Gardens' Bulletin Singapore **50** *(1998) 151–160.*

New Species of *Helicia* Lour. and *Heliciopsis* Sleumer (Proteaceae) from Borneo

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Abstract

Two new species of *Helicia* Lour. (*H. sessilifolia* and *H. symplocoides*) and two new species of *Heliciopsis* Sleumer (*H. percoriacea* and *H. litseifolia*) are described and illustrated from Borneo.

Introduction

In his accounts of Malesian Proteaceae, Sleumer (1955a, 1955b) recognised eight species of *Helicia* and two species of *Heliciopsis* from Borneo. The revision of the genera *Helicia* Lour. and *Heliciopsis* Sleumer (Proteaceae) for the Tree Flora of Sabah and Sarawak revealed, four new species. *Helicia symplocoides* and *Heliciopsis percoriacea* are endemic to Sabah and Sarawak respectively, while *Helicia sessilifolia* is known from Sabah and Sarawak only. *Heliciopsis litseifolia* is common throughout Borneo (except Brunei), Peninsular Malaysia and Sumatra. These species are described and illustrated below.

Helicia

1. *Helicia sessilifolia* R.C.K. Chung, **sp. nov.** Fig. 1
(Latin, sessilis=stalkless, folium=leaf)

Helicia sessilifolia Heliciae maxwellianae similis, sed in ramulis gracilibus, folii margine erecurvata, foliis anguste coriaceis flavido brunnescentibus in sicco, fructu stipitato ellipsoideo-apiculato castanescenti in sicco differt. Typus: Borneo, Sarawak, Limbang Division, Lawas, Ulu Trusan, Bt. Tebunan, 9 May 1986, *Bernard Lee S 52436* (*holotypus* KEP!; *isotypi* K, L, MO, SAN!, SAR!).

Treelet to small tree, up to 10 m tall. *Twigs:* youngest parts subangular, older ones terete, light brown, glabrous. *Leaves* spiral or subopposite; blades broadly oblong to elliptic, rarely obovate, (6–)9–17 x (4.5–)5–8.5 cm, thinly

coriaceous, yellowish brown when dry, not shining, glabrous; base rounded to subcordate, margin entire, apex acute; midrib slightly raised above, prominent below; lateral veins 6–7 pairs, curving and joining near margin, prominent on both surfaces; intercostal veins reticulate, inconspicuous on both surfaces; petioles extremely short, up to 2 mm long, slightly swollen at base, dull brown, glabrous. *Inflorescences* racemose, axillary, solitary, *c.* 7 cm long, laxly flowered near the base; rhachis terete, *c.* 1 mm diameter, glabrous; bracts minute, less than 0.5 mm long, glabrous. *Flowers:* pedicels 5–6 mm long, in pairs, not winged, connate up to about 2–3 mm from the base, glabrous; perianth (12–)16–19 mm long, glabrous, limb ellipsoid, 0.8–1.2 mm diameter; anthers 1–1.5 mm long; ovary ovoid, glabrous; style filiform, apex clavate, glabrous; stigma punctiform, terminal, stigmatic surface glandular; disk glands almost entirely connate in a crenulate ring. *Fruits* ellipsoid, 4–4.5 x 2.4–2.7 cm, slightly oblique, glabrous, chesnut-brown when dry, apiculum 1–4 mm long, contracted into a stipe of *c.* 3 mm long; pericarp smooth, 2.5–3 mm thick; fruit stalk unknown.

Distribution: Endemic to Borneo. Rare in Sarawak and Sabah, known in Sarawak only from Bt. Tebunan, Lawas (*S 52434* and *S 52436*) and in Sabah from Tambunan (*SAN 60837* and *SAN 111305*). Not yet recorded from Brunei and Kalimantan.

Ecology: Mixed dipterocarp forest, up to 900 m.

Notes: This species is similiar to *H. maxwelliana,* from which it is distinguished by its slender twigs (stout in *H. maxwelliana*), non-recurved leaf-margin (curled inwards in *H. maxwelliana*), thinly coriaceous leaves (thickly coriaceous in *H. maxwelliana*) which turn yellowish brown when dry (olivaceous-yellowish to dark brown in *H. maxwelliana*), long-apiculate and stiped ellipsoid fruit, which turns chesnut-brown when dry (subglobose fruit, without apiculum and stipe, and black when dry in *H. maxwelliana*). The new species is apparently confined to hill mixed dipterocarp forest. In contrast, *H. maxwelliana* is restricted to submontane forest.

Specimens Examined: BORNEO. SARAWAK: Limbang Division—Lawas, Ulu Trusan, Bt. Trusan, 9 May 1986, *Bernard Lee S 52434* (K, KEP!, L, MO, SAN!, SAR!), *S 52436* (K, KEP!, L, MO, SAN!, SAR!). SABAH: Pedalaman District—Tambunan, 21 July 1984, *Amin & Suali SAN 60837* (AA, K, KEP!, L, SAN!, SAR!, SING!), Rafflesia FR, 7 Sept. 1985, *Leopold Madani & Ismail SAN 111305* (K, KEP!, SAN!).

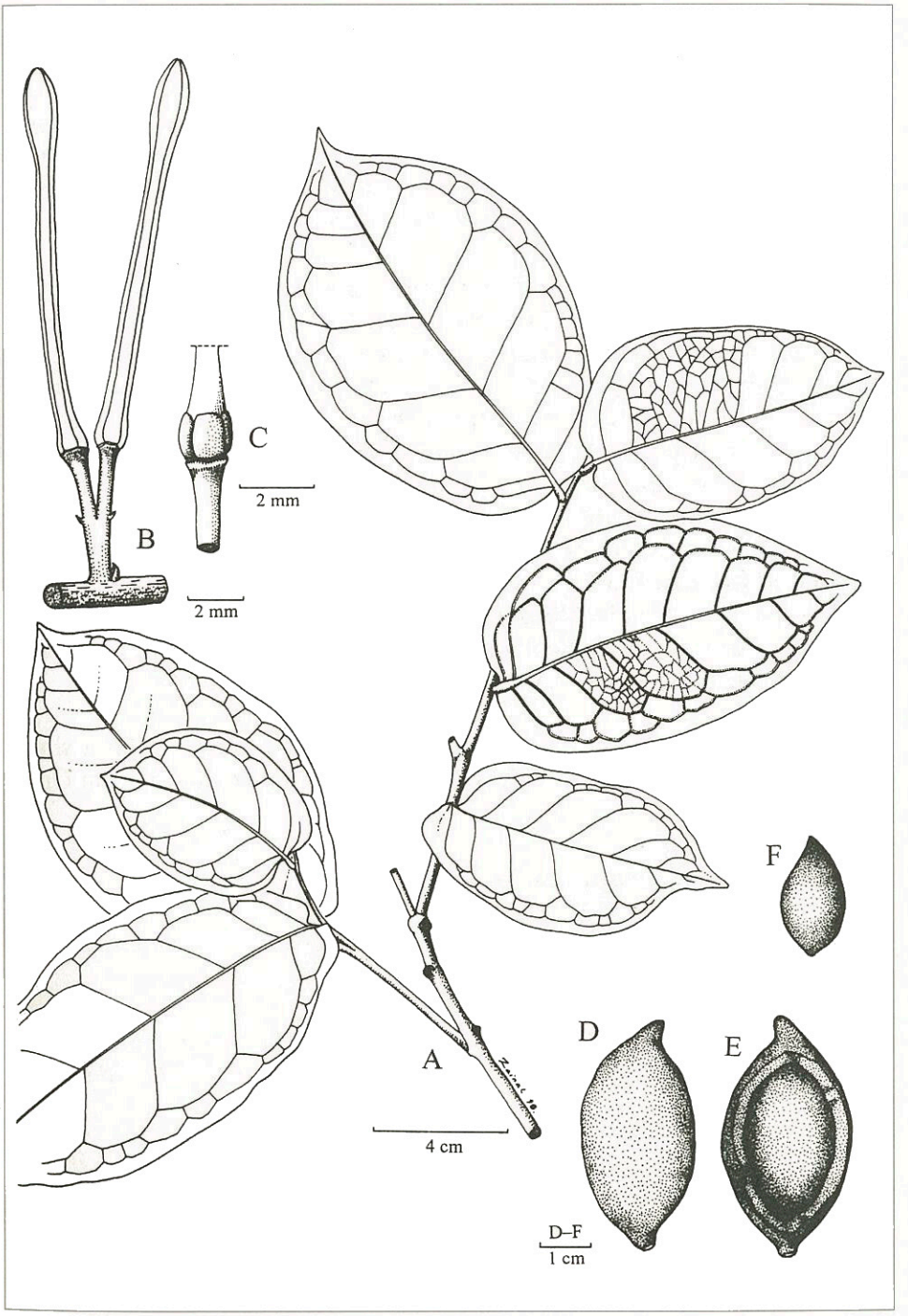

Figure 1. *Helicia sessilifolia*. A, leafy twig; B, flower buds; C, base of ovary with disk glands; D, fruit; E, fruit in longitudinal section; F, seed. (A–C from *S 52436,* D–F from *S 52434.*)

2. *Helicia symplocoides* R.C.K. Chung, **sp. nov.** Fig. 2
(Greek, -oides=resembling; with leaves resembling those of *Symplocos*)

Hac species nova a generis speciebus aliis foliis crasse coriaceis c. 10 cm longis 5 cm latis, apice emarginato vel obtuso, basi decurrenti cuneata, marginibus recurvatis, fructibus minutis ad 1.7 cm longis 1.4 cm latis differt. Typus: Borneo, Sabah, Pantai Barat District, Mt. Kinabalu, Mesilau Cave, 1 April 1964, *Chew & Corner RSNB 4786* (*holotypus* SAN!; *isotypi* K, L).

Tree 15 m tall, 25 cm diameter. *Twigs* terete, grey or greyish brown, glabrous with distinct leaf scars up to 3 mm diameter. *Leaves* spiral; blades obovate, 5–10 x 2.5–5 cm, thickly coriaceous, deep green above, brown below, not shining, glabrous; base cuneate, decurrent, margin entire or occasionally with 1–3 minute teeth in the upper half, recurved, apex obtuse or emarginate; midrib raised above, prominent below; lateral veins 6–8 pairs, curving near the margin and joining with next one to form looped intramarginal veins, visible below, inconspicuous above; intercostal veins inconspicuous on both surfaces; petioles 2–4 x 1.5–2 mm, swollen and wrinkled at the base, dark brown when dry, glabrous. *Flowers* not known. *Fruits* ellipsoid to broadly ellipsoid, 1.5–1.7 x 1.2–1.4 cm, oblique, glabrous, black when dry, shortly apiculate, apiculum *c.* 1 mm long, stipe *c.* 2 mm long; pericarp smooth, 0.8–1.5 mm thick; fruit stalk 5–7 x 1.5–2 mm.

Distribution: Recorded only from Sabah where it is known from a single collection, *Chew & Corner RSNB 4786*, from Mt. Kinabalu, Mesilau Cave, on ultramafic soil.

Ecology: Submontane forest at 1850 m.

Notes: The leaves of the new species resemble those of *Symplocos* Jacquin (Symplocaceae).

Specimens Examined: BORNEO. SABAH: Pantai Barat District—Mt. Kinabalu, Mesilau Cave, 1 April 1964, *Chew & Corner RSNB 4786* (K, L, SAN!).

Heliciopsis

1. *Heliciopsis litseifolia* R.C.K. Chung, **sp. nov.** Fig. 3
(With leaves resembling those of *Litsea*, Lauraceae)

Heliciopsis litseifolia Heliciopsidi montanae proxime affinis, a posteriore foliis simplicibus anguste coriaceis basi attenuata decurrenti, apice acuto vel

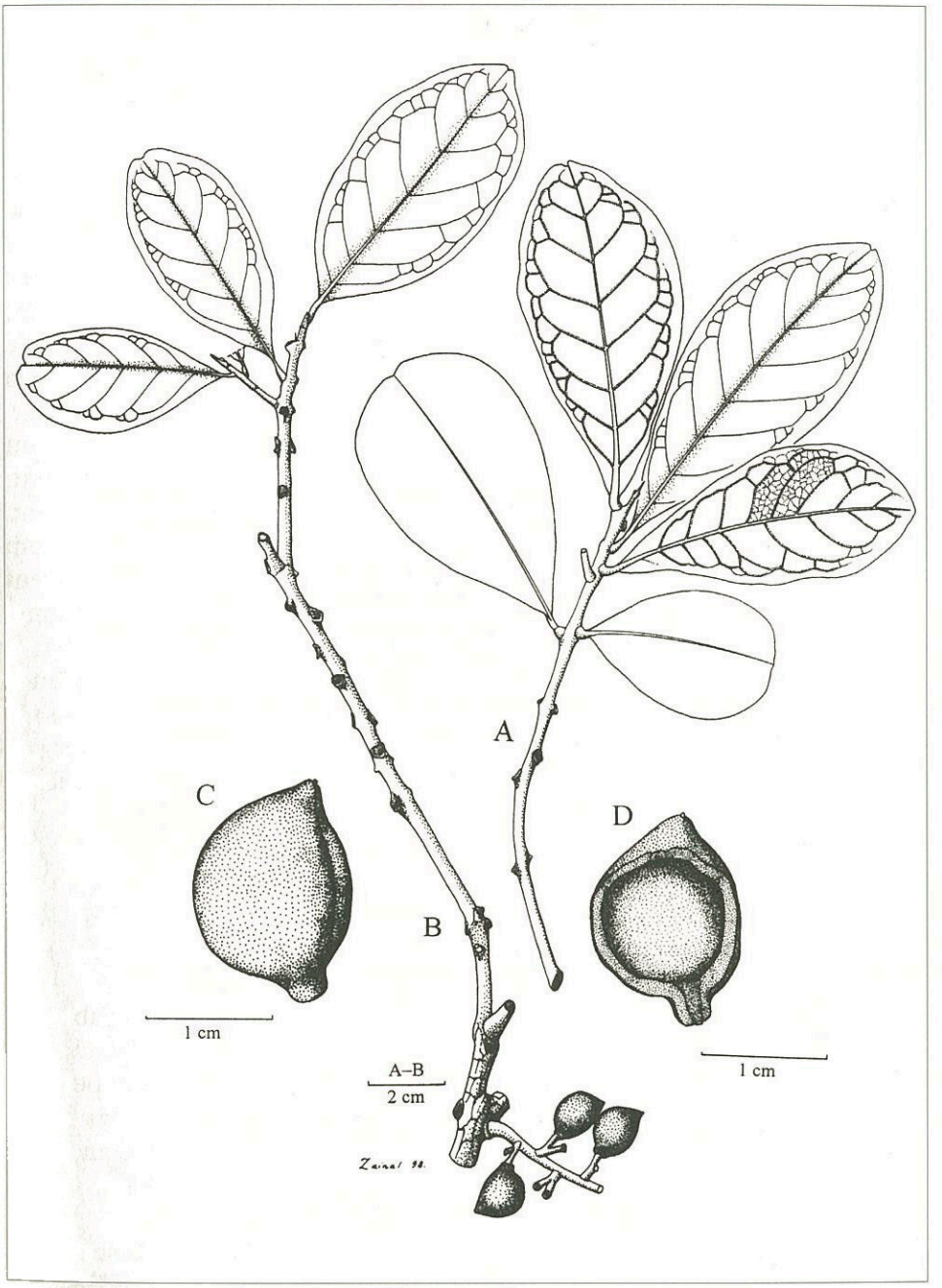

Figure 2. *Helicia symplocoides.* A, leafy twig; B, fruiting leafy twig; C, fruit; D, fruit in longitudinal section. (From *RSNB 4786.*)

acuminato, marginibus integris, petiolis brevibus ad 2 cm longis distinguendam. Typus: Borneo, Sarawak, Kapit Division, Belaga, 2 Sept. 1958, *Jacobs 5401* (*holotypus* SAR!; *isotypi* B, CANB, G, K, L, S, US).

Small to medium-sized tree, 6–25 m tall, 10–25(–50) cm diameter. *Twigs:* youngest parts angular, older ones terete, grey-brown, glabrous. *Mature leaves* elliptic to broadly elliptic, 10–25 x 4–11.5 cm, thinly coriaceous, yellowish green to olivaceous brown when dry, not shining, glabrous; base attenuate, decurrent, margin entire, apex acute or acuminate; midrib slightly raised above, prominent below; lateral veins 5–6 pairs, curved upwards and joining near the margin to form loops, prominent on both surfaces; intercostal veins reticulate, faint above, typically visible below; petiole (0.5–)1–2.5 cm long, swollen at the base, black and rarely yellowish brown when dry, glabrous. *Inflorescences* racemose, axillary or born on older, leafless branches, solitary, 12–26 cm long, laxly flowered except for about 3 cm from the base; rhachis 1–1.5(–2) mm diameter, rufous pubescent, soon glabrescent; bracts subulate, 1–2 mm long, persistent, rufous pubescent. *Flowers:* pedicels 5–8 mm long, mostly in pairs, connate up to 3–5 mm from the base, rufous pubescent; perianth 8–10 mm long, rufous pubescent to glabrescent, limb clavate, *c.* 1.5 mm diameter; anthers 1–1.5 mm long; ovary glabrous; style filiform, clavate towards the apex, glabrous; stigma discoid, lateral, stigmatic surface glandular, with distinct cleft; disk glands truncate, free, spaced. *Fruits* cylindric ellipsoid, (2.7–)3–3.5(–3.8) x (1.7–)2–2.2(–2.5) cm, smooth, shining black when dry; exocarp leathery, *c.* 1 mm thick; mesocarp built up by radial, soft brown fibres *c.* 2.5 mm long; endocarp woody, thin; fruit stalk 10–12 x 3–4 mm.

Distribution: Sumatra, Peninsular Malaysia and Borneo.

Ecology: Lowland and hill mixed dipterocarp forest, up to 900 m.

Notes: In Borneo, the leaf and petiole characters are rather variable. In *Othman Haron S 29994, Sumbing Jimpin SAN 110338,* and *Church 173,* the leaves range from 16–25 cm long and 9–11.5 cm wide, and the petioles from 2–2.5 mm in diameter. Furthermore the fruits in *de Wilde & de Wilde-Duyfjes 16611* from Sumatra, are larger (*c.* 4.5 x 3.5 cm) than those of the Bornean specimens and the endocarp is thicker (*c.* 3 mm).

Specimens Examined: SUMATRA. Atjeh, G. Leuser Nature Reserve, G. Mamas, 5 May 1975, *de Wilde & de Wilde-Duyfjes 16611* (BO, KEP!, L). PENINSULAR MALAYSIA. TERENGGANU—Ulu Setiu FR, 4 Aug. 1977, *Chan FRI 23980* (K, KEP!, L, SING!). JOHORE—Ulu Sg. Anak Endau, 3 April 1968, *Cockburn FRI 8118* (K, KEP!, SING!). BORNEO.

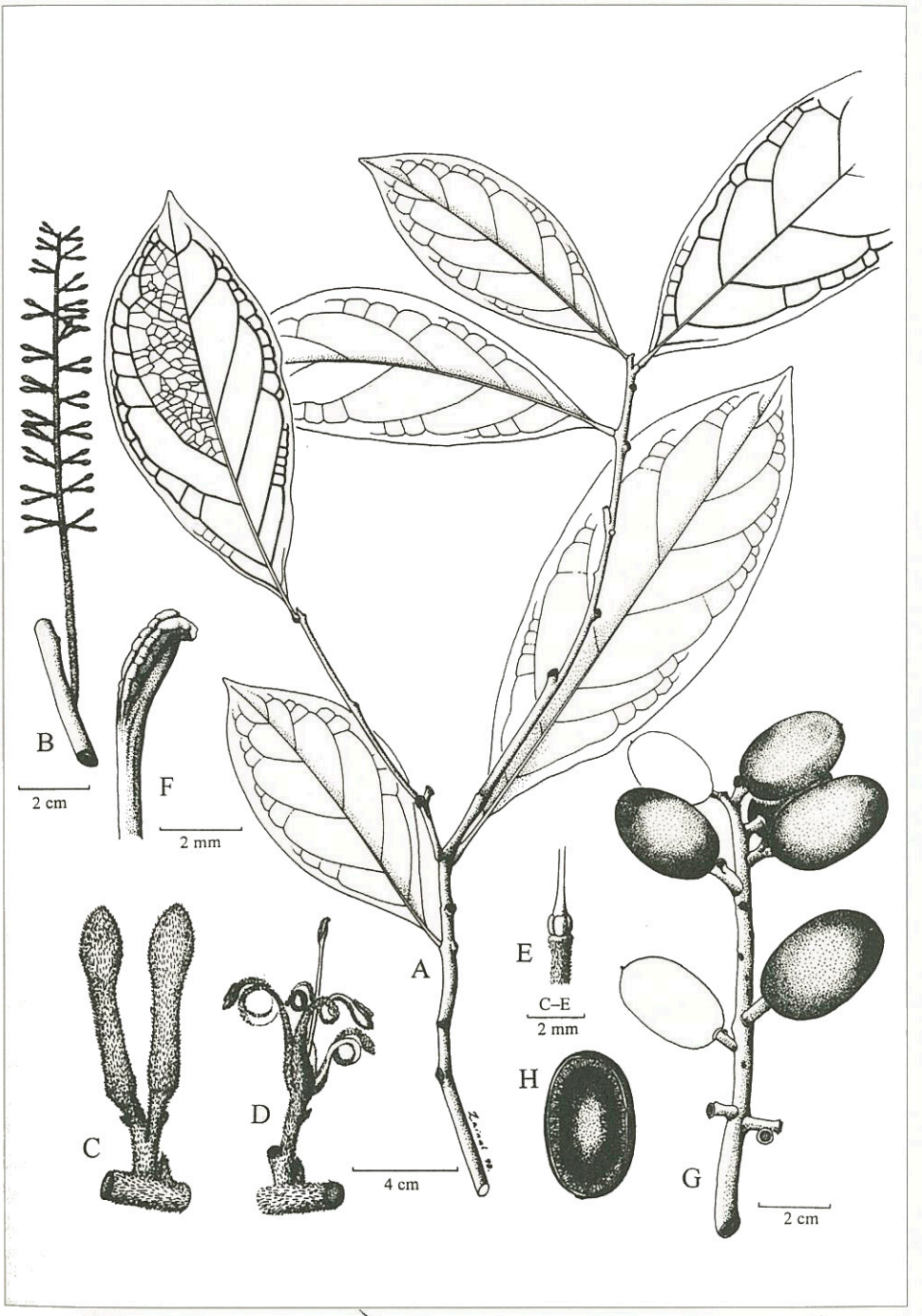

Figure 3. *Heliciopsis litseifolia.* A, leafy twig; B, male inflorescence; C, male flower buds; D, open female flower; E, base of ovary with disk glands; F, stigma; G, infructescence; H, fruit in longitudinal section. (A, G-H from *SAN 67659,* B–C from *S 34497,* D–F from *Jacobs 5401.*)

SARAWAK: Kuching Division—Sematan, G. Pueh, 23 June 1974, *James et al. S 34497* (A, K, L, MO, SAN!, SAR!). Samarahan Division—Serian, Sabal FR, 14 May 1974, *Tong S 34320* (K, KEP!, L, MO, SAN!). Sibu Division—Anap, Ulu Muput Kanan, Bt. Kemantan, 12 Oct. 1963, *Chai S 19547* (A, BO, K, L, MEL, SAN!, SAR!, SING!), Ulu Kakus, 9 March 1970, *Othman Haron S 29994* (A, K, KEP!, L). Kapit Division—Belaga, Rajang R., 2 Sept. 1958, *Jacobs 5401* (B, CANB, G, K, L, SAR!, SING!, US), Batu Laga, 4 Sept. 1984, *Abg. Mohtar S 48191* (K, KEP!, L, MO, SAN!, SAR!). SABAH: Pedalaman District—Keningau, Pensiangan FR, 16 Oct. 1985, *Sumbing Jimpin SAN 110338* (SAN!). Tawau District—Tawau, Sg. Pang Burong FR, 17 July 1969, *Leopold Madani & Saikeh SAN 67659* (K, L, SAN!, SAR!), Kinabutan Kecil, 20 May 1963, *Aban Gibot SAN 35872* (SAN!, SAR!). KALIMANTAN: Kalimanatan Barat—Sintang, Bt. Baka NP, 17 Oct. 1993, *Church 173* (A, BO, KEP!). Kalimantan Tengah—Ulu Barito, 22 June 1990, *Ridsdale PBU 595* (BO, KEP!, L).

2. *Heliciopsis percoriacea* R.C.K. Chung, **sp. nov.** Fig. 4
(Latin, per=exceedingly, coriaceus=leathery, referring to leaves)

Heliciopsidi montanae similis, foliis late ellipticis, petiolis glabrescentibus, pedicellis 8–10 mm longis, periantho 12–15 mm longo limbo c. 2.5 mm diam. distinguendam. A Heliciopside litseifolia in foliis crasse coriaceis, apice obtuso, petiolis perianthiis longioribus differt. Typus: Borneo, Sarawak, Kuching Division, Lundu, G. Pueh, 4 Oct. 1985, *Othman Ismawi et al. S 49967* (*holotypus* KEP (Sheet 1)!; *isotypi* K, KEP (Sheet 2)!, L, MO, SAN!, SAR!)

Medium-sized tree, 21 m tall, 36 cm diameter. *Twigs* terete, greyish brown, rufous tomentose when young, soon glabrous. *Mature leaves* broadly elliptic, (10–)12–18(–21) x (7–)8–11(–12.5) cm, thickly coriaceous, yellowish olivaceous or yellowish brown when dry, shining above, glabrous; base acute, margin entire, recurved, apex obtuse; midrib slightly raised above, distinctly prominent below, rufous tomentose, becoming glabrescent; lateral veins 7–8 pairs, curving and joining near the margin, slightly raised above, distinctly prominent below; intercostal veins reticulate, prominent on both surfaces; petioles 3.5–4.5 x 2.5–3 cm, rufous tomentose when young, glabrescent. *Inflorescences* racemose, solitary on older, leafless branches, 26–28 cm long, laxly flowered except for 1–2 cm from the base; rhachis terete, *c.* 2.5 mm diameter, rufous tomentose; bracts subulate, *c.* 1 mm long, persistent, rufous tomentose. *Flowers (male):* pedicels 8–10 mm long, in pairs, connate up to 4–6 mm from the base, rufous tomentose; perianth 12–15 mm long, rufous tomentose, limb ellipsoid, *c.* 2.5 mm diameter; anthers *c.* 2 mm long; disk glands ovate, free, slightly distant from each

Figure 4. *Heliciopsis percoriacea.* A, leafy twig; B, male inflorescence; C, longitudinal section of male flower. (From *S 49967* (Sheet 1).)

other. *Flowers (female)* and *fruits* not known.

Distribution: Endemic to Sarawak, it is very rare, once collected from G. Pueh. No record from Sabah, Brunei and Kalimantan.

Ecology: In Heath forest.

Specimens Examined: BORNEO. SARAWAK: Kuching Division—Lundu, G. Pueh, 4 Oct. 1985, *Othman Ismawi et al. S 49967* (K, KEP (2 Sheets)!, L, MO, SAN!, SAR!).

Acknowledgements

I wish to express my gratitude for the support and encouragement extended by the Director-General of FRIM, Kepong, the Directors of the Forestry Departments of Sabah and Sarawak. I am grateful to the Curators and Keepers of the BM, BO, BRUN, K, KEP, KLU, L, SAN, SAR and SING herbaria for loan of specimens and for permission to consult specimens at their institutions. I thank Dr J.F. Veldkamp of the Rijksherbarium, Leiden for providing Latin diagnoses of the new species. Dr Martin Cheek of the Royal Botanic Gardens, Kew, Mr Steve Cafferty of the Natural History Museum, London and Ms Stans Kofman of the Rijsherbarium, Leiden, for providing photographs of the type specimens. Dr L.G Saw of Forest Research Institute Malaysia, Kepong, for his assistance in searching the needed specimens during his tenure of Liaison Officer for the Tree Flora of Sabah and Sarawak Project. Grateful acknowledgement is also due to Dr E. Soepadmo and Mr K.M. Kochummen of Forest Research Institute Malaysia, Kepong, for their guidance and comments in the preparation of this paper. Mr Zainal bin Mustafa, University of Malaya, Kuala Lumpur, and Ms Rosemary Wise, Oxford Forestry Institute, U.K. kindly prepared the illustrations for this account. The present investigation is part of a revision of the Proteaceae for the Tree Flora of Sabah and Sarawak Project, funded by the U.K. Overseas Development Administration (ODA), the International Tropical Timber Organization (ITTO) and the Malaysian Government.

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