NOTES RELATING TO THE FLORA OF BHUTAN: XXXI. RUBIACEAE

L. S. SPRINGATE[1]

The following new species and new combinations are proposed for plants occurring in Bhutan or adjacent parts of India or China (Xizang): *Catunaregam longispina* (Link) Tirveng., *Galium hoffmeisteri* (Klotzsch) Ehrend. & Schönb.-Tem. ex R.R. Mill, *Leptodermis amoena* Springate, *L. ludlowii* Springate, *Oldenlandia erecta* (Manilal & Sivar.) R.R. Mill, *Ophiorrhiza longii* J.R.I. Wood, *Psydrax kingii* (Hook.f.) Bridson & Springate, *Rubia hispidicaulis* D.G. Long. A description of *Psydrax kingii* is provided. A lectotype is designated for *Neanotis gracilis* (Hook.f.) W.H. Lewis. Notes are provided on *Leptodermis lanceolata* Wall., *L. kumaonensis* R. Parker and *L. stapfiana* Winkler. The correct author citation of *Rubia manjith* is discussed.

Keywords. *Catunaregam*, *Galium*, lectotypifications, *Leptodermis*, *Neanotis*, new combinations, new species, *Oldenlandia*, *Ophiorrhiza*, *Psydrax*, *Rubia*.

CATUNAREGAM

D. D. Tirvengadum[2]

Catunaregam longispina (Link) Tirveng., **comb. nov.**
Basionym: *Posoqueria longispina* Link, Enum. Pl. 1: 225 (1821).
Neotype (designated here): Icones Roxburghianae 1379 (K).

Full synonymy and notes on typification will be published by the author in a forthcoming synopsis of the genus.

GALIUM

R. R. Mill[3]

Galium hoffmeisteri (Klotzsch) Ehrend. & Schönb.-Tem. ex R.R. Mill, **comb. nov.**
Basionym: *Asperula hoffmeisteri* Klotzsch in Klotzsch & Garcke, Reise Prinz Waldemar 87: t. 74 (1862).
Syn.: *Galium triflorum* Michaux var. *hoffmeisteri* (Klotzsch) Hook.f., Fl. Brit. Ind. 3: 205 (1882); *G. asperuloides* var. *hoffmeisteri* (Klotzsch) Hand.-Mazz., Symb. Sin. 7: 1027 (1936); *G. asperuloides* subsp. *hoffmeisteri* (Klotzsch) H. Hara, Enum. Fl. Pl. Nepal 2: 201 (1979). Type: Himalaya (no precise locality), *W. Hoffmeister* (n.v.).

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This combination appears on many of Ehrendorfer & Schönbeck-Temesy's *determinavit* slips on specimens that were returned after study by them to E and K in 1990, but the combination has not been published. As the research done on the genus for *Flora of Bhutan* corroborates their view that *Asperula hoffmeisteri* is best regarded at species rank within *Galium*, the opportunity is taken here to validate Ehrendorfer & Schönbeck-Temesy's combination in order that the name can be used in the *Flora*. (An attempt to communicate with the authors asking their permission failed to elicit any reply.)

Notes on *G. acutum* and *G. asperifolium* will be published separately (Mill, 1996).

LEPTODERMIS

Many collections of *Leptodermis*, including much type material, were loaned by British herbaria to the Breslau Herbarium in the 1920s. Following the destruction of Breslau in 1945, the collections could not be traced and it is no longer possible to verify many early specimen citations.

In the descriptions provided below, stem vestiture is recorded from young shoots; older stems and stipules are often covered by fine erect fungal conidia which are black at least when dry. The calyx 'tube', when present, is the free tubular portion between the rim of the hypanthium and the calyx lobes.

Notes on Leptodermis lanceolata *Wall.,* L. kumaonensis *R. Parker and* L. stapfiana *Winkler*

Leptodermis lanceolata Wall. in Roxburgh, Fl. Ind. 2: 191 (1824).
Lectotype (designated here): Napalia 1821, Wall. Num. List 6241A p.p. (K-W: specimen with mature flowers labelled 'TYPE').

Leptodermis kumaonensis R. Parker in Indian Forester 48: 576 (1922).
Syntypes: [India, Uttar Pradesh], Garhwal, near Dhanpur, 2400–3000m, 23 vi 1922, *Chandan Singh* s.n. (DD, n.v.; duplic. K); ibid., *Osmaston* 184 (DD, n.v.); ibid., *Osmaston* 1158 (DD, n.v.); [India, Uttar Pradesh], Kumaon, 2400–3300m, vii 1886, *Duthie* 5634 (DD, n.v.); ibid., 7 viii 1886, *Duthie* 5634 (DD, n.v.); ibid., 19 vii 1886, *Duthie* 5634a (DD, n.v.; duplic. BM).

Leptodermis stapfiana Winkler in Repert. Sp. Nov. 18: 164 (1922).
Syntypes: [India], Assam [in error?], *Griffith*, EIC 2121 (BM); [India], east Himalaya, *Griffith*, Kew Dist. 2967 (P, n.v.).

Leptodermis lanceolata Wall. was described from specimens gathered by Wallich and his collectors at a number of localities in central Nepal. In the following year material gathered for Wallich in central Nepal was described as *Hamiltonia fruticosa* D. Don, though only treated as doubtfully distinct from *L. lanceolata*. Wallich subsequently

distributed his specimens under the catalogue number 6241A, corresponding to '*Leptodermis lanceolata* Wall. Napalia 1821'. Specimens with this number at BM, E and K-W represent three distinct species: one is the plant well known as *L. lanceolata* from the botanical literature of west Himalaya and accepted with that name here (at BM, E and K-W), one I take to be *L. kumaonensis* R. Parker (at E) and one is *L. stapfiana* Winkler (at K-W). The specimens of *L. kumaonensis* would be included in the broader circumscription of *L. lanceolata* of previous authors discussed below.

Wallich distributed further collections of *Leptodermis* under his Num. List 6241B, C, D and E (from Kumaon, Sirmur and the Saharanpur and Calcutta Botanic Gardens respectively). On brief examination the representatives of 6241B, C and E at K-W were confirmed as *L. lanceolata*, but 6241D seemed badly overgrown. All BM duplicates of 6241 are mounted on a single sheet, possibly with errors in the numbering, at least as regards '6241C' and '6241E'. Both are quite distinct from the specimens at K-W and are *L. stapfiana*, a species not otherwise recorded west of Nepal. They may represent the same collections as the second and first sheets respectively of 6241A at K-W. The BM specimen of 6241A is therefore not taken as a reliable example.

Wallich's description of *L. lanceolata* does not agree adequately with any individual specimen seen (though most are too small to show habit and lack open flowers) and it would seem to be based on elements of more than one species. Lack of a clear definition has resulted in the name being applied occasionally to other species of *Leptodermis* occurring in central and east Himalaya. However, restriction of its application in west Himalaya (Dunn, 1920; Parker, 1922, 1924) has resulted in the name being used consistently in most publications for the single species mentioned above, here considered to reach its eastern limit in Nepal.

Two previous typifications have been made independently for *Leptodermis lanceolata*: '*Wall.* s.n. [Central Nepal] (types of *L. lanceolata* & *H. fruticosa*)' (Hara & Gould, 1979); 'Napaulis, 1921 (sic), Wall. Cat. 6241a (K-W)' (Nazimuddin & Qaiser, 1989). The latter give *H. fruticosa* as a synonym without note of its type. Hara and Gould's type has not been traced. No unnumbered specimen of *Leptodermis* from Wallich nor any original material of *H. fruticosa* has been located. Nazimuddin and Qaiser's typification could be taken to refer to the material on one of the sheets at K-W bearing the designation 'TYPE' at that time (Anonymous, 1982). Such a choice would preserve the principal current usage of the name and is considered appropriate here. However, the validity of this citation as a lectotypification has been challenged (by a reviewer of this paper) so the specimen is unambiguously designated lectotype of *L. lanceolata* Wall. here.

Hamiltonia fruticosa has been consistently relegated to the synonymy of *L. lanceolata*, at least since *Flora of British India* (Hooker, 1881). The name was previously applied by Hamilton (in sched., E) to his collection of *Spermadictyon suaveolens* Roxb. from Uttar Pradesh. At some stage Wallich combined part of the collection with material from Nepal for the purposes of distribution (Num. List 6239A, 'Islamabad' in error). However, Don's use of the name seems quite independent.

Don's description does not fully agree with any Wallich specimen seen and is too short for reliable identification beyond genus. The hexamerous condition of the flowers would be quite exceptional if it was predominant in his material. I have found only one similar example in any Himalayan gathering of *Leptodermis*: the specimens of *L. kumaonensis* under Wall. Num. List 6241A at E. However, Don's description could hardly have been based entirely on any part of that particular collection and it does not provide an adequate reason for rejecting Hara and Gould's linkage of *L. lanceolata* and *H. fruticosa*.

Parker separated *L. kumaonensis* from *L. lanceolata* on the form and position of the inflorescence and by the corollas of the former being hairy externally (Parker, 1922). Specimens subsequently collected in Nepal seem to have been determined according to external corolla vestiture alone and the inflorescence characters ignored (e.g. Hara & Gould, 1979). However, if the few specimens resembling *L. lanceolata* in inflorescence type are excluded, the remainder can be interpreted as a single species with more or less continuous variation in external corolla vestiture, ranging from no hair at all (though at least mamillate or papillose on the lobes) to almost complete pubescence. The isosyntypes seen of *L. kumaonensis* confirm the application of that name to this species.

Leptodermis stapfiana is the most variable of the three species found under Wall. Num. List 6241A. It includes many populations with distinctive facies but probably with too much variation in individual characters to allow the effective delimitation of subordinate taxa, though the issue is confounded by severe environmental modification. The location 'Assam' on the BM syntype was not written by Griffith and no specimens of *L. stapfiana* have been seen from the area he termed Assam.

The species may usually be distinguished as follows:

1a. Flower-heads several, small, sessile near the top of old wood and overtopped by current season's immature growth or subterminal on old spurs; mature leaves absent ——— **L. kumaonensis**

1b. Inflorescence terminal, from small, capitate to large, open, paniculate, with mature leaves at base or throughout ——— 2

2a. Corolla hairless or a few hairs at apex of lobes only ——— **L. lanceolata**

2b. Corolla puberulous or pubescent ——— **L. stapfiana**

Leptodermis kumaonensis is more closely related to *L. stapfiana* than *L. lanceolata* and atypical specimens are more easily confused with *L. stapfiana*. In one specimen of *L. kumaonensis* some axillary flower-heads were borne on the current season's growth in autumn, though the main flowering had already occurred as usual on old wood. Individual stems or whole shrublets dwarfed and often intricately branched from exposure, grazing or disease generally occur only in *L. stapfiana*. Determination is difficult in these circumstances, but very rarely a specimen flowering early or successively from the nodes of old wood then new wood seems to be *L. kumaonensis*.

Leptodermis lanceolata is quite rare in Nepal and rather atypical, apart from

Wallich's collections. Specimens of the one other collection seen from central Nepal differ in little other than corolla vestiture from some extreme forms of *L. stapfiana* of East Nepal and are only dubiously determined. Wallich's collections would also be the easternmost seen, even though individual specimens lack precise locality. There must therefore be some doubt concerning the origin of these specimens. They are still assumed to constitute part of the original material on which *L. lanceolata* was based, as Wallich's description could not have been based solely on the specimens seen of *L. stapfiana* and *L. kumaonensis*. The other specimens of *L. lanceolata* seen from Nepal were:

WEST NEPAL. Doli district, Wari, 16 v 1929, *Bis Ram* 418 (BM); Gum, near Rara Daha, 7500ft, 14 viii 1952, *Polunin, Sykes & Williams* 5203 (BM, E); Ruga, near Rara, 6500ft, 21 vi 1952, *Polunin, Sykes & Williams* 4368 (BM). CENTRAL NEPAL. Dhaulagiri zone, Parbat district, Shika–Kali Gandaki–Tatopani, 28°28′N, 83°39′E, 1600m, 15 vii 1983, *Ohba et al.* 8310392 (BM); Dhaulagiri zone, Parbat district, Shika (2100m)–Kali Gandaki (1350m)–Tatopani (1360m), 15 vii 1983, *Ohba et al.* 8330457 (BM).

The specimens of *L. stapfiana* and *L. kumaonensis* cited by Hara & Gould (1979) are correct, those of *L. stapfiana* demonstrating its wide variability, but the following two specimens of *L. kumaonensis* were incorrectly cited as *L. lanceolata*:

CENTRAL NEPAL. Bhim Khola, E of Kutharpekot, 8000ft, 27 iv 1954, *Stainton, Sykes & Williams* 290 (BM). EAST NEPAL. Likhu Khola, E of Chaukharma, 27°30′N, 86°25′E, 8500ft, 17 vi 1964, *McCosh* 240 (BM).

New species

Leptodermis amoena Springate, **sp. nov. Fig. 1A–E.**
Media characteribus inflorescentiae inter *L. glomeratam* Hutch. et *L. lanceolatam* Wall.; a *L. glomerata* caulibus fruticosis et foliis majoribus (ad 90 × 30mm) nervos plures (5–9-jugos) praebentibus distinguitur; a *L. lanceolata* bracteis cymularum ligulatis vel anguste triangularibus (haud foliaceis) et bracteolis saepissime 1-nervatis et corollis extus pubescentibus distat. Species mihi etiam florescentia in serum autumnum ab illis recedit.
Type: Bhutan, [Tongsa district], Tongsa Dz[ong], Mangde Chu, 7000ft, 'Corolla pink to mauve pink. On open rocky hillside', 15 x 1949, *Ludlow, Sherriff & Hicks* 19828 (holo. E, iso. BM).

Shrub 0.6–2.5m tall; stems usually very slender, erect, subglabrous or puberulous with hairs in two bands decurrent from stipules or more scattered. *Leaves* ovate-lanceolate, to 90 × 30mm, subglabrous or puberulous, scabridulous above towards apex, with 5–8(–9) pairs of main veins; petiole to 4mm long, puberulous; stipules (1–)2–3.5(–5)mm long, cuspidate, ciliate, pubescent below. *Inflorescences* terminal on new shoots with all upper nodes bearing 2–4 lateral shoots with axillary and terminal clusters of cymules, either forming a very open inflorescence with all axes elongate or a much narrower thyrse with an elongate central axis and short lateral

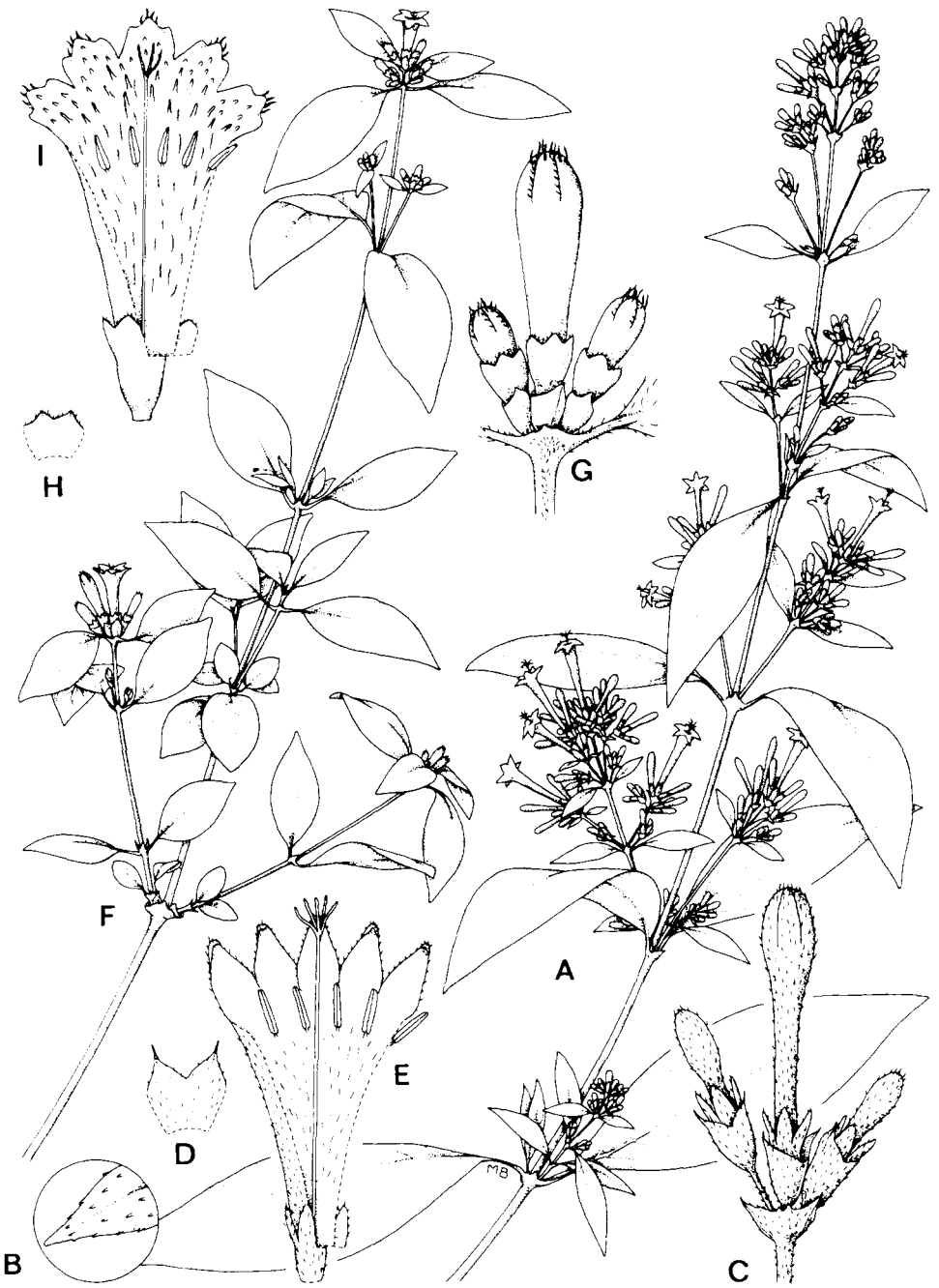

FIG. 1. *Leptodermis amoena* Springate. A, habit, × ⅔; B, leaf tip, × 6; C, terminal cymule, × 3; D, spread bracteole pair, × 3; E, spread flower, × 3. *L. ludlowii* Springate. F, habit, × ⅔; G, terminal cymule, × 3; H, spread bracteole pair, × 3; I, spread flower, × 3. A–E from *Ludlow, Sherriff & Hicks* 19828. F–H from *Ludlow & Sherriff* 160; I from *Ludlow, Sherriff & Hicks* 19284. Drawn by Mary Bates.

branches; bracts of cymules small, ligulate or narrowly triangular. *Bracteoles* roughly equalling calyx at anthesis, 2.5–5.5mm long, mucronulate or cuspidate, ciliate, with one vein apparent, rarely three if bracteoles extremely thin; bracteole pairs divided about halfway. *Flowers* heterostylous, fragrant. *Calyx* tube ± absent, the lobes oblong, 1.2–2.3mm long, obtuse to acuminate, ciliate. *Corolla* narrow-infundibular, pale to purplish pink, pubescent outside; the tube slender, 12–14.5mm long, with long fine tuberculate hairs within; the lobes ovate, 3–5mm long, glabrous on inner face. *Short-styled flowers*: filaments 0.7–1.3mm long; anthers 2.1–2.5mm long, attached near centre, partly exserted; stigmas included immediately below anthers. *Long-styled flowers*: filaments c.0.2mm long; anthers 1.8–2.5mm long, attached towards base, included; stigmas completely exserted. *Stigmas* 5, filiform, c.2mm long. *Capsule* narrow, apparently oblong. Flowering period October and November.

Additional specimens examined. BHUTAN, SOUTH. [Chukka district], Chukka, 4000ft, 19 xi 1914, *Cooper* 3619 (BM, E).

BHUTAN, CENTRAL. Tongsa [district], Tashiling, 7000ft, 6 x 1914, *Cooper* 2302 (BM, E); [Tashigang district], Trashigong, 4000ft, 15 x 1934, *Ludlow & Sherriff* 1062 (BM); [Tashigang district], Rungzyung, Gamri Chu, 4500ft, 17 xi 1936, *Ludlow & Sherriff* 2863 (BM, E); [Tashigang district], camp on Jiri Chu via Yonpu La, 27°08′N, 91°29′E, 5500ft, 10 xi 1938, *Ludlow, Sherriff & Taylor* 7212 (BM, E); [Tashigang district], Jiri Chu, 3000ft, 21 xi 1938, *Ludlow & Sherriff* 6757 (BM, E).

INDIA, ARUNACHAL PRADESH. Balipara Frontier Tract, Rupa, 5–6000ft, 21 x 1935, *Kingdon-Ward* 12454 (BM); Saleri–But, 5–6000ft, 20 x 1955, *Rankin & Pretzlik* 084 (BM).

Ludlow examined eight of these collections and recognized them as a single taxon, which he identified as '*L.* cf. *riparia* Parker'. In a manuscript attached to the folder of those specimens at BM he noted a number of differences with the few specimens known of *L. riparia* (from Kumaon, on the border with Nepal) and suggested that the plants from Bhutan might warrant separation once more material from Kumaon was available for comparison. No further examples of *L. riparia* have been received since then at BM, E or K and it would seem a species of limited distribution and little variation, quite distinct from *L. amoena*. While the arrangement of the inflorescence of *L. amoena* can sometimes resemble that of *L. riparia* (and *L. lanceolata* Wall. and *L. gracilis* C.E.C. Fischer) with elongate lateral branches, the majority of collections show greater similarity to *L. glomerata* Hutch. in that only the central axis is elongate and the lateral branches are very reduced. *L. riparia* also differs in its smaller more scabrid leaves (to 55 × 20mm) with 4–6(–7) pairs of main veins, bracts all leaf-like, three-veined bracteoles, shorter corolla with shorter hairs outside and flowering period in July.

Leptodermis lanceolata differs in its glabrous or subglabrous inflorescence, bracts all ± leaf-like, bracteoles always long and cuspidate with reticulate veins, corolla mamillate or papillate but hairless outside, flowering period (July–)August(–September); *L. gracilis* in its smaller leaves (to 50 × 15mm) subglabrous on both surfaces with 4–6 pairs of main veins, bracts all ± leaf-like, shorter corolla mamillate but hairless outside, flowering period between February and July; *L. glomerata* in

its suffrutescent habit, smaller leaves (to 50 × 20mm) with 4–6 pairs of main veins, bracteole cusps not exceeding the hypanthium; flowering period (July–)August (–September). These three species are also geographically isolated from *L. amoena*, *L. lanceolata* in the western half of the Himalayas, *L. gracilis* in easternmost Arunachal Pradesh and *L. glomerata* in Yunnan.

The recognition of a species intermediate in many characters between *L. lanceolata* and *L. glomerata* would support the tentative association of these two quite divergent species by Winkler (1922).

Leptodermis ludlowii Springate, **sp. nov. Fig. 1F–I.**

Leptodermidi forrestii Diels et *L. potaninii* Batalin var. *potaninii* similis, sed tubo calycis 1–1.5mm longo (hypanthio excluso) et quam lobis longiore haud aegre dignoscenda (in illis calyx fere ad hypanthium divisus est).

Type: W Bhutan, [Thimphu district], Pemithanka [Pyemitangka], 8500ft, 'Shrub 4–5ft. Corolla white, purplish-lilac at throat. Calix dark lilac. Shady river bank', 28 vi 1933, *Ludlow & Sherriff* 160 (holo. BM).

Shrub 0.6–1.5m tall; stems very slender, with two bands of hairs decurrent from the stipules. *Leaves* ovate or ovate-oblong, to 48 × 20mm, gradually to abruptly acuminate, attenuate at base, ciliate, subglabrous to puberulous above and beneath; main veins (3–)4–5 pairs; petiole 2–4mm long, pilose adaxially; stipules 1.5–3(–4)mm long, cuspidate, glandular-denticulate or laciniate, ciliate, pubescent below. *Inflorescences* terminating short new growths, small, with the uppermost pair of nodes approximate, few cymules and up to 12 flowers; bract pairs foliaceous and petiolate, rarely ligulate on subsidiary 1-flowered cymules; stipules as those of vegetative growth or reduced, hyaline and laciniate. *Bracteole* pairs not exceeding hypanthium, deeply divided, subglabrous, the lobes broadly triangular, obtuse or subacute, mucronulate, usually ciliate, the central pair in a cymule often more elongate and cuspidate. *Calyx* glabrous, the tube 1.1–1.4mm long, the lobes triangular, rarely rounded, 0.7–0.8mm long, with dense short hairs or papillae around the margins; rarely an extra (sixth) lobe or two deeper clefts in the tube predominant. *Corolla* broadly infundibular, white or cream to reddish or violet, sometimes bicoloured, the exterior finely mamillate, more prominently so towards the apex, with a few apical hairs and very rarely with few short hairs decurrent from the sinuses of the lobes; tube 10–11.5mm long, with long fine tuberculate hairs within; lobes 2–3mm long, with relatively few short stout smooth hairs on inner face, usually with few or no transitional long smooth hairs, the apparent shape of the marginal tissue variable. *Short-styled flowers*: filaments 1–1.7mm long; anthers 1.9–2.7mm long, attached below centre, partly exserted; stigmas immediately below anthers. *Long-styled flowers*: filaments c.0.3mm long; anthers 1.7–2mm long, attached near base, rarely at centre, included; stigmas completely exserted. *Stigmas* 2–4, filiform, to 2.5mm long, with hairs sometimes extending onto upper style. *Capsule* narrow, apparently oblong. Flowering period June–September.

Additional specimens examined. BHUTAN, SOUTH. Chukka district, Gedu area, c.2400m, 17 vii 1983, *Sargent* 8 (E); [Chukka district], 28km S of the confluence of Paro Chu and Wong Chu rivers on the road from Thimbu to Phuntsholing, 2200m, 21 v 1984, *Bartholemew & Tse* 1737 (E); [Ha district], between Ha and Puduna, 2797m, 25 vi 1971, *Bedi* 289 & 295 (both K); [Thimphu district], Cheka–Sankepang–Gunitsana, 3000m, 24 vi 1966, *Nishioka* 5495 (BM); Bumthang [district], Shabejetang, 10–11,000[ft], 1 vii 1949, *Ludlow, Sherriff & Hicks* 19284 (BM, E).

?INDIA, ?SIKKIM. Galing, 10,000ft, 12 ix 1912, *Rohmoo* 60 (E).

CHINA, TIBET, CHUMBI. 30 vii 1877, *Dungboo* 4645 (K); Yatung, 27°51′N, 88°35′E, [ann.] 1897, *Hobson* s.n. (K); Chumbi, 9 vii 1913, *Cooper* 232 (E).

CHINA, SE TIBET. Migyitun, 28°40′N, 93°39′E, 9–10,000ft, 9 vii 1935, *Kingdon-Ward* 11947 (BM); Kyimpu, Chayul–Charme, 11,500ft, 3 vii 1936, *Ludlow & Sherriff* 2278 (E); Migyitun, Tsari Chu, Chikchar, 28°42′N, 93°18′E, 10,000ft, 25 x 1938, *Ludlow, Sherriff & Taylor* 6634 (E).

In manuscripts attached to the folders of the relevant specimens at BM Ludlow identified five of these collections as a new species, distinguished from *L. forrestii* Diels by their 'broad calyx with short tips'. He treated *Ludlow & Sherriff* 2278 and nine further collections from SE Tibet as '*L.* aff. *forrestii* Diels', differing from typical *L. forrestii* in their much smaller corollas that were not always dentate. A broad view of *L. forrestii* is provisionally adopted here, which would include all of the latter collections except *Ludlow & Sherriff* 2278. The separation of *L. forrestii* from *L. potaninii* Batalin var. *potaninii* has always been problematic (cf. Winkler, 1922), the delimitation here coinciding more closely with differences in stigma number than with differences in stipule margin and apex or corolla size.

Leptodermis ludlowii shows remarkably little variation compared to other well-known species of the genus, but *L. forrestii* sensu lato and *L. potaninii* var. *potaninii* are quite variable. The only constant differences between *L. ludlowii* and either of the latter taxa are its prominent calyx tube and geographic range. In *L. forrestii* sensu lato and *L. potaninii* var. *potaninii* the sinuses between all calyx lobes extend more or less to the rim of the bowl-shaped roof of the hypanthium, roughly level with the top of the nectarial disc, and a definite calyx tube is absent. However, in two specimens of *L. ludlowii* the calyx tube is usually partly divided by two obliquely extended sinuses between calyx lobes, but the pattern of 5 (or 6) regular calyx lobes is still apparent above the incomplete tube. Only *L. ludlowii* has been found on the southern flanks of the Himalayas. It also occurs in Tibet in the valleys of river systems that eventually cut through the Himalayas (the Chumbi and Subansiri rivers), whereas I have seen no specimens of *L. forrestii* from south or west of the drainage system of the Tsangpo, which flows eastwards around the eastern end of the Himalayas. *L. potaninii* var. *potaninii* seems to occur only further east. *L. forrestii* has been reported from within the range of *L. ludlowii* in Tibet, from Yadong and Cona (Li Hen, 1985), but specimens are not cited and the report could not be verified.

All specimens seen of *L. forrestii* and *L. potaninii* var. *potaninii* also differed from *L. ludlowii* in possessing some of the following characters: most cymules terminating the flowering shoot with a single flower, rarely with three flowers; calyx lobes more

than 1mm long or the margins entire or with long cilia but lacking numerous short hairs or papillae; corolla longer than 17mm, smooth outside or lacking any apical hairs; corolla lobes densely hairy within (with smooth hairs long, little shorter than the tuberculate hairs of the throat); stigmas mostly five.

NEANOTIS

R. R. Mill[4]

Neanotis gracilis (Hook.f.) W.H. Lewis in Ann. Missouri Bot. Gard. 53: 38 (1966). Basionym: *Anotis gracilis* Hook.f., Fl. Brit. India 3: 71 (1880).
Lectotype (designated here): [India, Meghalaya], Khasia, Moflong, fl. white, 1 viii 1850, '*Hedyotis* 34', *Hooker & Thomson* s.n. (K).

Two sheets are present in the type cover at K bearing a printed *Hooker & Thomson* label named '*Hedyotis* 34' and localized 'Khasia 5–6000 ped.' Both are annotated '*Anotis gracilis* Hook. f. Type'. The one selected here as the lectotype additionally bears a white handwritten label reading '*Hedyotis*, fl. white, Moflong, August 1 1850'.

OLDENLANDIA

R. R. Mill[4]

Oldenlandia erecta (Manilal & Sivar.) R.R. Mill, **comb. nov.**
Basionym: *Hedyotis erecta* Manilal & Sivar. in Bot. Not. 129: 191 (1976). Type: '(*Sivarajan* 491) [India, Kerala] in declivo lateritico prope locum Idimuzhikkal collectus, circ. 5km a campo Universitatis Calicutensis (Kerala) remotum' (holo. LWG, iso. E).

There is considerable debate about the generic limits of *Hedyotis* L., some authors treating it in a very wide sense including not only *Oldenlandia* but also *Kohautia* and other taxa. In *Flora of Bhutan* we have followed the view that *Oldenlandia* is sufficiently distinct to be separated from *Hedyotis* at generic rank. This necessitates the above new combination.

OPHIORRHIZA

J. R. I. Wood[5]

Ophiorrhiza longii J.R.I. Wood, **sp. nov.** bracteis obovatis usque 10mm latis, persistentibus distincta. **Fig. 2A–E.**

Isophyllous perennial herb with erect stems arising from a creeping rootstock. *Stems* 10–15cm high, dark green, below glabrous, above bifariously pubescent. *Leaves*

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ovate or broadly elliptic, acute or shortly acuminate, 4–8 × 2–4cm, base broadly cuneate or rounded, upper surface dark green, glabrous, lower surface paler, glabrous except for the scurfy veins; petioles short, slightly unequal, scurfy, 2–15mm long; stipules filiform from a triangular base, glabrous, 8–9mm long, ?persistent. *Inflorescence* of solitary, terminal, dense, bracteate heads, c.2.5cm long and wide, glabrous or with scattered papillae; peduncle 1.5–3.3cm long, glabrous, erect; bracts obovate, obtuse, glabrous, persistent, 9–10 × 7–8mm; bracteoles 1-veined, oblong, glabrous, c.8 × 2mm; pedicels c.1mm long; hypanthium c.1mm long, teeth 0.5mm long, oblong-ovate, acute, glabrous. *Corolla* 2cm long, 2mm wide, slightly curved, white tinged pink, outside glabrous, inside thinly pilose; lobes erect, triangular, c.4mm long. *Stamens* inserted above the middle of the tube; filaments c.1.5mm long; anthers c.2.5mm long. *Ovary* and *style* bilobed; style c.3mm long. *Capsule* not known.

Typus: Bhutan, near Dakpai, S of Shemgang [27°13′N, 90°41′E], shaded rocky bank in ravine in moist forest, 1650m, 6 vi 1979, *Grierson & Long* 1700 (holo. E, iso. THIMPHU).

Although *O. longii* is known only from the type collection, the broad obovate bracts are outstanding in this very complex genus with otherwise often ill-defined species. It is probably closest to *O. griffithii* Hook.f. but is not very closely related.

This new species is named after David Long who has done more to increase our knowledge of Bhutanese plants than any other individual in recent years. His extensive collections in this often neglected genus have added considerably to our awareness of the presence and distribution of these critical species.

PSYDRAX

D. M. Bridson[6] *& L. S. Springate*

The palaeotropical genus *Psydrax* Gaertn. was reinstated by Bridson (1985) and notes on species occurring in southern India were provided by Bridson and Matthew (in Matthew, 1993). They indicated that specimens from central and eastern India, usually determined as '*Canthium dicoccum*' (or '*C. didymum*'), are distinct from *Psydrax dicoccos* Gaertn., a species restricted to southern India and Sri Lanka. *Psydrax* has been recorded in northeast India from the Khasi, Jaintia and north Cachar Hills as '*Canthium dicoccum*' (Kanjilal et al., 1939; Balakrishnan, 1981; Haridasan & Rao, 1987). The limited material (without any fruit) at BM, E and K from the Khasi Hills suggests one (or two) distinct taxa are present there. This taxon is not conspecific with *P. umbellata* (Wight) Bridson either and we know of no available specific epithets from eastern India or Burma that could apply. A species of *Psydrax* has also been cited from Darrang as '*Canthium dicoccum* var. *umbellatum*' (Kar & Panigrahi, 1963), but we have seen no material from this region (see below).

One species of *Psydrax* occurs further north in the Himalayas. It is clearly distinct

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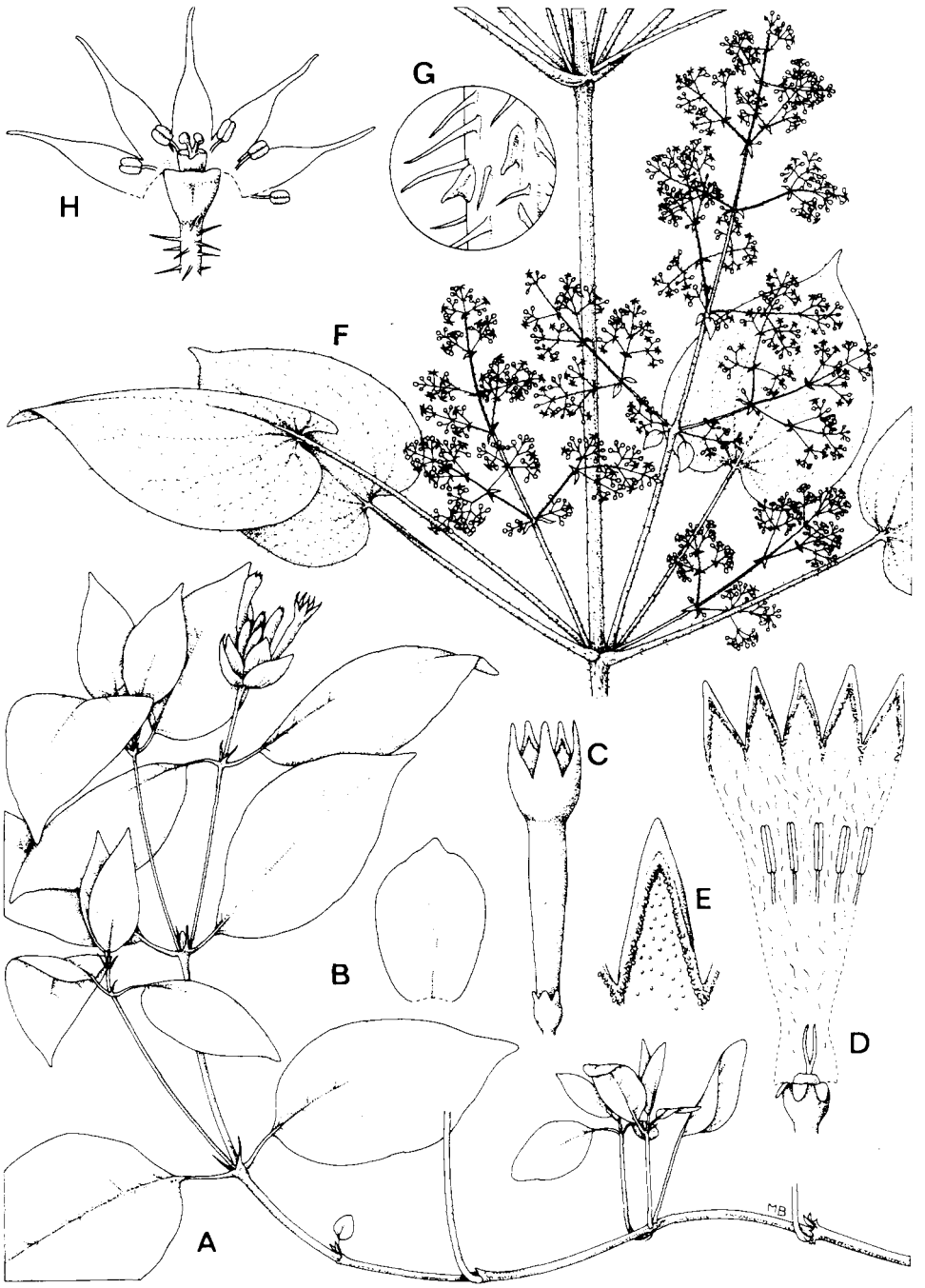

FIG. 2. *Ophiorrhiza longii* J.R.I. Wood. A, habit, ×⅔; B, bract, ×2; C, flower, ×2; D, spread flower, ×3; E, corolla lobe, ×6. *Rubia hispidicaulis* D.G. Long. F, habit, ×½; G, stem vestiture, ×20; H, spread flower, ×8. A–E from *Grierson & Long* 1700. F–H from *Grierson & Long* 2283. Drawn by Mary Bates.

from the taxon discussed above and can be distinguished by its longer corolla tubes, always distinctly exceeding the lobes, few-flowered subumbellate inflorescence and thinner leaves. The Himalayan species may also be distinguished from *P. dicoccos* and *P. umbellata* by these characters. It also differs from the former in its oblong fruit with straight pyrenes and from the latter in its oblong-elliptic abruptly acuminate leaves, puberulous inflorescence, slender peduncles and more elongate fruit.

This taxon, described as a variety of *Canthium didymum* C.F. Gaertn. (var. *kingii* Hook.f.), was raised to full species by Brandis (1906). However, this rank was not generally adopted. Bridson and Matthew (in Matthew, 1993) affirmed it as a good taxon without further comment; it is here transferred to *Psydrax* and a full description provided.

Psydrax kingii (Hook.f.) Bridson & Springate, **comb. nov.**

Basionym: *Canthium didymum* C.F. Gaertn. var. *kingii* Hook.f., Fl. Brit. India 3: 132 (1880). Type: India, West Bengal, Darjeeling district, Sitong, 1500ft, 12 v 1876, *G. King* s.n. (holo. K).

Syn.: *Canthium kingii* (Hook.f.) Brandis, Indian Trees 385 (1906).

Plectronia didyma (C.F. Gaertn.) Kurz var. *kingii* (Hook.f.) A.M. Cowan & J.M. Cowan, Trees of N Bengal 78 (1929).

Misident: *Canthium dicoccum* sensu H. Hara & S. Gould in Hara et al., Enum. Fl. Pl. Nepal 2: 200 (1979), non (Gaertn.) Teijs. & Binn.

Shrub or small tree to 8m, glabrous throughout except cymes. *Leaves* oblong-elliptic, 90–140 × 35–47mm, abruptly acuminate with a narrow-oblong subobtuse acumen, attenuate at base, thin-coriaceous, with 3(–5) main (arcuate) pairs of lateral veins and reticulate pattern of raised subsidiary veins on both faces; petiole c.7mm. *Stipules* c.6mm long including cusp, cusp not strongly keeled (less than 1mm deep). *Cymes* subumbellate, puberulous; flowers 10–22(–30); peduncle 4–8mm long, relatively narrow (c.1mm across); bracts weakly cupular, 0.5–1.2mm; pedicels (3–)5–8mm long at anthesis, up to 15mm long in fruit. *Calyx* subglabrous, the free tube to 0.5mm long, the lobes triangular or ovate, 0.3–0.7mm long, acute or obtuse, ciliate. *Corolla* tube 4–5.5mm long, the lobes ovate-oblong, 3mm long, subacute. *Style* c.9mm long; pollen receptacle 1.4–1.9 × 0.9–1.2mm. *Fruit* (of a single immature collection) oblong-obovate, c.15 × 7mm, truncate at apex, obtuse at base; pyrenes straight, bullate. Flowering period May.

Additional specimens examined. NEPAL. Ratua Khola, 26°48′N, 87°44′E, 1000ft, 31 v 1969, *Williams* 302 (BM).

INDIA, DARJEELING DISTRICT. Lal, 4000ft, 15 v 1919, *Cave* s.n. (E); Rangit ['12000ft' in error], 17 v 1919, *Cave* s.n. (E); sin. loc., 3500ft, 22 v 1923, *J.M. Cowan* s.n. (E).

P. kingii occurs in the lower and middle hill forest of Darjeeling (Cowan & Cowan, 1929) and the neighbouring part of Nepal. One further specimen — [India, Orissa], Ganjam district, Goomsur (ex herb. Beddome) (BM) — is clearly this species. Since a Nepal/Darjeeling–S Orissa disjunct distribution would seem very unlikely, we pro-

visionally assume it to be incorrectly labelled. Beddome's herbarium, now incorporated in BM, contains many other specimens from Darjeeling district.

A *Psydrax* has been reported from Mêdog district, Xizang (Tibet), as '*Canthium dicoccum*' (Li Hen, 1985), but we have not seen any specimens from this area. The figure provided shows a plant rather similar to *P. kingii*, but there are some differences in the details cited (few subsidiary veins of the leaf apparent, corolla tube about 3mm long, fruit 8–10 × 6–8mm, flowering period August). We have excluded it from the circumscription of *P. kingii* in this account, but accept that further investigation might show it to be correctly included in a broader concept of that species. The population previously cited from Darrang might also prove to be *P. kingii*.

RUBIA

D. G. Long[7]

Notes on the Rubia cordifolia *group*

The plant widely known as *Rubia cordifolia* L. in eastern Asia has been the source of much confusion. Because of taxonomic difficulties, the name has been frequently applied in a very broad sense to those *Rubia* species with broad, petiolate leaves, e.g. by Hooker (1881), Deb & Malik (1968), Nazimuddin & Qaiser (1989).

However, other authors from the time of Decaisne (1837), in particular Hara & Kurosawa (1963), Hara & Gould (1979) and Hara (1967), have attempted to define segregate species within the complex. Unfortunately these attempts have largely been confined to Japan and the East Himalaya, and other important regional morphotypes, in particular those from China, have not been reviewed.

The fundamental matter of the typification of *Rubia cordifolia* L. has been incompletely dealt with; an East Siberian plant was proposed as lectotype (Hara & Kurosawa, 1963; Hara, 1967), but no particular specimen was formally designated. The problem was also discussed by Verdcourt (1975) in dealing with tropical African segregates of the species.

Rubia manjith Roxb. in Fleming, Asiatic Res. 11: 177 (1810).

Recent publications have consistently given the author citation for this species as Roxb. ex Fleming (e.g. Hara & Kurosawa, 1963; Hara, 1967; Hara & Gould, 1979). Under strict interpretation of Art. 46 of ICBN (Tokyo Code) it is clear that the validating description was provided by Roxburgh and not Fleming as following both the name and description is the note 'Roxb. ms.' which clearly means that Roxburgh supplied both the name and the diagnosis which were then published in Fleming's paper. Thus the correct citation is Roxb.

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Rubia hispidicaulis D.G. Long, **sp. nov. Fig. 2F–H.**
R. manjith Roxb. similis sed habitu robustiore et colore plerumque omnino viridecenti, caulibus dense patenti-hispidis et aculeis uncinatis armatis, foliis majoribus (5–11 × 3–7cm) plerumque late ovatis et ad basem valde cordatis paginis ambabus hispidis, floribus majoribus 5–6mm diametro differt.

Similar to *R. manjith* Roxb. but differing in its more robust habit and usually greenish colour throughout; stems densely spreading-hispid and with hooked prickles; leaves larger, 5–11 × 3–7cm, usually broadly ovate and strongly cordate at base, hispid on both surfaces; flowers larger, 5–6mm diameter.

Type: Bhutan, Deothang district, 3km N of Tschilingor, N of Samdrup Jongkhar, 27°04′N, 91°25′E, in thicket of tall *Polygonum*, 'Robust climbing herb, flowers reddish-green. Apparently distinct from small-leaved form which was common in the area', 2450m, 26 vi 1979, *A.J.C. Grierson & D.G. Long* 2283 (holo. E; iso. K, THIMPHU).
Syn.: *Rubia cordifolia* L. forma *strigosa* Deb & Malik in Bull. Bot. Surv. India 10: 9 (1968). Type: [Bhutan], 'Chumbi' Ta-ssiu-Doom, 17 vi 1884, *King's Collector* 482 (holo. CAL, n.v.; iso. K).

Vigorous hispid climbing herb, green or somewhat reddish-tinged throughout; stems long and slender, quadrangular, with a mixture of deflexed prickles and dense spreading hispid hairs 0.3–0.7mm long. *Leaves* in whorls of 4, membranous, ovate often broadly so, 5–11 × 3–7cm, apex acuminate, base deeply cordate, margins entire, palmately 7–9-veined, hispid with long hairs on both surfaces; petiole 2–7.5cm, with hooked prickles and spreading hairs. *Flowers* in diffuse axillary and terminal panicles 5–20 × 3–11cm; bracts leaf-like but smaller, 0.5–3 × 0.3–1.5cm, rounded at base; bracteoles lanceolate, 2–4mm; pedicels slender, 1–6mm. Flowers pale green or reddish-tinged, 5–6mm diameter, 5-merous. *Calyx* c.0.5mm, adnate to ovary, unlobed. *Corolla* tube very short, 0.5–0.6mm; lobes widely spreading, lanceolate, 2.0–2.4 × 0.8–1mm, with subulate tip, sparsely hispid externally. *Stamens* short, c.0.8mm, spreading, inserted on corolla tube between lobes. *Styles* 2, free to base, short and straight. *Fruit* smooth, black when ripe, subglobose, c.5mm diameter, or deeply 2-lobed, up to 9mm broad.

Additional specimens examined. BHUTAN, SOUTH. Chukka district, 2km S of Takhti Chu, 27°00′N, 89°35′E, 2170m, 24 ii 1982, *Grierson & Long* 3201 (E, K).

BHUTAN, CENTRAL. Thimphu district, [towards Panga, 1980–2290m, v 1838], *Griffith* KD 3070 [Itin. 1021] (K); Thimphu district, Ta-ssiu-doom [= Tashi Cho Dzong], vi 1884, *King's Collector* [Dungboo] 482 (K, isotype of *Rubia cordifolia* L. forma *strigosa* Deb & Malik); Timpu, 2440m, viii 1914, *Cooper* 3316 (BM, E); Thimphu district, Moti Thang, 2434m, viii 1971, *Bedi* 538 (K); ?Tongsa district, Sharna to Choidi Ponkay, 2835–2740m, vii 1938, *Gould* 1020 (K); Tongsa district, 9km S of Tongsa, 27°29′N, 90°30′E, v 1979, *Grierson & Long* 1187(E); Tashigang district, Gamri Chu, 1950m, vi 1985, *Bowes Lyon* 9125 (E).

BHUTAN, NORTH. Upper Mo Chu district, near Tatsi Markha, E of Laya, 28°05′N, 89°46′E, vii 1983, *Sargent* 79 (E).

INDIA, DARJEELING DISTRICT. Pankasari, 2440–3050m, viii 1904, *Haines* 926 (E, K).
INDIA, SIKKIM. Lachoong [= Lachung], 3050m, x 1849, *Hooker* s.n. (K).

Amongst the many collections of the *Rubia cordifolia* complex from the East Himalaya are a number of a very distinctive morphotype, already recognized by Deb & Malik (1966, 1968) as forma *strigosa* of *Rubia cordifolia*. However, this plant is very distinctive in several characters from all other Asiatic relatives and is therefore described as a new species. Deb & Malik's type of forma *strigosa* is labelled 'Chumbi' and was published as such, but in fact comes from a collection made in 1884 by Dungboo, one of George King's collectors, at least in part from western Bhutan. These specimens, represented in CAL and K, require detailed documentation as they include a number of interesting plant records, some from the Ha and Thimphu districts of west Central Bhutan, such as *Meconopsis superba* Prain.

Deb & Malik (1968) also record the plant from Kameng, Arunachal Pradesh. Its known distribution is therefore Sikkim, Darjeeling, Bhutan and Arunachal Pradesh. *Rubia hispidicaulis* may therefore be regarded as an East Himalayan endemic.

ACKNOWLEDGEMENTS

I wish to thank the authors who have contributed sections to this paper. I am also indebted to David Long, Robert Mill, Dick Brummitt and Roy Vickery for advice and additional research, to Robert Mill for the Latin diagnosis of *Rubia hispidicaulis*, to the curators of the herbaria of the Royal Botanic Gardens, Kew and the Natural History Museum, London (BM) for the loan of specimens and use of herbarium facilities, and to Mary Bates for the illustrations.

REFERENCES

ANONYMOUS (1982). *The Wallich Herbarium on Microfiche*. Zug: Inter Documentation Company AG.

BALAKRISHNAN, N. P. (1981). *Flora of Jowai*. Vol. 1. Howrah: Botanical Survey of India.

BRANDIS, D. (1906). *Indian Trees*. London: A. Constable & Co.

BRIDSON, D. M. (1985). The reinstatement of *Psydrax* (Rubiaceae, subfam. Cinchonoidae tribe Vanguerieae) and a revision of the African species. *Kew Bull.* 40: 687–725.

COWAN, A. M. & COWAN, J. M. (1929). *The Trees of Northern Bengal*. Calcutta: Bengal Secretariat Book Depot.

DEB, D. B. & MALIK, K. C. (1966). Contribution to the genus *Rubia* L. *Journ. Bombay Nat. Hist. Soc.* 63: 781–783.

DEB, D. B. & MALIK, K. C. (1968). Revision of the genus *Rubia* in India and adjoining regions. *Bull. Bot. Surv. India* 10: 1–16.

DECAISNE, J. (1837). *Recherches anatomiques et physiologiques sur la Garance, du Genre Rubia et se ses Especes*. Bruxelles: Hayez.

DUNN, S. T. (1920). *Leptodermis parkeri*. *Kew Bull.* 1920: 206–208.

HARA, H. (1967, '1966'). *Rubia*. In: HARA, H. (ed.) *The Flora of Eastern Himalaya*, pp. 315–316. Japan: University of Tokyo.

HARA, H. & GOULD, S. (1979). Rubiaceae. In: HARA, H. & WILLIAMS, L. H. J. *Enumeration of the Flowering Plants of Nepal* 2: 199–209. British Museum (Natural History), London.

HARA, H. & KUROSAWA, S. (1963). Notes on the *Rubia cordifolia* group. *Sci. Rep. Tohoku Univ.* Ser. IV (Biology) 29: 257–259.

HARIDASAN, K. & RAO, R. R. (1987). *Forest Flora of Meghalaya.* Vol. 2. Dehra Dun: Bishen Singh Mahendra Pal Singh.

HOOKER, J. D. (1880, 1881). Rubiaceae. In: *Flora of British India* 3: 17–210. London: L. Reeve & Co.

KANJILAL, U. N. et al. (1939). *Flora of Assam.* Vol. 3. Shillong: Government of Assam.

KAR, S. K. & PANIGRAHI, G. (1963). The Rubiaceae in Assam and North East Frontier Agency. *Bull. Bot. Surv. India* 5: 227–237.

LI HEN (1985). Rubiaceae. In: WU CHENG-YIH (ed.) *Flora Xizangica* 4: 424–470. Science Press.

MATTHEW, K. M. (1993). Precursory notes for a Flora of the Palni Hills, South India: II. *Kew Bull.* 48: 757–765.

MILL, R. R. (1996). The *Galium acutum* and *G. asperifolium* species complexes in the Eastern Himalaya. *Edinb. J. Bot.* (in press).

NAZIMUDDIN, S. & QAISER, M. (1989). Rubiaceae. In: NASIR, E. & ALI, S. I. (eds) *Flora of Pakistan*, fasc. 190. Karachi & Islamabad.

PARKER, R. N. (1922). A new species of *Leptodermis. Indian Forester* 48: 576–577.

PARKER, R. N. (1924). Botanical notes on some plants of the Kali Valley. *Indian Forester* 50: 387–400.

VERDCOURT, B. (1975). Studies in the Rubiaceae-Rubioideae for the 'Flora of Tropical East Africa': I. *Kew Bull.* 30: 247–326.

WINKLER, H. (1922). Monographische Übersicht der Gattung *Leptodermis. Repertorium specierum novarum* 18: 145–166.

Received 1 September 1995; accepted in revised form 24 October 1995