew *Blumea* (in press).

Synonym: *Codonoboea lilacina* (Ridley) Ridley

Fl. Mal. Pen. 2 (1923) 534.

Type: Tahan Valley Ridley 2165 (holo K; iso SING).

Distribution: Endemic to the Tahan Valley.

Habitat: It grows in lowland forest at c. 100 m a.s.l. on steep earth banks devoid of other vegetation on the slopes above Sg. Tahan.

Specimens examined: Tahan valley 1893 *Native coll.* (K), July 1911 Ridley 2165 (K, SING), Sept 1929 *Md. Nur s. n.* (SING), 7 June 1931 *Henderson SFN24847* (K, SING); *Mohd Shah MS2717* (SING), 5 Sept 1982 *R. Kiew RK1216*, 20 March 1987 *RK2407* (UPM).

Notes: It is a rare and local species, known only from a few populations where it grows in dense clumps. Its leaves are unequal, of a pair the leaf produced away from the earth bank on which it grows is longer than the one produced towards the bank. The leaves are very soft and in dry weather, e.g. in March 1987, its leaves were wilted, although other undergrowth herbs, such as *Sonerila* species and *Didymocarpus platypus* showed no signs of water stress.

10. ***Didymocarpus lithophilus* Kiew nom. nov.**

Synonym: *D. kompsoboea* Ridley Trans. Linn. Soc. 2nd. Ser. 3 (1893) 328; Fl. Mal. Pen. 2 (1923) 518 — non *D. kompsoboea* C.B. Clarke in D.C. Mon. Phan. 5 (1883) 92, t. 10.

Type: Ridley 2152 Kuala Tanah (holo K; iso SING).

Distribution: Endemic to Peninsular Malaysia: Kedah — G. Bintang; Kelantan — G. Setong; Pahang — Tahan Valley; Perak — G. Inas, Temangok; Selangor — Bk. Hitam; Trengganu — Bk. Kajang.

Habitat: It grows on shaded vertical rock faces (usually granite) on stream banks or cliffs, usually in the lowlands but at Wray's Camp it grows at c. 1,000 m a.s.l..

Specimens examined: Sg. Tahan Aug 1891 Ridley 2152 (K), 21 June 1922 *Md. Haniff & Md. Nur 8037* (K, SING), Aug 1928 *Holttum 20953* (SING), *Seimund 873* (SING),

March 1987 R. Kiew RK2425 (SING), RK2483 (UPM); Wray's Camp 8 July 1911 Ridley s. n. (K).

Notes: This species has a woody stem 6–21 cm long, its leaves are 17–33 cm long and 4–10.5 cm wide, they are plane above with 33–50 pairs of secondary veins, the surface is not bullate and its capsule is c. 3 cm long. Ridley (1893) identified it as *D. kompsoboea*, which was described from Borneo (type Beccari PB 3440, FI). Apart from possessing the same rectangular venation pattern (Fig. 2), *D. kompsoboea* differs in its rosette habit and its smaller, conspicuously bullate leaves (14 by 6–7 cm), which are rugose beneath and its longer fruits (5.5–6 cm long). The rosette habit is rare among Malayan species of sect. *Heteroboea* to which *D. lithophilus* belongs and is seen only in *D. rugosus* Ridley. All other Malayan species in this section are robust plants with a woody stem bearing a mop of large leaves at the top. Since it is not conspecific with *D. kompsoboea*, Ridley's species is renamed *D. lithophilus*.

Among Malayan species, *D. lithophilus* most resembles *D. platypus* in its thin leaves, which are not densely pubescent on the upper surface. It differs from *D. platypus* in the tertiary venation, which forms a pattern of regular rectangles, and the areoles, which are flat and are not surmounted by a raised hair base. This arrangement gives the dried leaf the appearance of crocodile skin. In contrast, in *D. platypus* (Fig. 2) the tertiary veins form a polygonal pattern, and in addition the areole is mammilate with a large hair base arising from its centre. *D. lithophilus* is also different in being shorter, in having a thinner and more wiry stem, in its lower leaves, which are spaced on the stem, and in bearing fewer leaves in the crown (about 7 compared with about 10 in *D. platypus*), and in life the corolla appears thinner, more delicate and almost transparent (the corolla of *D. platypus* is thicker and more fleshy). The corolla is white suffused with pale lilac, the lobes are more deeply tinted. Flower colour is variable in *D. platypus* depending on locality. Usually it is white with two lemon-yellow nectar guides in the throat, but in some popula-

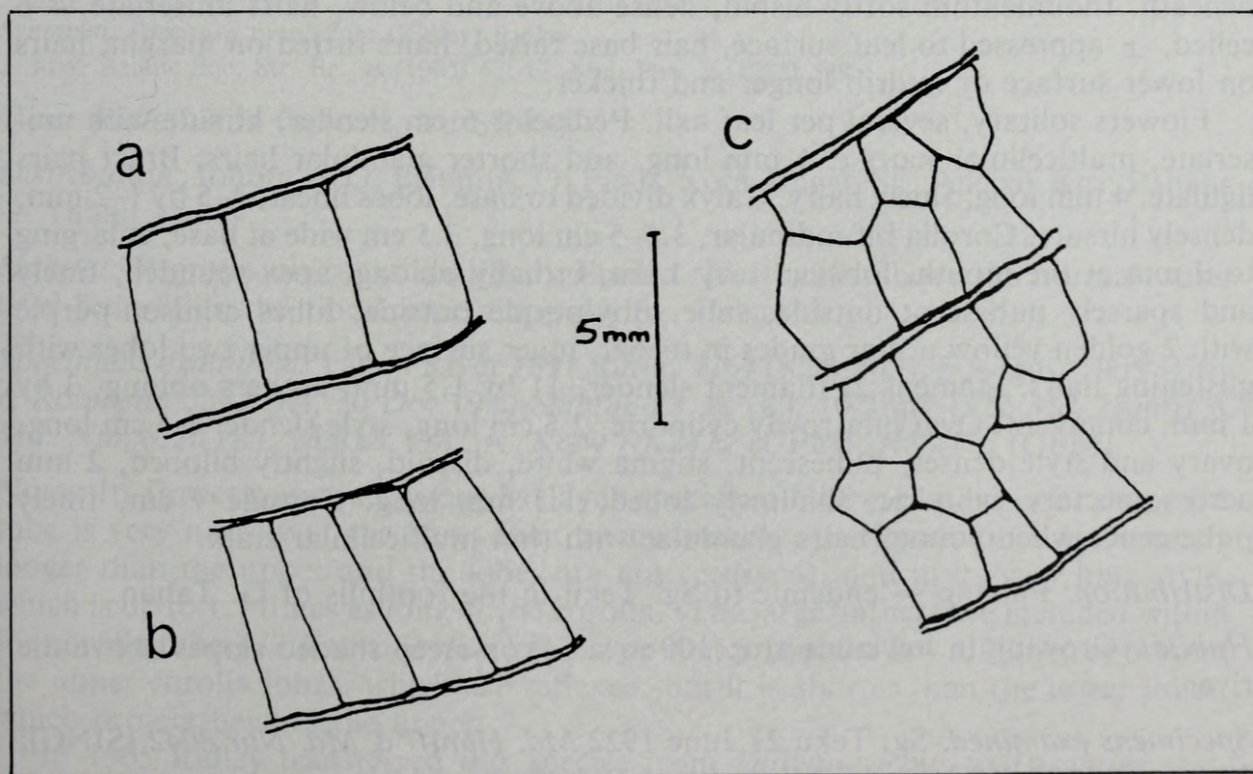


Fig. 2. Tertiary venation patterns in a. *Didymocarpus lithophilus* (RK2425), b. *D. kompsoboea* (Beccari 3440) and c. *D. platypus* (Henderson 11422).

tions these lines are lacking, and in a few populations the corolla is tinged purple or cream or yellow. The fruit of *D. lithophilus* is shorter, c. 2.5 cm long, compared with that of *D. platypus*, which is c. 5 cm long.

D. lithophilus is named for its habitat. It grows on vertical rock faces, a unique habitat for Malayan species of sect. *Heteroboea*. Its wiry root system splays out over the rock surface and becomes woody, while the fine roots penetrate cracks and crevices. Its less robust habit, shorter stem and fewer leaves may be an adaptive feature in reducing the weight of the top of the plant. *D. platypus* and the other species in sect. *Heteroboea* are rooted in the soil.

11. *Didymocarpus platypus* C.B. Clarke

in D.C. Mon. Phan. 5 (1883) 94; Ridley Fl. Mal. Pen. 2 (1923) 517.

Distribution: Throughout Peninsular Malaysia. Sumatra.

Habitat: It is the commonest species of *Didymocarpus* in Peninsular Malaysia and is found in almost every undisturbed shady lowland and hill forest up to about 1,000 m a.s.l., where it grows on the forest floor, frequently gregariously.

12. *Didymocarpus polyanthoides* Kiew *sp. nov.*

A Didymocarpus atosanguineus tubo corollae rubineo-purpureo et lobis carmesino-purpureo et fructis brevioribus differt.

Type: Kiew RK2480 (UPM).

Stem woody 30–85 cm tall and 1 cm thick. Leaves sessile, crowded at top of stem. Lamina oblanceolate, 25–30 by 6–9 cm, apex acute to attenuated, narrowed and winged to base, thin, drying chartaceous, margin doubly serrate. Midrib plane above, prominent beneath. Secondary veins c. 28 pairs, plane above, prominent beneath, tertiary veins obscure above, prominent beneath, areoles forming a polygonal pattern beneath. Indumentum softly hispid, dense above and below, hairs uniseriate, 4–6 celled, $\pm$ appressed to leaf surface, hair base raised, hairs tufted on margin, hairs on lower surface of midrib longer and thicker.

Flowers solitary, several per leaf axil. Pedicel 4–6 cm slender, hirsute with uniseriate, multicellular hairs c. 1 mm long, and shorter glandular hairs. Bract pairs ligulate, 4 mm long, finely hairy. Calyx divided to base, lobes linear, 4–5 by 1–2 mm, densely hirsute. Corolla infundibular, 3.5–5 cm long, 3.5 cm wide at base, enlarging to 9 mm at the mouth, lobes c. 1 by 1 cm, broadly oblong, apex rounded, finely and sparsely pubescent outside, tube ruby-purple outside, lobes crimson-purple with 2 golden yellow nectar guides in throat, inner surface of upper two lobes with glistening hairs. Stamens 2, filament slender, 11 by 1.5 mm, anthers oblong, 3 by 1 mm, connivent. Ovary narrowly cylindric, 2.5 cm long, style slender 1.5 cm long, ovary and style densely pubescent, stigma white, discoid, slightly bilobed, 2 mm across, nectary cylindric, shallowly lobed, 1.5 mm long. Capsule 7 cm, finely pubescence when young, hairs glandular with thin multicellular stalk.

Distribution: Pahang — endemic to Sg. Teku in the foothills of G. Tahan.

Habitat: Growing in lowlands at c. 100 m a.s.l. on steep shaded slopes above the river.

Specimens examined: Sg. Teku 21 June 1922 Md. Haniff & Md. Nur 8042 (SING); 29 March 1987 RK2480 (UPM).

Notes: Along the Tahan valley, grow seven species of sect. *Heteroboea*. While *D. lithophilus* is restricted to rock faces, the others are plants of the forest floor. *D.*

platypus is the most common and widespread; the others are either widespread but less common, e.g. *D. atosanguineus*, or are locally common, such as *D. quinquevulnerus*, which grows in dense patches, or they are rather rare, such as *D. crinitus*, *D. fasciatus* and *D. polyanthoides*. In some cases, more than one species grow together, as for example populations of *D. quinquevulnerus* which often grow intermixed with plants of *D. platypus*. The few plants of this new species were also found growing with plants of *D. quinquevulnerus*.

This new species is distinguished by its flower colour, which recalls that of the purple garden polyanthus with its yellow-orange eye. Among Malayan *Didymocarpi*, red corollas are seen only in *D. atosanguineus*, which however has blood-red rather than ruby-purple corolla lobes as does *D. polyanthoides*. Among species in sect. *Heteroboea* only *D. quinquevulnerus* has deep purple lobes, which are an imperial purple untainted by red; the other species have white corollas which may be suffused with pale purple. It is not known what pollinates any of these species but a circular hole at the base of the corolla of one flower of this new species indicates that nectar thieves were at work.

Apart from flower colour, *D. polyanthoides* can be distinguished by its shorter fruits (7 cm long) from *D. atosanguineus*, which has exceptionally long fruits (8.5–10 cm long). It can be told apart from *D. quinquevulnerus* not only by flower colour but also by indumentum, as that of *D. quinquevulnerus* is longer and more silky. It is also not as floriferous as *D. quinquevulnerus*.

It is obviously a very rare plant. I was only able to find a single population consisting of a few plants along the Sg. Teku above Kuala Teku, which is also the area from where Md. Haniff and Md. Nur collected it.

13. *Didymocarpus pyroliflorus* Ridley

Trans. Linn. Soc. 2nd Ser. 3 (1893) 330

Synonym: *Paraboea pyroliflora* (Ridley) Ridley

J. Roy. Asiatic Soc. Str. Br. 43 (1905) 67; Fl. Mal. Pen. 2 (1923) 529.

Type: Ridley 2164 (holo K, iso SING).

Distribution: Johore — G. Belumut, G. Panti, Kota Tinggi, Sg. Pelepah Kiri; Pahang — Tahan Valley.

Habitat: It grows on rocks on lightly shaded river banks above the normal water level but within the flood zone along the Sg. Tahan.

Specimens examined: Tahan River 1891 Ridley 2164 (K, SING); 5 August 1905 Wray & Robinson 5545 (K), 20 Dec 1920 Seimund s. n. (K), 10 June 1922 Md. Haniff & Md. Nur 8126 (K), March 1987 R. Kiew RK2422 (UPM), RK2470 (UPM).

Notes: Its flower is unique among Malayan species of *Didymocarpus* in its shape (its tube is very narrow at the base, then opens broadly, the lower lobes are scarcely longer than the upper and the lobes are not recurved), and in its very long style, which is up to 1.7 times as long as the corolla. (The large anthers are included within the corolla tube.) *D. heterophyllus* has a style that projects a few millimetres beyond the upper corolla lobes, which are reflexed, but it is shorter than the lower lobes, which project beyond the upper.

In 1905 Ridley transferred this species from *Didymocarpus* to *Paraboea* sect. *Campanulati*, which he erected to accommodate species of *Didymocarpus* with short-tubed campanulate flowers, short stamens and a style longer than the stamens. Burt (1971) abolished this section as he considered it contained short-flowered species of

Didymocarpus. Apart from *D. cordatus* and *D. tahanicus*, he placed the remaining species in section Salicini in *Didymocarpus*. However, sect. Salicini is best used in a narrow sense to include only those species with willow-shaped leaves. Neither does *D. pyroliflorus* fit comfortably into any other of Ridley's sections, for while in habit and foliage it resembles some species in sect. Didymanthus, species in this section have tubular flowers with long thin filaments and the style is included within the corolla tube. *Didymocarpus pyroliflorus* is therefore an isolated species within the genus and until the sections are revised (almost all of which at present include anomalous species), it is best not to assign this species to a section or to erect a new one to accommodate it.

14. *Didymocarpus quinquevulnerus* Ridley

Trans. Linn. Soc. 2nd Ser. 3 (1893) 328; Fl. Mal. Pen. 2 (1923) 518.

Type: Ridley 2153 August 1891 Tahan Woods (holo K, iso SING).

Distribution: Johore — Ulu Endau; Kelantan — Kg. La; Malacca; Pahang — Fraser's Hill, Semangok Pass, Tahan valley; Selangor — Klang Gates, Batu Tiga, Kanching F.R..

Habitat: Shaded slopes in lowland forest up to 1,000 m a.s.l..

Specimens examined: Tahan valley Aug 1891 Ridley 2153 (K, SING); Aug 1928 Holttum 20550 (CGE, SING), 20955 (SING); July 1929 Henderson 21877 (SING), 22012 (SING); 22 March 1987 R. Kiew RK2426 (UPM); Kuala Teku July 1911 Ridley 16219 (K); Dec 1920 Seimund 508 (SING), 870 (SING); June 1922 Md. Haniff & Md. Nur 8042 (K).

Notes: Apparently sharing the same habitat as *D. platypus*, with which it frequently grows, it is nevertheless not a common species and its distribution is very local. Where it occurs, it grows in dense patches. It is easily the most beautiful species in sect. *Heteroboaea* not only by virtue of its deep purple corolla lobes but also by its floriferous habit (up to 40 flowers may be open at any one time). Ridley (1912) described it as a beautiful plant 'worth going far to see'. In 1893, he noted that it is well worthy of cultivation. Unfortunately, these soft-leaved forest species do not thrive away from the cool, humid conditions of the forest floor.

Colour of the corolla lobes is usually deep imperial purple but a few populations or a few plants within a population may have paler lilac lobes (they are still, however, a deeper purple than those of *D. lithophilus* for example). One specimen from Fraser's Hill (Burkill & Holttum 8611, SING) is a white form collected within a population of purple-lobed plants.

The original description of the species described the corolla lobes as 'lovely dark violet-purple' and as 'crimson edged white' and among the specimens cited by Ridley (1893), the one from Kota Gelanggi (Ridley 2154, K, SING) is described as 'the pink variety'. This specimen resembles the others of this species in all other respects, although of course flower colour is not preserved. Unfortunately description of colour is sometimes not consistent especially for the purple spectrum which may variously be described as pink, purple or blue depending on the collector. In this case since Ridley collected both specimens there is likely to be some difference in colour between them. Unfortunately the Kota Gelanggi population no longer exists as the surrounding forest has been converted to oil palm estate. The status of the pink variety therefore remains in doubt. *D. quinquevulnerus* also differs from other species in sect. *Heteroboaea* in its densely silky indumentum.

15. **Didymocarpus ridleyanus** B.L. Burtt

Notes Roy. Bot. Gard. Edinb. 23 (1960) 99.

Synonym: *D. grandiflorus* Ridley

J. Fed. Mal. States Mus. 6 (1915) 167; Fl. Mal. Pen. 2 (1923) 523.

Type: Ridley s. n. July 1911 (K).

Distribution: Endemic to Gunung Tahan (Wray's Camp).

Habitat: Collected from streams in hill forest at c. 1,100 m a.s.l..

Specimens examined: Ridley s. n. July 1911 (K); 27 Aug 1928 *Holttum* SFN20587 (K).

Notes: This is a very rare species indeed, known from two collections from the type site. It certainly does not belong to sect. *Boeopsis* where Ridley placed it, as this section is defined as including plants with small flowers and a rosette habit, whereas *D. ridleyanus* has pairs of leaves 2 cm apart and its flowers are, according to Ridley, 5 cm long (although buds on *Holttum* SFN20587 are 2 cm long). Vegetatively it resembles some species in sect. *Didymanthus* and in particular *D. flavescens* Ridley, which also has solitary flowers. However, its flower is unusual for species of *Didymocarpus*. Ridley described them as violet purple, a colour more commonly encountered in species of *Didissandra* or *Chirita*.

16. **Didymocarpus robinsonii** Ridley

J. Linn. Soc. 37 (1908) 318; Fl. Mal. Pen. 2 (1923) 513.

Type: 5 July 1905 Wray & Robinson 5470 (K)

Distribution: Endemic to G. Tahan at 1,700–2,000 m.

Habitat: This species is very common on lightly shaded slopes in upper montane forest, e.g. in the gully at Tangga Dua Belas. It was through this gully that H.C. Robinson found a route from the south to the top of G. Tahan in 1905. It is therefore appropriate that this species should be named for him.

Specimens examined: G. Tahan 5 July 1905 Wray & Robinson 5470 (K); July 1911 Ridley 5470 (K, SING), 16040 (K); 11 June 1922 Md. Haniff & Md. Nur 8140 (K), 30 August 1928 *Holttum* 20658 (K); 2 March 1973 F.S.P. Ng FRI020963 (K, KEP); 24 March 1987 R. Kiew RK2432 (UPM).

Notes: *Didymocarpus robinsonii* is very similar to *D. hispidus* Ridley, which is a common species in montane forest on the Main Range, in its erect, shrubby habit with distant, opposite leaves and in its flowers, which are produced on long peduncled cymes. It differs in flower colour — in *D. hispidus* the lower three lobes are sometimes streaked with purple, whereas in *D. robinsonii* there is a well-defined pattern of purple lines alternating with the yellow nectar guides. *D. robinsonii* is also distinct in its shorter fruit stalks (5–6 cm long) as compared with 8–12 cm in *D. hispidus*. It differs from the other montane species with white flowers with violet stripes, *D. albinellus* Ridley, which has larger leaves with c. 12 pairs of veins compared with 9 pairs in *D. robinsonii*.

At Tangga Dua Belas bumblebees were observed visiting its flowers.

17. **Didymocarpus rubiginosus** (Ridley) B.L. Burtt

Notes Roy. Bot. Gard. Edinb. 31 (1971) 44

Synonym: *Paraboea rubiginosa* Ridley

J. Linn. Soc. Bot. 37 (1908) 319; Fl. Mal. Pen. 2 (1923) 530.

Type: Wray & Robinson 5390 (K).

Distribution: Endemic to G. Tahan between 1,300–2,000 m.

Habitat: It is most unusual for a species of *Didymocarpus* to grow rooted in fissures on dry, exposed, vertical rock faces. It is found in this habitat on ridges and below the edge of the *padang*.

Specimens examined: G. Tahan 3 June 1905 *Wray & Robinson* 5390 (K); July 1911 *Ridley* 16043 (K); 11 June 1922 *Md. Haniff & Md. Nur* 7865 (K, CGE); March 1987 *R. Kiew* RK2446 (UPM), 2467 (UPM).

Notes: This species is conspicuous in its dense velvety indumentum, which covers the stem, petioles, upper leaf surface, and veins on the lower leaf surface. It is tempting to suggest that this thick indumentum is an adaptation to reduce water loss. In life, the upper leaf surface is dark green and the stem, petiole and veins on the lower surface are densely covered by purple-brown hairs. In the dried state, the leaf is reddish-brown. Plants growing in a more exposed position higher up the rock face are more or less stemless and their compact rosette of leaves is appressed to the rock surface. Those in a more shaded position may have stems up to 6 cm tall with internodes between 2.5–10 mm long.

Ridley (1908) described this species under *Paraboea* sect. *Campanulati* as it has campanulate as opposed to trumpet-shaped flowers. Burt (1971) in transferring it to *Didymocarpus* placed it in sect. *Salicini*. However, this section consists of a well-defined group of narrow-leaved species, which usually live by rocky streams. Among Ridley's sections, *D. rubiginosus* with its rosulate habit and small flowers fits best within sect. *Boeopsis*.

18. *Didymocarpus salicinus* Ridley

Trans. Linn. Soc. 2nd Ser. 3 (1893) 329.

Synonym: *Paraboea salicina* (Ridley) Ridley

Fl. Mal. Pen. 2 (1923) 530.

Type: Ridley 2166 (K).

Didymocarpus filicifolius Ridley syn. nov.

J. Fed. Mal. States Mus. 6 (1915) 166

Paraboea filicifolia (Ridley) Ridley

Fl. Mal. Pen. 2 (1923) 530.

Type: Ridley 16059 (holo K; iso SING).

Distribution: Pahang, endemic to G. Tahan and Tahan valley.

Habitat: Rocky river banks growing at water level and on rock faces above the river, from 70 to 1,700 m a.s.l..

Specimens examined: Tahan River 1891 *Ridley* 2166 (K, SING), 1893 *Mat s. n.* (SING); 5 Aug 1905 *Wray & Robinson* 5544 (K); Dec 1920 *Seimund s. n.* (K); 21 July 1922 *Md. Haniff & Md. Nur* 8087 (K); 18 July 1936 *Kiah SFN31705* (K); 20 March 1987 *R. Kiew* RK2409 (UPM); Kuala Teku July 1911 *Ridley* 16271 (K, SING); G. Tahan July 1911 *Ridley* 16059 (K, SING).

Notes: *Didymocarpus salicinus* is one of the few rheophytes in the Gesneriaceae. Along the Sg. Tahan, it grows on rocky banks within or immediately above the flood zone. It is typical of rheophytes in having woody roots, which are firmly attached to crevices in the rocks, wiry stems (the older plants branch and become bushy), and willow-shaped leaves.

At Latah Berkoh on Sg. Tahan, plants just above the normal water level and which are presumably subject to regular flooding have narrower leaves (c. 1 cm wide) than plants that grow 2–4 m above the water level and which are presumably less

regularly subject to flood waters, which have broader leaves up to 2.3 cm wide. Plants growing in the small shaded tributaries also have broader leaves.

Didymocarpus filicifolius is based on one specimen collected from a stream bank on G. Tahan at 1,700 m a.s.l.. Ridley (1905) distinguished it in his key from *D. salicinus* by its white corolla and oblong parallel-sided leaves. However, flowers of *D. salicinus* fade from pink to white and Ridley (1915) noted that the plant of *D. filicifolius* was nearly out of flower suggesting its flowers were old. The leaves of *D. filicifolius* fall within the range of size and shape of those plants of *D. salicinus* that grow in more shaded or sheltered positions and have larger and more oblong leaves. Although Ridley (1925) gives petiole length in *D. salicinus* as half an inch and that of *D. filicifolius* as an eighth of an inch, examination of specimens shows that the petiole length of *D. filicifolius* (5–12 mm) falls within the range of that of *D. salicinus* (6–18 mm). The midrib of *D. filicifolius* is curiously wrinkled, but this appears to be an abnormality of growth. Apart from its larger corolla, (7 mm long compared with that of *D. salicinus*, which is about 4 mm long), *D. filicifolius* falls within the range of variation of *D. salicinus* and with which it is considered synonymous.

19. *Didymocarpus tahanicus* B.L. Burt

Notes Roy. Bot. Gard. Edinb. 31 (1971) 46.

Synonym: Didymocarpus grandifolius Ridley

J. Linn. Soc. Bot. 37 (1980) 318.

Paraboea grandifolia (Ridley) Ridley

Fl. Mal. Pen. 2 (1923) 531.

Type: Wray & Robinson 5369 (holo BM, iso SING).

Robust plant, stemless or with short stout woody stem c. 4 cm long and 1 cm thick. Leaves crowded, young leaves purple beneath. Lamina oblanceolate, up to 28 cm by 9 cm, apex acute, narrowing to base, margin crenate. Veins 17–19 pairs, arching towards margin, midrib and veins plane above, prominent beneath, tertiary veins conspicuous beneath. Indumentum of petiole, lower surface of midrib and veins, peduncle, pedicel and outside of bracts and calyx with a dense layer of long multicellular uniseriate hairs, appearing woolly on young petioles and peduncles. Petiole 5–6 cm long, fleshy.

Inflorescence a cymose panicle with up to 3rd order branching and up to 14 flowers orientated in the same direction. Peduncle 12–21 cm long, stout (up to 4 mm thick in infructescence), branches 3–4 cm long. Bract pairs lanceolate, lowermost 10 by 1.5 mm, upper bracts 5 by 1 mm. Pedicel c. 5 mm long, pale violet. Flowers pendant, 4–4.5 cm long, corolla lobes contorted in bud. Calyx divided to base, lobes narrowly lanceolate, 7–9 mm by 2 mm, pale violet. Corolla tube trumpet-shaped, 25–30 mm long, flattened dorsiventrally, 3 mm wide at base expanding to 8 mm at mouth, pale rosy-lilac outside with 2 yellow nectar guides in throat, sparsely covered by stalked glandular hairs outside, inner surface glabrous, lobes broadly oblong, apex rounded, pale lilac to almost white, upper two lobes recurved, 5 by 5 mm, each with a large lemon-yellow spot which coalesces at their juncture, lower 3 lobes 8 by 6 mm and projecting 5–10 mm beyond the upper lobes. Stamens 2, filaments slender 8 mm long, attached halfway up corolla tube, anthers narrowly ovoid, 2 by 1 mm, connivent. Ovary narrowly cylindric 12 by 1.2 mm, glabrous, style slender 12 mm long, stigma discoid 1 mm across. Disc cylindric c. 1 mm long. Capsule narrowly cylindric, 6.5 cm long and 2 mm thick.

Distribution: Pahang — Gunung Tahan; Trengganu — G. Padang.

Habitat: On G. Tahan, it is common in a very local area on steep damp wooded slopes in hill forest around Wray's Camp at c. 1,100 m a.s.l..

Specimens examined: Wray & Robinson 5369 (SING), Holttum SFN20942 (SING), March 1987 R. Kiew RK2427 (UPM), RK2472 (UPM).

Notes: In flower it is a very fine plant with up to 14 purple flowers each about 4 cm long on a single inflorescence and often with several inflorescences per plant. As the original description is incomplete because Ridley (1908) had only fruiting material available, a complete description is provided here. Its flowers are unusual in several respects. The bud is pointed because the unopened lobes are twisted. (In most species the lobes are imbricate and the bud is broadly rounded.) The open flowers hang down as though the pedicel is too weak to support the long corolla, and the flattened corolla results in the mouth of the tube being narrowly oval rather than circular as it is in most species.

Ridley (1908) first described it as a species of *Didymocarpus* with uncertain affinities within the genus but in 1923 he transferred it to *Paraboea*, on the grounds of habit as its flowers were then unknown. (*Paraboea* he characterised by its small, campanulate flowers.) With flowering material available, Burt (1971) returned this species to *Didymocarpus* and, pointing out that 'grandifolius' had already been used as an epithet for another species of *Didymocarpus*, renamed it 'tahanicus'. (It has also been collected from G. Padang in Trengganu, Moysey & Kiah SFN33924, SING.) Burt assigned it to sect. *Heteroboea*, which is, however, a section comprising species with one-flowered inflorescences. It belongs with a group of montane species with cymose panicles and foliaceous bracts that includes *D. calcareus* Ridley, *D. pubiflorus* Ridley, *D. castaneifolius* Ridley and *D. venustus* Ridley, the latter two Ridley (1923) placed in sect. *Didymanthus*.

20. *Didymocarpus yongii* Kiew *sp. nov.*

Species venatione alba conspicuis a congeneribus Malaya diversa.

Typus: R. Kiew RK2481 (holo UPM; iso L, K, SING).

Common name: The Kale-leaved *Didymocarpus*.

Stemless plant with woody rootstock and congested rosette of leaves $\pm$ appressed to ground. Lamina obovate, sometimes lanceolate, (9-) 14.5 (-15) by (4-) 5.5 (-6) cm, apex acute or rounded, base narrowed, cordate, usually unequal, slightly rough above. Indumentum on both surfaces of lamina and petiole of minute, erect, unicellular hairs, dense in young leaves, leaf margin densely fringed, lower surface of midrib and veins with dense covering of longer hairs. In life light or dark green above with white veins, in some plants purple below. Margin finely serrulate. Midrib and veins plane above, prominent below. Lateral veins (6-) 8 (-9) pairs, widely spaced, subopposite, marginal vein 4-5 mm distant from margin, tertiary venation obscure above, forming non-polygonal reticulation beneath. Petiole 1-3 cm long, slender.

Inflorescence a long-scaped cymose panicle. Peduncle slender 14-17 cm long (to 18 cm long in infructescence), branches 1.5-3.5 cm long, 2- to 3-times branched with c. 12 flowers. Bract pairs ligulate, lower 2 mm long, upper 1 mm long. Pedicel 1-2.5 mm long, slender, flowers nodding. Indumentum of peduncle, pedicel, bracts and calyx densely and minutely hispid. Calyx 1.5 mm long almost divided to base, lobes narrowly acute, c. 1 mm long. Corolla campanulate, in bud minutely hispid outside, 7 by 4 mm, pale lilac to almost white outside, lobes rosy-lilac, oval, 1.5 by 1 mm, apex rounded, $\pm$ equal in size. Stamens 2, filaments short c. 1.5 mm long, thick; anthers yellow, oblong, 1.5 by 0.75 mm, connivent. Ovary cylindric 1 mm long; style 2 mm long, curved upwards, minutely hispid; stigma minute, discoid, off-

white in colour. Disc circular, 1 mm high. Capsule narrowly linear, 2–2.5 cm long, glabrous.

Distribution: Pahang — endemic to Sg. Tahan and Sg. Teku at base of G. Tahan.

Habitat: Edge of overhanging rocks or cliffs where there is a covering of earth, 75 m a.s.l..

Specimens examined: Kuala Tahan 22 June 1922 Md. Haniff & Md. Nur 8301 (K); Sg. Teku 29 March 1987 R. Kiew RK2481 (K, L, SING, UPM).

Notes: This is a remarkable species of *Didymocarpus* with striking leaves that recall those of kale (*Brassica oleracea* Acephala group, Cruciferae) in being glossy green with the veins finely delineated in white. Hence its common name, the Kale-leaved *Didymocarpus*. This feature is unique in Malayan *Didymocarpi*, for while several species have leaves with a pale band down the centre, as for example plants of *D. curtisii* Ridley, *D. fasciatus*, *D. malayanus* Hook. f., and *D. puncticulatus* Ridley, only *D. marginatus* Ridley has a pale band along the midrib that extends partway along the veins. Another herbaceous species with this same pattern of white-veined variegation is *Argostemma pictum* Wall. (Rubiaceae).

The population of *D. yongii* is polymorphic for the presence of purple undersides to the leaf. Leaves without this purple coloration are grass-green above, those with purple undersides are dark green above, but in both cases the veins are white.

Didymocarpus yongii was discovered at the top of a low shaded cliff on the banks of Sg. Teku above Kuala Teku by Yong Ghong Chong for whom it is named. It is a precarious species to collect as it grows on loose soil on the downward sloping edge of the cliff. Only one population was found, although there is an earlier collection of a small plant from Kuala Tahan.

The species is not closely related to any other in Peninsular Malaysia. From its habit, it falls within Ridley's sect. *Boeopsis*, which he defined as having 'leaves crowded in a tuft at the top of a woody root stock, peduncles slender, flowers usually small'. However, it differs from the species that Ridley included in this section in its panicle of nodding flowers. It somewhat resembles *D. rubiginosus* (see above) in that both have panicles of rosy-purple flowers. However, they are strikingly different vegetatively: *D. yongii* is a larger plant with leaves with widely spaced veins that in life are conspicuously white; the leaves of *D. rubiginosus* are densely pubescent with many closely spaced veins and the leaves dry a rusty brown colour. In addition, *D. yongii* is a lowland plant; *D. rubiginosus* is a montane plant which grows above 1,000 m.

Acknowledgements

I am most grateful to the Director of Wildlife and National Parks for permission to carry out research in Taman Negara; to Universiti Pertanian Malaysia which funded the expedition and to St John's College, Cambridge, which sponsored my visit to Florence; to Yong G.C. and J. Dawn, without whom I should not have reached G. Tahan at all; to our Batik guides and Temuan porters for their cheerful co-operation; and to the curators of herbaria at CGE, FI, K and SING for permission to examine specimens in their keeping.

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