NOTES RELATING TO THE FLORA OF BHUTAN: XLII. *SCROPHULARIACEAE,* EXCLUDING *PEDICULARIS*

R. R. MILL*

Seven new species and one new subspecies in *Scrophulariaceae* from the *Flora of Bhutan* area are described. They include two new species of *Euphrasia*, *E. chumbica* R.R. Mill *sp. nov.* (Chumbi, Sikkim and C Bhutan) and *E. melanosticta* R.R. Mill *sp. nov.* (Sikkim, N Bhutan); one new species of *Kickxia*, *K. papillosa* R.R. Mill *sp. nov.* (E Bhutan); one new species of *Lagotis*, *L. chumbica* R.R. Mill *sp. nov.* (Chumbi); one new species of *Neopicrorhiza*, *N. minima* R.R. Mill *sp. nov.* (N Bhutan); two new species of *Scrophularia*, *S. cooperi* R.R. Mill *sp. nov.* (C Bhutan) and *S. subsessilis* R.R. Mill *sp. nov.* (N Bhutan); and a new subspecies of *Ellisiophyllum pinnatum* (Wall.) Makino, subsp. *bhutanense* R.R. Mill *subsp. nov.* (Bhutan). *Alectra avensis* (Benth.) Merr., *Bacopa monnieri* (L.) Pennell, *Scrophularia himalayensis* Royle, *Striga asiatica* (L.) Kuntze and *S. densiflora* Benth. are all recorded from Bhutan and/or Sikkim for the first time. A brief argument is given for the continued use of hyphenated *fel-terrae* as the correct spelling of that epithet in *Picria*.

Keywords. Alectra, Bacopa, Bhutan, China, *Dopatrium, Ellisiophyllum*, *Euphrasia*, hyphenation (ICBN Art. 60), *Kickxia*, *Lagotis*, *Neopicrorhiza*, orthography, *Picria*, *Scrophularia*, Sikkim, *Striga*.

INTRODUCTION

This paper is the first of two that will treat new taxa and other novelties discovered while preparing the account of *Scrophulariaceae* for *Flora of Bhutan*. It covers all genera except *Pedicularis*, which will be the subject of the second paper (Mill, 2001). Four other papers arising out of the research on *Scrophulariaceae* for *Flora of Bhutan* are also in the course of preparation by the author. They will deal with *Ellisiophyllum*, *Lagotis*, *Mimulus* and the *Picrorhiza–Neopicrorhiza* complex. However, any new names in those genera requiring validation for use in *Flora of Bhutan* are published in the present paper; fuller accounts of the taxa concerned will be published elsewhere.

All specimens cited have been seen by the author.

NEW TAXA

Ellisiophyllum Maxim

It is planned to publish a full revision of this genus at a later date but one new combination needs to be validated here so that the name can be used in *Flora of Bhutan*.

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Ellisiophyllum pinnatum (Wall.) Makino **subsp. bhutanense** R.R. Mill, **subsp. nov.**
A subsp. *pinnato* caulibus parcissime adpresse-villosis (haud patentim villosis) pilis brevioribus, petiolis subglabris (non villosis), lobis calycis subglabris, antheris minoribus (1.3–1.4mm, non 2.1–2.5mm longis) differt.
Type: Bhutan, Chorten Gora–Dechan Phodung, moist soil in wet broad-leaf forest, white flowers, 8000ft, 4 vi 1985, *Bowes Lyon* 9063 (as *Anemonopsis*) (holo. E).

Stems very sparsely antrorsely adpressed-pilose, the hairs 0.35–0.5mm. *Petioles* 25–55mm, subglabrous except for a few spreading hairs in distal region. *Leaf blades* 11–30 × 11–24mm, ovate-oblong in outline, usually very slightly narrower than long, with 2 pairs of lateral leaflets and a terminal leaflet; abaxial and adaxial surfaces of blade sparsely and very shortly puberulent, the hairs only 0.1–0.2mm on lamina, slightly longer on veins. *Pedicel* 31–58mm, shorter than petiole, sparsely pilose below, more densely so above. *Basal bract* absent. *Calyx* campanulate, c.5.2mm; lobes lanceolate-elliptic, subacute, almost glabrous except for a very few adpressed hairs on exterior. *Corolla* 8.1mm; tube 4.5mm; lobes 2.5–3.2 × 1.6–2.2mm, oblong; throat of corolla densely hairy. *Stamens* just exceeding tips of corolla lobes; anthers 1.3–1.4mm long. *Style* c.6.5mm, longer than calyx and subequalling the corolla lobes and stamens. *Ovary* 1.6mm diam.

Distribution and ecology. Bhutan. Wet broad-leaved forest; c.2440m. Flowering in June.

This new subspecies of *Ellisiophyllum pinnatum* can be distinguished from subsp. *pinnatum* (which is by far the more frequent and widespread of the two subspecies that occur in our area) by its different stem indumentum (very sparsely adpressed, not densely spreading-villous) of shorter hairs, petioles and calyx lobes similarly almost glabrous (not villous), and shorter anthers. The species as a whole can be divided into several discrete infraspecific taxa over its wide range (Nepal to Philippines). A full treatment is in preparation; this will include an amplified description, and an illustration, of this new subspecies in the context of the whole genus.

Euphrasia L.

The East Himalayan species of *Euphrasia* are in need of critical study. The two new species (more accurately, microspecies) described here are possibly the tip of an iceberg but most taxonomic problems probably lie further west in the Himalayas, since *Euphrasia*, unlike many Himalayan genera, has its main centre of diversity to the west, in Europe and Russia, rather than in China to the east. The number of species declines eastwards so that in the *Flora of Bhutan* area there are as yet only three known microspecies (although our area has been under-collected) while in the whole of China (excluding Taiwan, whose species are all perennial and belong to a different section of the genus) only five are known. All three microspecies within the *Flora of Bhutan* area are endemic to it and belong to Sect. *Semicalcaratae* Benth.

Two cannot be matched with material from outwith the area and are here described as new species; the third is *E. bhutanica* Pugsl.

Euphrasia chumbica R.R. Mill, **sp. nov.** (Sect. *Semicalcaratae* Benth.) **Fig. 1B.**
*E. himalayica*e Wettst. similis sed inflorescentia praecipue in fructu strictiore et densiore distinguenda. *Caules* 17–27cm alti, (0.6–)1–1.5mm diametro, plantis debillimis exceptis plerumque ramis aliquot validis erectis, breviter crispato-pubescentes, pilis glandulis nullis. *Folia* vegetativa caduca. *Positio florens*: planta e foliorum pare circiter tertia primo florens. *Inflorescentia* densa, in fructu angusta et stricta, internodiis inferioribus folio florali subtenti haud sesquilongioribus et capsula matura plerumque aequantibus vel etiam brevioribus. *Folia floralia inferiora* ovata vel late ovata, 5.5–6 × c.6mm, dentium subacutorum paribus 3–4 profunditate c.1mm provisis, secus marginem venosque eglanduloso-setulosa. *Calyx* tempo florendi 3.5–4mm longus, circa ad medium divisus; quisque lobus dentibus duobus anguste triangulari-acuminatis c.1.5mm longis provisus; tubus lobique eglanduloso-setosi, pilis bases nigros carentibus. *Corolla* alba 7–7.5mm longa labio inferiore purpureo-lineata; tubus labium superiusque appresso-pubescens; labium inferius trilobatum, lobis late vadoseque emarginatis. *Capsula* ad caulem crebre et ± parallele appressa, 4.5–5.5 × c.1.8mm, sparse pilosa, apice obtuse truncato et mucronato.
Type: China (Xizang), Chumbi, 4″, purplish in gravelly hill-slope, 26 viii 1913, *R.E. Cooper* 725 (holo. E).

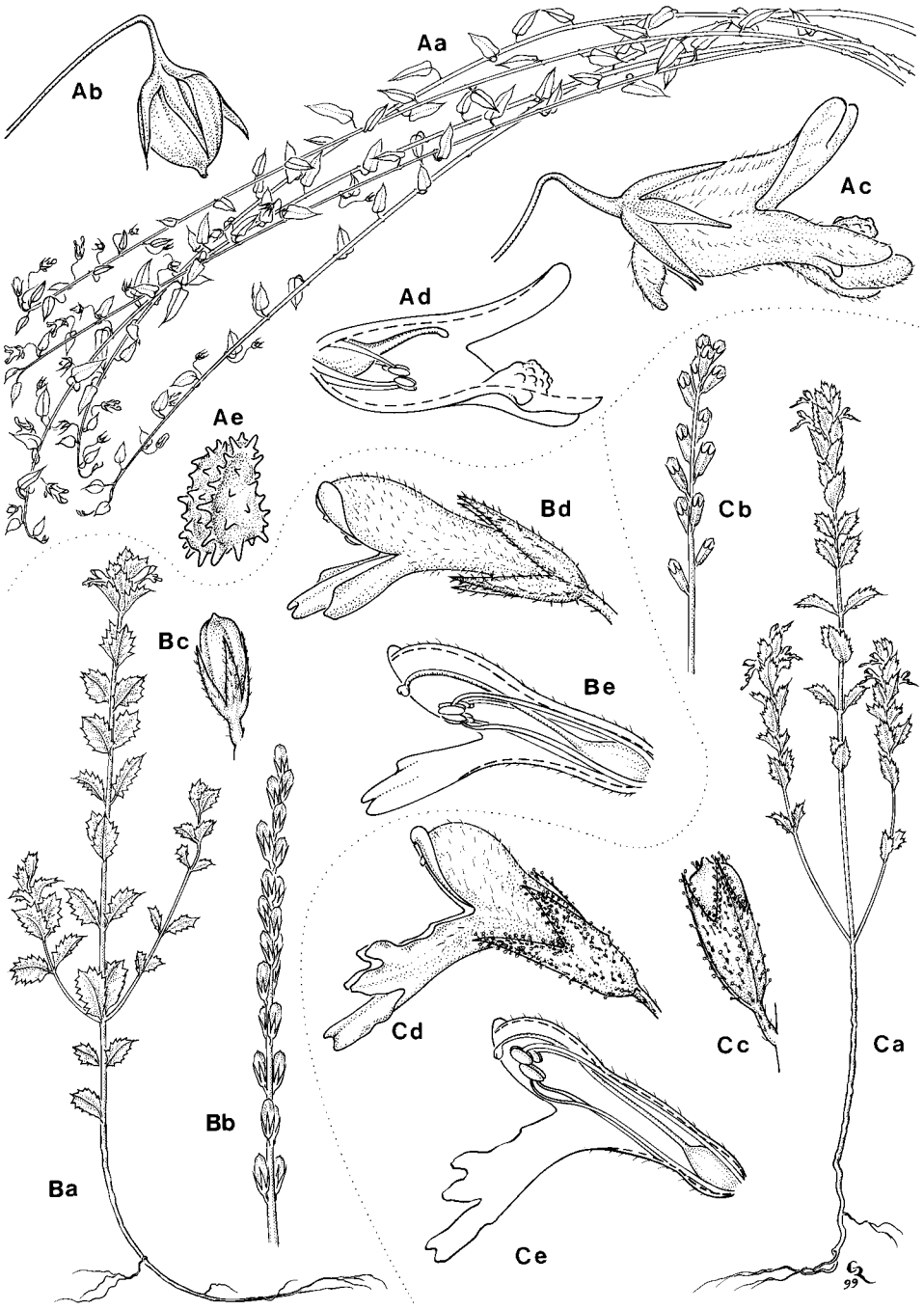
Annual. *Stems* 17–27cm, (0.6–)1–1.5mm diam., usually with several strong erect branches except in weakest plants, shortly crispate-pubescent, lacking glandular hairs. *Vegetative leaves* caducous. *Flowering* beginning at about node 3. *Inflorescence* dense, lower internodes not more than 1.5 × subtending floral leaf and mostly equalling or even shorter than ripe capsule. *Lower floral leaves* ovate or broadly ovate, 5.5–6 × c.6mm, with 3–4 pairs of subacute teeth c.1mm deep, eglandular-setulose on margin and veins. *Calyx* 3.5–4mm in flower, divided to c.½, each lobe with 2 narrowly triangular-acuminate teeth c.1.5mm; lobes eglandular-setulose, hairs without black bases. *Corolla* 7–7.5mm, white, lower lip with purple streaks; tube and upper lip appressed-pubescent; lower lip 3-lobed, lobes broadly and shallowly emarginate. *Capsule* appressed close to and ± parallel to stem, 4.5–5.5 × c.1.8mm, sparsely pilose; apex obtusely truncate and mucronate.

Distribution and ecology. N India (Sikkim), China (Xizang), Bhutan. Alpine meadows, 2750–3700m.

Additional specimens examined. INDIA (SIKKIM). Yeumthang, 11,000ft, 17 xi 1916, *Cave* s.n. (E); Takti, vii 1879, *King's native collector* s.n. (E).

CHINA (XIZANG). Chumbi, 12,000ft, ix–x 1914, *Ribu & Rhomoo* 7220 (E); ibid., x 1904, *C.H. Bell* s.n. (K); Chumbi mountains, 9 viii 1851, *A. Fleming* 309 (E); Gnathong, 12,000ft, 10 xii 1912, *Rohmoo Lepcha* 728 (E); Chumbi, in meadow, 9 vii 1913, *Cooper* 218 (E).

BHUTAN. Thimphu district: Timpu, 9000ft, 5 xii 1914, *Cooper* 3551 (E, BM).


Aa
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The very dense, strict fruiting inflorescences with capsules closely adpressed to the stem are very distinctive and *E. chumbica* is especially readily distinguished from the other Bhutan and Sikkim species when in fruit. Some material of this species has been misidentified by Siddiqi (*in sched.*) as belonging to two mainly NW Himalayan species, *E. platyphylla* Pennell and *E. kurramensis* Pennell. The latter, if recognized, is exclusively NW Himalayan; it was reduced to synonymy within the much more widespread *E. himalayica* Wettst. by Yeo (1981). Both *E. himalayica* (which is very variable) and *E. platyphylla* extend as far east as E Nepal (fide Hara *et al.* 1982: 113) but have not yet been accurately identified from either Sikkim or Bhutan.

The specimen cited from Bhutan (*Cooper* 3551) is tentatively referred here; it differs from the other material in having subsessile glands on the calyx. More material from this locality is needed to assess its status.

Euphrasia melanosticta R.R. Mill, **sp. nov.** (Sect. *Semicalcaratae* Benth.). **Fig. 1C.** Species inter eas Emodi montium orientalium *Euphrasiae* pilorum in caule, foliis floralibus, et calycibus basibus maculis (glandulis) nigris instructis insignis. *Caules* debiles, 3–18cm alti, 0.5–1mm diametro, supra saltem purpurascentes et basibus pilorum maculis (glandulis) nigris, plerumque simplices sed interdum basin versus ramis 1–3 exorientibus, breviter eglanduloso-crispato-puberuli et supra pilis glandulosis paucis 2–3-cellulis. *Folia* vegetativa et floralia inferiora ut videtur mox caduca. *Planta* e foliorum pare 2–5 primo florens. *Internodia* floralia inferiora folio subtenti 1.5–2.5plo longiora. *Folia floralia* inferiora late ovata, c.6 × 6mm, dentium acute triangularium c.1mm profundorum 3–4-paribus et lobo terminali latiore obtusioreque, paginis sparse setulosis et glanduloso-pilosis, pilis e basibus nigrescentibus exorientibus. *Calyx* tempo florendi c.4mm longus, ad c.¾ divisus, utrumque labium dentibus anguste triangularibus c.1mm longis; tubo labiaque glanduloso-pilosi, pilis e basis conspicuis nigris exorientibus. *Corolla* 5–6.5mm longa, alba, labium superius purpureolineata, labio inferiore macula centrali lutea et in latere ventrali striis duabus purpureis; tubus breviter pubescens; labium superius et pagina ventralis labii inferioris pilosa, pilis aliquot maculis parvis atris exorientibus; labium superius 2.5–3mm longum, emarginatum, inferius inaequaliter trilobatum, lobis omnibus emarginatis. *Capsula* ad angulum acutum cauli patens, oblonga,

FIG. 1. A, *Kickxia papillosa* R.R. Mill: Aa, habit × 1; Ab, pedicel and young fruit × 8; Ac, undissected flower × 8; Ad, corolla in longitudinal section showing stamens and pistil × 8; Ae, seed × 20 (all from *Wood* 7355). B, *Euphrasia chumbica* R.R. Mill: Ba, habit of flowering plant × 1; Bb, fruiting inflorescence × 1; Bc, fruiting calyx × 6; Bd, undissected flower × 15; Be, corolla in longitudinal section showing stamens and pistil × 15 (Ba, Bd & Be from *Fleming* 309, Bb & Bc from *Ribu & Rhomoo* 7220). C, *Euphrasia melanosticta* R.R. Mill: Ca, habit of flowering plant × 1; Cb, fruiting inflorescence × 1; Cc, fruiting calyx × 15; Cd, undissected flower × 15; Ce, corolla in longitudinal section showing stamens and pistil × 15 (Ca, Cd & Ce from *Sinclair & Long* 5081, Cb & Cc from *Ribu & Rhomoo* 6448). Drawn by Glenn Rodrigues.

3.5–5.5(–6) × 1.8–2.5mm, calycem fructiferum subaequans, apice late obtuso vel paene truncato, breviter mucronato, setulis longiusculis obtecta.
Type: Bhutan, Upper Kulong Chu district: Me La, Cho La Valley, banks in open grassland, flowers white marked with mauve, 12,000ft, 30 vi 1949, *F. Ludlow, G. Sherriff & J.H. Hicks* 20437 (holo. BM).

Annual. *Stems* weak, 3–18cm tall, 0.5–1mm diam., purplish at least above and with black gland-blotches at bases of hairs, usually unbranched, sometimes with 1–3 branches towards base, shortly eglandular crispate-puberulent and with a few spreading 2–3-celled glandular hairs above. Vegetative and lower floral *leaves* apparently very easily early deciduous and so very rarely collected; *vegetative leaves* 2 pairs, broadly ovate-orbicular, c.3 × 3mm, the lowest pair entire, the upper pair with 2 pairs of lateral lobes; surfaces sparsely hairy. *Flowering* beginning at node 2–5; lower floral internodes 1.5–2.5 × subtending leaf. *Lower floral leaves* broadly ovate, c.6 × 6mm, with 3–4 pairs of acutely triangular teeth c.1mm deep and a broader, more obtuse terminal lobe, sparsely setulose and glandular-pilose, hairs arising from black bases. *Calyx* c.4mm in flower, divided to c.¾, each lip with 2 narrowly triangular teeth c.1mm; tube and lips glandular-pilose, hairs arising from ±conspicuous black bases. *Corolla* 5–6.5mm, white, upper lip with purple streaks, lower lip with central yellow blotch and 2 purple streaks on ventral side; tube shortly pubescent, upper and ventral surface of lower lips pilose, some hairs arising from small dark blotches; upper lip 2.5–3mm, emarginate, lower lip unequally 3-lobed, each lobe broadly and shallowly emarginate, the notch having a ±acute base. *Capsule* borne at an acute angle to stem, oblong, 3.5–5.5(–6) × 1.8–2.5mm, subequalling fruiting calyx, apex broadly obtuse or almost truncate, shortly mucronate, with rather long, very fine setules.

Distribution and ecology. India (Sikkim), China (Xizang), Bhutan. Peaty hillsides and open grassland, 2800–4270(–4570)m.

Additional specimens examined. INDIA (SIKKIM). Kapup, peaty hillside, 'white and purple', 14,000ft, 27 viii 1913, *Cooper* 625 (E); Megu, 14,000ft, 1913, *Ribu & Rhomoo* 6448 (E); N district, Yumthang, 27°48′08″N, 88°42′22″E, grassy yak pasture, 3600m, 'flowers white, throat yellow', 13 vii 1996, *Noltie EENS* 169 (E).

CHINA (XIZANG). Chumbi: Chumegati, 15,000ft, 12 ix 1912, *Rohmoo* 322 (E).

BHUTAN. Bumthang district: Lhabja, in meadow, 12,500ft, 22 ix 1914, *Cooper* 2182 (BM, E – E specimen named *E. kingdon-wardii* Pugsl. by E.O. Callen, 1946 *in sched.*). Upper Mo Chu district: Gasa Dzong, 27°55′N, 89°46′E, damp grassy bank in scrub, 'erect herb, flowers white, upper lip with fine purple veins, lower lip with central yellow blotch', 2800m, 14 ix 1984, *Sinclair & Long* 5001 (E); hillside above Kohina, 28°00′N, 89°47′E, open rocky slope, 'erect herb, corolla white with purplish streaks, lower lip with central yellow blotch', 3290m, 17 ix 1984, *Sinclair & Long* 5081 (E).

This eyebright differs from other E Himalayan specimens of *Euphrasia* examined, variously identified as *E. hirtella* Reut., *E. schlagintweitii* Wettst., *E. tatarica* Fisch. ex Spreng. etc., in the conspicuous black blotches at the bases of the hairs on calyx, floral leaves and corollas, from which the specific epithet is derived (from Greek,

melano-, black and *stiktos*, adj., spotted or dappled). Similar blotches occur in some species which occur outwith the *Flora of Bhutan* area (e.g. *E. saamii* Juz. from N Scandinavia and the Kola Peninsula, Russia) but *E. melanosticta* is the only eyebright species from our area to have them. One specimen (*Rohmoo* 322) is superficially very different from all the others in being very dwarf and forming very dense, small cushion-like clumps, but this may reflect the very high altitude (c.4600m) at which it was gathered; most of the 'cushions' appear in fact to be composed of turf rather than *Euphrasia*. It possesses the black glands so distinctive of this species and hence is meantime referred to it.

E. kingdon-wardii Pugsl., to which *Cooper* 2182 had been referred by Callen (1946 *in sched.*), is a synonym of *E. regelii* Wettst., a species occurring from Kashmir through Kazakstan and Kyrgyztan to China and Far Eastern Russia (Hong De-yuan *et al.*, 1998) which differs from *E. melanosticta* in numerous characters, especially its much longer (3–5mm), acuminate calyx lobes.

Kickxia Dumort.

The genus *Kickxia* was recently revised by Sutton (1988) but further work still needs to be done on the Indian and Himalayan species. The species of *K.* Sect. *Valvatae* (Wettst.) Janchen, to which all the Bhutanese species belong including the one described here, were divided between two segregate genera, *Nanorrhinum* I. Betsche and *Pogonorrhinum* I. Betsche, by Betsche (1984). These genera were not accepted by Sutton, and, following his circumscription, the genus *Kickxia* is being treated in its traditional sense in *Flora of Bhutan*. John Wood collected material from Mongar (Bhutan) in 1990 which does not match any of the existing east Himalayan species. It is described below as the new species *K. papillosa.*

Kickxia papillosa R.R. Mill, **sp. nov.** (Sect. *Valvatae* (Wettst.) Janchen). **Fig. 1A.**
K. membranaceae Sutton seminibus papillis obtusis albescentibus provisis affinis sed a qua foliis ovatis haud longe sagittatis, infra dense papillosis supra pilis paucis appressis, seminibus minoribus (c 0.4×0.25mm) differt.
Type: Bhutan, Mongar district, between Gorgon and Tangmachu, Lhuntse, in rock crevices in steep rocky slopes in dry Chir Pine valley, perennial herb, corolla yellow, 1200m, 16 x 1990, *J.R.I. Wood* 7355 (holo. E).

Suffrutescent many-stemmed perennial. *Stems* slender, 25–40cm, 0.4–0.7mm diam., glabrous even at base, strongly ribbed. *Leaves* all similar, shortly petiolate (petiole 2–4mm, very slender, about $\frac{1}{4} \times$ lamina); lamina ovate, $4–25 \times 2–15$mm, dark grass-green above and paler beneath, 5-veined, apex acute-mucronate, base obtuse or very shallowly cordate but never with lateral lobes, margin entire, with a few appressed hairs above near midrib, glabrous but densely papillose beneath. *Pedicels* 11–12mm, twining, filiform, straight or slightly curved for most of their length, recurved distally. *Calyx lobes* linear-ovate, $3–3.5 \times 0.6–0.8$mm, abruptly long-acuminate from a slightly

widened, broadly scarious-margined basal portion, the acuminate distal half subequalling the broader proximal half. *Corolla* with whitish, pink-tinged tube and bright yellow lips spotted dark red in throat, 7mm excluding spur, sparsely pilose outside and inside; *spur* 1.5mm, making an angle of c.90° with corolla tube. *Capsule* broadly ellipsoid to globose, c.3 × 3.5mm, valvate, glabrous except for a few hairs at apex. *Seeds* oblong, c.0.4 × 0.25mm, covered with large, whitish, blunt, non-barbate papillae.

Distribution and ecology. Endemic to Bhutan and known only from the type, which was collected in rock crevices in Chir Pine (*Pinus roxburghii* Sarg.) forest.

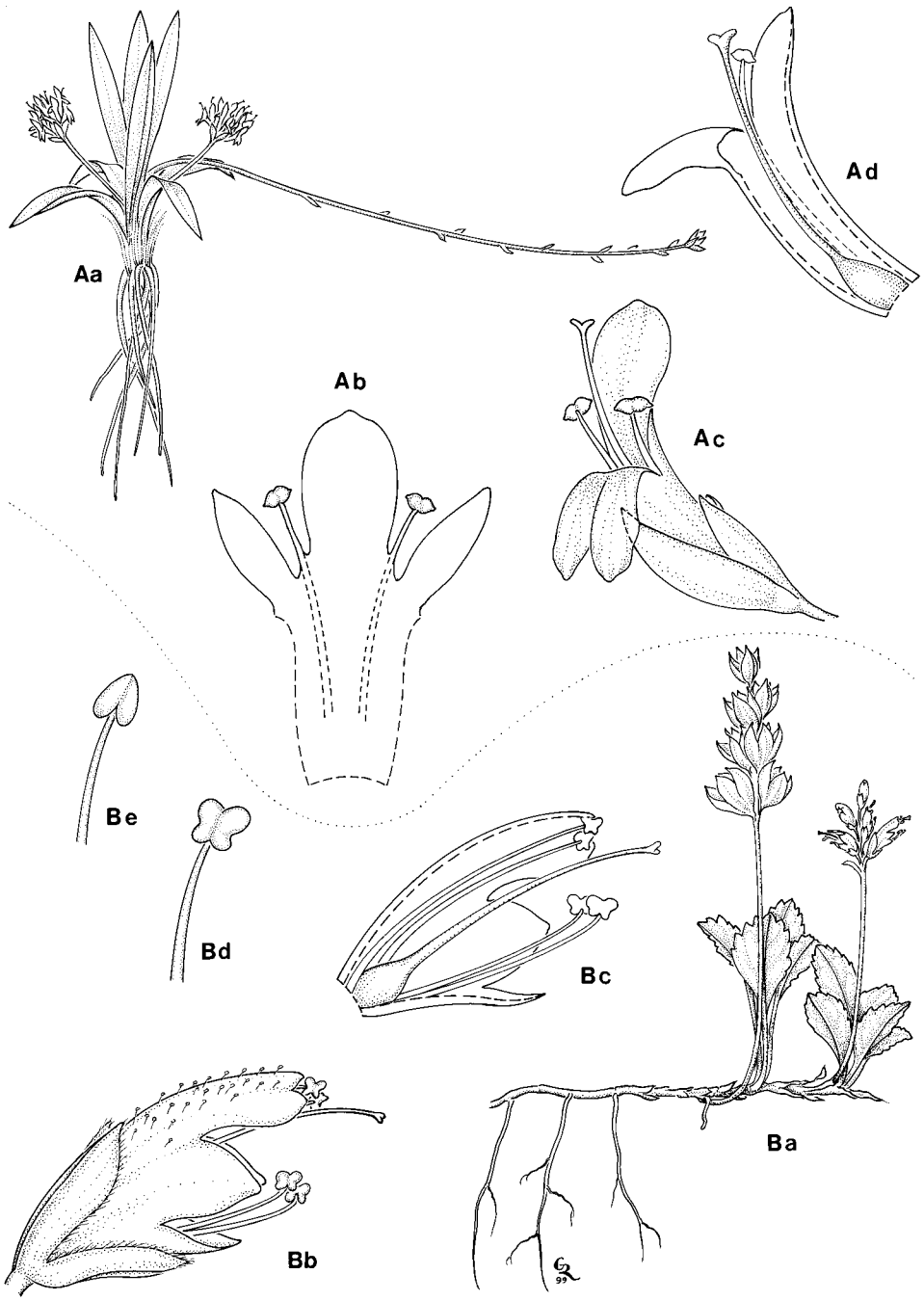
The seeds of this new *Kickxia*, apart from their more oblong shape and smaller size, are very similar to those of *K. membranacea* Sutton. The latter species is endemic to the dry valleys of Punakha in western C Bhutan, and is considered to be the nearest relative of *K. papillosa* which consequently belongs to Sect. *Valvatae* (Wettst.) Janchen. *K. papillosa* differs from both *K. membranacea* and most (not all!) specimens of *K. ramosissima* (Wall.) Janchen (= *Nanorrhinum ramosissimum* (Wall.) I. Betsche) by the leaves having an obtuse, not hastate or sagittate, base. Leaf shape in *K. ramosissima* is very variable and the species may be taxonomically divisible, but the variation is as yet poorly understood. However, all material of *K. ramosissima* is separable from *K. papillosa* by the dark brown seeds which have barbate tubercles.

Lagotis Gaertn.

One new species of *Lagotis* is described here; another paper (Mill, in preparation) will treat some other east Himalayan novelties which do not occur within the confines of the *Flora of Bhutan* area.

Lagotis chumbica R.R. Mill, **sp. nov.** (Sect. *Acaules* Maxim.). **Fig. 2A.**
L. brachystachyae Maxim. affinis sed foliis angustioribus inferne canaliculatis marginibus ±involutis apicibus obtusis, petiolis brevioribus minus distincte e lamina delimitatis, inflorescentiis scapisque brevioribus, staminibus vix exsertis (non inclusis) differt. A *L. pharica* Prain foliis integris recedit, a *L. ramalana* Batalin caulibus stoloniferis separatur, et a *L. crassifolia* Prain habitu acaulescenti facile distinguenda. Type: China, Xizang, Chumbi Valley, Khamba Jong (Kamba Dzong), 11 vii 1903, *F.E. Younghusband* 50 (holo. K).

FIG. 2. A, *Lagotis chumbica* R.R. Mill: Aa, habit × 1; Ab, corolla and attached stamens opened out, × 15; Ac, undissected flower × 15; Ad, corolla in longitudinal section showing stamen and pistil × 15 (all from *Norton* 375). B, *Neopicrorhiza minima* R.R. Mill: Ba, habit × 2; Bb, undissected flower × 7; Bc, corolla in longitudinal section showing stamens and pistil × 7; Bd, anther × 8; Be, anther of *Neopicrorhiza scrophulariiflora* (Pennell) D.Y. Hong (for comparison) × 8 (Ba–Bd from *Ludlow, Sherriff & Hicks* 17190; Be from *McCosh* 280). Drawn by Glenn Rodrigues.


Aa
Ab
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Ad
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Ba

Small alpine herb, stoloniferous, ±acaulescent, drying blackish. *Roots* numerous, 3–7cm, rather fleshy, slender, pinkish grey. *Stolons* 5–20cm or more long, slender, bearing very small, subsessile elliptic, entire-margined leaves 2–3 × 1–2mm and sometimes ending in an inflorescence slightly bigger than those of the scapes and which is subtended by a few leaves. *Leaves* all rosulate, all similar, 7–10 per plant; lamina linear-elliptic, 10–25 × 1–2.5(–4)mm, the apex obtuse, the base attenuate, the outer leaves of the rosette soon reflexed and touching the soil; surfaces glabrous, canaliculate beneath; margins entire, ±involute beneath; petiole indistinctly delimited from lamina, 3–5mm. *Scape* leafless, 3–8(–10)mm, shorter than the leaves, soon becoming strongly reflexed, puberulent. *Inflorescences* of the scapes ovoid-globose, 6–8 × 6–8.5mm, dense, spicate; those of the stolons similar but larger, up to 12mm. *Bracts* oblong to ovate-lanceolate, equalling the flowers. *Calyx* divided almost to base into 2 ovate-oblong lobes and with hyaline keels on each side. *Corolla* pinkish white, c.6.5mm, less than twice length of calyx; lips equal, upper one ovate, c.2 × 1mm, lower one pendent, bifid with 2 elliptic-ovate lobes c.2 × 0.5mm. *Filaments* c.2mm, blackish when dry; *anthers* subequalling or scarcely exserted from corolla, c.0.4–0.5 × 0.7–1.1mm, the thecae strongly divergent. *Style* c.7mm long. *Capsule and seeds* unknown.

Distribution and ecology. China (Xizang); apparently endemic to the Chumbi Valley (Phari plain) and Kamba Dzong areas. Alluvial or marshy soil in river-valley beds, and on stony ground and in alpine turf; c.4300–4900m. Flowering from May to July.

Additional specimens examined. CHINA (XIZANG). Chumbi Valley area, Phari Plain and the upper Chumbi Valley, on the way to Phari, end of May 1904, *E.H. Walsh* 132 (K); above Kampa Dzong (Kambu Dzong), turf, 15,500ft, 17 vii 1922, *E.F. Norton* 375 (K; signature almost illegible, but see Langstaff in Bruce, 1923); Kampa Dzong, alluvial soil in valley bed, 16,000ft, 18 vii 1924, *R.W.G. Hingston* 111 (K); Shakar Dzong, stony ground, 14,000ft, 9 vii 1922, *E.F. Norton* 349 (K); Tingri, marshy soil in valley bed, 14,500ft, 4 vii 1924, *R.W.G. Hingston* 376 (K).

This new species belongs to *Lagotis* sect. *Acaules* Maxim., which also includes *L. stolonifera* (K. Koch) Maxim. (Turkey, Iran, Caucasia), *L. blatteri* Schulz (E Afghanistan, and Waziristan and Kurram in Pakistan), *L. korolkowii* (Regel & Schmalh.) Maxim. (Tien Shan and Pamir Alai), *L. pharica* Prain (Sichuan, SE Xizang and Bhutan) and *L. brachystachya* Maxim. (NW China: Gansu, Qinghai, Sichuan and Xinjiang). Of these, *L. stolonifera*, *L. blatteri* and *L. korolkowii* can all be distinguished from the new species by their bluish or violet (not pinkish white) corollas and their leaves with remotely dentate margins. *L. brachystachya*, which is the most similar to *L. chumbica* and as which all six specimens of *L. chumbica* were originally named, differs in having larger leaves (20–60 × (3.5–)4–13mm), which on any given plant are not all ±similar and linear but are a mixture of clearly elliptic leaves and much more linear ones; the petiole is longer (10–35mm) and much more clearly delimited from the lamina. Moreover, the leaf margin is flat, not involute; the latter characteristic of *L. chumbica* is presumably an adaptation to the high-

altitude environment. The scapes of *L. brachystachya* are longer (10–20mm) and the inflorescences larger (10–20 × 8–15mm). Both *L. brachystachya* and *L. chumbica* agree in having whitish or pinkish white flowers (not blue or violet as in the other three species), but in *L. brachystachya* the filaments are slightly shorter and the stamens just included (instead of very shortly exserted), and the style is slightly shorter. *L. chumbica* is clearly closely allied to *L. brachystachya* but well separated in its ecology as well as in morphology; it occurs at much higher altitudes (4420–4877m, instead of 2300–2500m). In sect. *Acaules*, only *L. korolkowii* ascends to comparable altitudes.

One other species of *Lagotis* occurs on the high Chumbi plains: *L. pharica* Prain (*L. ramalana* sensu T. Yamaz., non Batalin). This is another small plant, but easily distinguished from *L. chumbica* by its non-stoloniferous habit, ovate-oblong pinnately divided leaves with truncate base, and dark blue corollas. *L. ramalana* Batalin was recorded from Bhutan by Hong De-yuan *et al.* (1998: 82) but no authentic material of this species has been seen by me from Bhutan. All specimens named as *L. ramalana* have turned out to be either *L. pharica* or *L. kunawurensis* (Benth.) Rupr. var. *sikkimensis* (Hook.f.) T. Yamaz., dwarf forms of which were misnamed *L. ramalana* by Yamazaki (1971) although he later corrected this (Yamazaki in Ohashi, 1975).

Neopicrorhiza D.Y. Hong

A full revision of *Picrorhiza* Royle ex Benth. and *Neopicrorhiza* D.Y. Hong is in preparation but the following name is validated here in advance in order that it may be used in *Flora of Bhutan*.

Neopicrorhiza minima R.R. Mill, **sp. nov. Fig. 2B.**

A *N. scrophulariiflora* (Pennell) D.Y. Hong habitu humili foliis dentibus paucioribus (plerumque 7–9, haud plus quam 20), thecis antherarum transverse orientibus facile distinguitur.

Type: Bhutan, Tongsa district, Padima Tso nr Thampe La, rocky hillslopes laid bare by the melting snow, calyx green, corolla dark violet, 15,000ft, 23 viii 1949, *F. Ludlow, G. Sherriff & J.H. Hicks* 17190 (holo. BM, iso. E).

Small, rhizomatous perennial. *Leaves* (3–)5–6(–8) per rosette; *petioles* 3–20mm; *lamina* obovate to shortly spathulate or suborbicular, 5–20 × 2.5–8(–12)mm; *marginal teeth* 7–9(–15) in total number, each one 0.2–0.5mm deep with longest side 1–4mm; *lamina surfaces* glabrous. *Scape* in flower 0.8–5.5cm, in fruit 4.5cm or more, excentric, densely puberulent especially when young with very short glandular hairs which appear bluish white under low power (×20) dissecting microscope because of purple (not brown) joints. Inflorescence shortly capitate, few-flowered (4–9). *Calyx lobes* 3.5–4mm with marginal hairs c.0.1mm. *Corolla* (8–)8.5–10.5(–12)mm, violet-purple; upper lip deeply emarginate, minutely glandular on back. *Anthers* shallowly reniform, 0.5 × 1mm, pollen whitish buff. *Capsule* 6mm, ovoid-acuminate.

Distribution and ecology. Endemic to Bhutan. Steep rocky and grassy hillsides, 4420–4725m. June–August.

Additional specimens examined. BHUTAN. Upper Bumthang Chu district: Mangde Chu, Wartang [sic; = Waitang?], 14,500ft, 10 vi 1966, *S. Bowes Lyon* 3433 (BM, E); Waitang, Tsampa, 15,500ft, 22 vii 1949, *F. Ludlow, G. Sherriff & J.H. Hicks* 19222 (BM, E). Upper Kulong Chu district: Me La, 14,000ft, 5 viii 1933, *Ludlow & Sherriff* 396 (BM).

Closely allied to another entity within *Neopicrorhiza* from Xizang, as yet undescribed; a description of that taxon, and an amplified description of *N. minima*, will appear elsewhere.

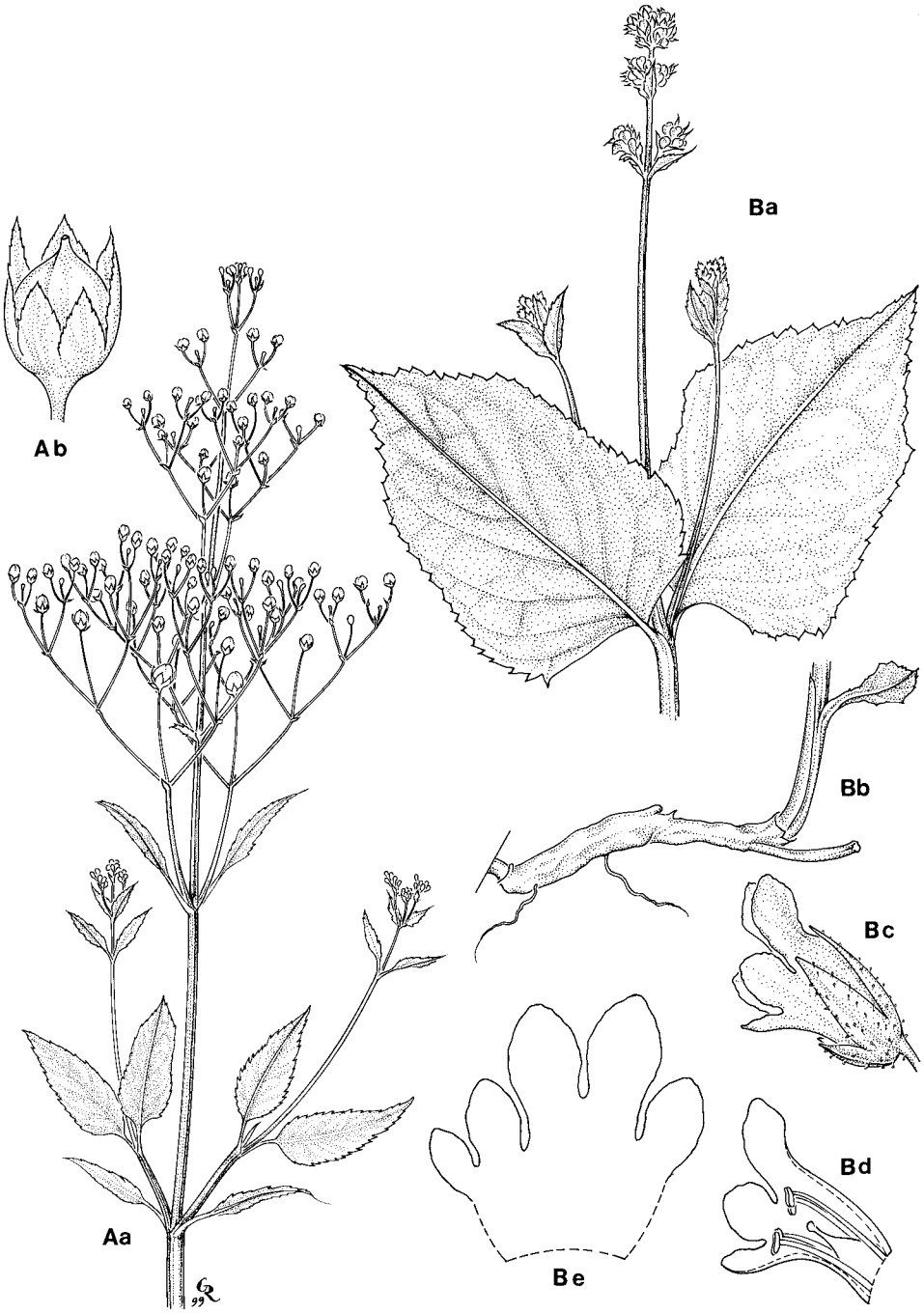
Scrophularia L.

Scrophularia cooperi R.R. Mill, **sp. nov. Fig. 3A.**
S. elatiore Benth. similis sed foliis magis subtiliter dentatis, bracteolis brevioribus differt.
Type: Bhutan, [Thimphu/Punakha districts: Dochung La]: Duké La, 8000ft, 17 viii 1914, R.E. Cooper 3361 (holo. BM, iso. E).

Stout perennial. *Stems* to 120cm tall, c.7mm diam. below, angled and narrowly winged throughout, glabrous. *Petioles* 4–20mm, broadly winged (the wing broadening at base) and basally auriculate, glabrous. *Lamina of leaves* (only upper ones seen) oblong-ovate, 35–60 × 12–25mm, acute, base cuneate or obtuse, margin finely serrate, very sparsely short-pilose above, glabrous beneath with moderately conspicuous venation. *Inflorescence* a large terminal panicle with few axillary inflorescences below; peduncles in opposite pairs subtended by a pair of small floral leaves (c.10mm long), lower ones peduncles 20–30mm; cymes divaricately dichotomous, mostly 13–19-flowered; pedicels fairly stout, the primary (alar) ones 4–9mm; axis and peduncles glabrous, pedicels with sparse very short-stalked glands. *Bracteoles* narrowly oblong, 3.5–4.5mm, glandular. *Calyx lobes* ovate, c.2.5 × 1.5mm, glandular, narrowly paler- but scarcely scarious-margined. *Corolla* green to greenish white, 5–6mm. *Stamens* exserted; staminode broadly spathulate. *Capsule* globose-ovoid, c.5mm, tapered apically to a short point c.1mm.

Distribution and ecology. Endemic to C Bhutan (Thimphu and Mongar districts), collected in flower in late July and in flower and fruit in mid August. Little is known

FIG. 3. A, *Scrophularia cooperi* R.R. Mill: Aa, habit (inflorescence and upper part of stem) × ⅔; Ab, calyx and young fruit × 6 (both from *Cooper* 3361). B, *Scrophularia subsessilis* R.R. Mill: Ba, habit (inflorescence and upper part of stem) × ⅔; Bb, rootstock and lowest part of stem × ⅔; Bc, undissected flower × 7; Bd, corolla in longitudinal section showing stamens and pistil, × 7; Be, corolla opened out, × 8 (all from *Ludlow, Sherriff & Hicks* 20383). Drawn by Glenn Rodrigues.


Ba
Ab
Bb
Bc
Bd
Be
Aa

about its habitat or ecology save for a comment on *Cooper* 4172 that it was collected 'below dry rock'.

Additional specimen examined. BHUTAN. Mongar district: Anjor, 2100–2400m, *Cooper* 4172 (BM, E).

Resembling *S. elatior* Benth. (to which it keys out in the *Scrophularia* account in Hong De-yuan *et al.*, *Flora of China* 18: 11–20, 1998) but the leaves are more finely toothed and the bracteoles shorter and glandular (not eglandular as in most examples of *S. elatior*). The last character is not diagnostic for *S. cooperi* as *S. elatior* does sometimes have glandular bracteoles and calyces; an example is *Clarke* 27355 (BM) from Darjeeling. However, this specimen has the coarsely toothed leaves typical of *S. elatior* and so cannot be included in *S. cooperi*.

The epithet honours R. Edgar Cooper (1890–1962) who collected in Sikkim (1913) and Bhutan (1914, 1915) for Bees' nursery firm, Cheshire. His Bhutan collections are particularly important.

Scrophularia subsessilis R.R. Mill, **sp. nov. Fig. 3B.**
*S. pauciflora*e Benth. similis sed foliis subsessilibus petiolo minus quam 10mm longo (non 20–50mm) et corolla majore circiter 6mm longa (non c.4mm) recedit.
Type: Bhutan, Upper Kulong Chu district, Shingbe (Me La), clearing in *Abies* forest, c.3500m, 21 vi 1949, *F. Ludlow, G. Sherriff & J.H. Hicks* 20383 (holo. BM, iso. E).

Herb, probably perennial but basal parts not collected. *Stem* single, erect, c.60cm, c.5.5mm maximum diam., hollow, subglabrous below, sulcate, purplish tinged below and blackish tinged above, narrowly winged, very sparsely pilose (mainly in grooves), sparsely eglandular-pubescent above the uppermost leaf-pair. *Leaves* opposite, all subsessile (petioles of lower leaves mostly 4–8mm, of upper ones much less), lowest pair smallest and upper middle ones largest; lamina ovate, 45–90 × 25–60mm, apex acute, base shallowly cordate-cuneate, margin coarsely doubly dentate (c.10–12 primary teeth per side), each tooth with a stout mucro; surfaces very sparsely white-pilose and with numerous pale yellow-green dots; veins conspicuous, blackish, the laterals c.6 per side. *Cymes* dense, shortly pedunculate (peduncle 4–6mm, densely sessile-glandular). *Pedicels* short, densely sessile-glandular. *Calyx lobes* ovate, c.3mm, shortly but abruptly acuminate with the acuminate tip erect or becoming somewhat recurved, sessile-glandular on central part of lamina outside, without a distinct scarious margin but the margin slightly paler, without glands, and appearing slightly toothed near the tip of each calyx lobe. *Corolla* (mostly young) green, urceolate, c.6mm, margins of lobes paler; 2 posterior lobes largest. *Stamens* included; filaments c.4mm; anthers c.1mm wide, thecae paler than filaments when dry. *Staminode* absent? *Ovary* ovoid-globose, c.2 × 2mm, tapered to a blunt apex. *Mature capsule* not seen.

Distribution. Apparently endemic to northern Bhutan.

Known only from the type gathering, both specimens of which are mostly in bud with a few open but probably rather immature flowers. One of these on the E sheet

has been dissected by a previous worker (probably A.J.C. Grierson); this dissection does not show a visible staminode although there has been some folding of corolla parts during mounting on to card and consequently it is possible that any staminode may have been obscured. It has not been possible to repeat the dissection due to insufficient material on either sheet. More material, especially in fruit, is needed to complete the description. The epithet chosen, *subsessilis*, is perhaps not very definitive since many other figworts have subsessile leaves, but it does serve as an identifier when the species is compared with its nearest putative ally, *S. pauciflora* Benth. whose leaves are distinctly petiolate. The BM isotype was determined as *S. pauciflora* by Tsoong in 1950 (*in sched.*).

NOMENCLATURAL NOTE

Picria fel-terrae Loureiro

The epithet of this species is derived from Latin *fel*, poison or gall, and *terra*, land or earth giving the meaning 'poison of the land': possibly an allusion to it being a noxious weed, or to the bitterness of its leaves. Hong De-yuan *et al.* (*Flora of China* 18: 29, 1998) 'corrected' the spelling by removing the hyphen: '*felterrae*'. However, ICBN Art. 60.9 states that a hyphen is to be used when an epithet is composed of two words that can stand independently, as in *uva-ursi*, *lacryma-jobi*. The formation of *fel-terrae* is exactly analogous to these examples in the ICBN and consequently the epithet is not to be corrected by the removal of the hyphen.

NEW RECORDS

Alectra avensis (Benth.) Merrill

BHUTAN. Chukka district: c.3km S of Chimakothi, thin, dry, well-drained grassland below scattered *Quercus lanata*, 1900m, 11 xi 1987, *J.R.I. Wood* 6066 (E).

Bacopa monnieri (L.) Pennell

BHUTAN. Phuntsholing district, Toribar near Phuntsholing, frequent weed of flooded rice paddies, 500m, 16 viii 1991, *C. Parker* 7139 (WRO).

Dopatrium junceum (Roxb.) Benth.

BHUTAN. Thimphu district: Simtokha, 2300m, 13 viii 1991, *C. Parker* 7126 (E); Punakha district: nr Punakha, 1100m, *J.R.I. Wood* 6653 (E).

First recorded (field obs., *Parker*) in 1988; new for Bhutan, but apparently quite widespread. Not yet recorded from Sikkim. An abundant weed of flooded rice between 1100m and 2300m.

Scrophularia himalayensis Royle

BHUTAN. Chukka district: between Chimakothi and Bunakha, moist shaded rocks in damp broad-leaved forest, 2000m, 8 ix 1989, *J.R.I. Wood* 7163 (E).

Striga asiatica (L.) Kuntze (*S. lutea* Lour.)

BHUTAN. Punakha district: around rock outcrops in dry open bushland in the Sankosh valley, c.10km S of Wangdi Phodrang, 8 x 1989, *J.R.I. Wood* 7195 (E).

Striga densiflora Benth.

INDIA (SIKKIM). Teesta, E bank, 5 iv 1875, *Gamble* 3463A (K; det. A. Raynald). Parasitic on grasses including *Sorghum*.

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