

NOTES RELATING TO THE FLORA OF BHUTAN: V
New and noteworthy plants collected in Bhutan in 1979

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ABSTRACT. Some of the plants new to Bhutan collected by the authors in 1979 are enumerated, with more detailed discussion of the more significant discoveries, and taxonomic and nomenclatural notes where relevant. Five new taxa are described: *Myricaria albiflora* Grierson & Long, *sp. nov.*, *Rubus sengorensis* Grierson & Long, *sp. nov.*, *Pentstemon pulcherrimus* Grierson & Long, *sp. nov.*, *Cinnamomum bejolghota* (Ham.) Sweet var. *pubescens* Grierson & Long, var. *nov.* and *Elatostema longicaudatum* Grierson & Long, *sp. nov.* The following new names and combinations are included: *Bistorta griffithii* (Hook. f.) Grierson, *comb. nov.*, *Persicaria barbata* (L.) Hara var. *stagnina* (Meisner) Grierson, *comb. et stat. nov.*, *Viscum album* L. subsp. *meridianum* (Danser) Long, *stat. nov.*, *Boehmeria macrophylla* Hornem. var. *canescens* (Wedd.) Long, *comb. nov.*, *B. macrophylla* Hornem. var. *scabrella* (Roxb.) Long, *comb. nov.*, *B. macrophylla* Hornem. var. *tomentosa* (Wedd.) Long, *comb. nov.*, *B. penduliflora* Long, *nom. nov.* (to replace *B. macrophylla* D. Don, *hom. illeg.*), *Elatostema caveanum* Grierson & Long, *nom. et stat. nov.*, *Engelhardia spicata* Bl. var. *integra* (Kurz) Grierson & Long, *comb. nov.*, and *Lithocarpus listeri* (King) Grierson & Long, *comb. nov.* A key to *Myricaria* in the Himalayan region is given.

INTRODUCTION

Botanical exploration of Bhutan in the past has been largely concentrated on the mountains in the north of the country because of the large number of horticulturally valuable plants in that area. Most of Bhutan is clothed in dense forest, from subtropical jungle in the south to wet fir and hemlock forests on the mountain ridges in the centre and north. Apart from the expedition of Griffith in 1838 (Long, 1979) no botanical expedition has previously been made to Bhutan primarily to study the forest vegetation.

A three month visit to Bhutan by the authors in 1979 aimed to redress this imbalance to some extent, and considerable collections were made from all the major forest types throughout southern and central parts of the country, including several very rich districts until then unexplored by botanists. Not surprisingly, a large number of plants not previously reported from Bhutan were collected; some are species well known from adjacent Sikkim and Darjeeling, and therefore were expected to occur in Bhutan, but others represent interesting extensions of range from more distant places such as Burma and Yunnan. These latter species are reported in detail in this paper, along with several new taxa and notes on other interesting additions to the flora. Only some plant families are dealt with, mainly those studied to date in preparation for the *Flora of Bhutan*. New taxa from other families will be treated in a future publication, as will details of itineraries during this and other expeditions to Bhutan. All specimens cited have been studied; *Grierson & Long* specimens are housed in E, with duplicates of many in THIMPHU.

NEW AND NOTEWORTHY PLANT RECORDS

Annonaceae

Artabotrys caudatus [Wall. ex] Hook. f. & Thomson

BHUTAN: Sarbhang-Chirang road 15 km above Sarbhang, 26°51'N 90°15'E, 900 m, in dense mixed forest, 31 v 1979, *Grierson & Long* 1513.

DARJEELING: Darjeeling, 3500 ft, 21 v 1923, Cowan s.n. (E,K).

KHASIA HILLS: *Wallich Cat.* 6417 (type K,BM).

New to Bhutan; a rare climbing shrub apparently known only from the three localities cited. Hooker & Thomson (1855) and King (1893) cited only the type locality, whilst Cowan & Cowan (1929) did not list it for the Darjeeling district.

Menispermaceae

Cocculus laurifolius DC.

BHUTAN: Mangde Chu near Yoormu, 27°19'N 90°35'E, 1250 m, amongst shrubs on river bank, 25 v 1979, *Grierson & Long* 1312.

New to E Himalaya; although widely distributed in other parts of SE Asia. In the Himalayas it was previously known only from Kashmir to central Nepal (Hara & Williams, 1979).

Tamaricaceae

Myricaria albiflora Grierson & Long, sp. nov. Fig. 1.

M. rosea W. W. Smith similis a quo habito erecto, foliis, floribus et capsulis minoribus, petalis albis differt.

Frutex erectus, 1–2 m altus; rami atropurpurei. Folia dimorpha, glabra, minute punctata, ea surculi principalium disposita, ovato-lanceolata, 3.5–7 × 1–2 mm lata, acuminata, basi leviter attenuata, ea surculi lateralium conferta, linearia, 2–3 × 0.5–0.75 mm, apice incurva, subacuta. Racemis florigeri 3–6 cm longi, fructigeri 6–10 cm longi; bracteae ovato-lanceolatae, 3.5–7 × 1–2 mm, integrae, albo-marginatae; pedicelli 2–3 mm longi. Sepala lanceolata, 3–4 mm longa, anguste albo-marginata. Petala alba, obovato-spathulata, 4–5 × 2–2.5 mm. Stamina ad medium in cupulam connata. Capsulae ovoideae, 8–10 mm longae, valvis griseovirentibus. Semina 1.5 mm longa; coma subsessilis.

BHUTAN: Stony river beds, Ha, 2745 m, 13 vi 1933, *Ludlow & Sherriff* 85 (holotype E, iso. BM); Ha Dzong, 2800 m, 15 viii 1949, *Ludlow & Sherriff* 19614 (E, BM); Chalimarphe, Thimphu, 2130 m, 11 vii 1914, *Cooper* 1498 (E,BM); Paro, 2440 m, 14 xi 1914, *Cooper* 3580 (E); Ha, 2700 m, vii 1938, *Gould* 1120 (K); Thimphu Chu below Taba, Thimphu, 27°30'N 89°38'E, 14 v 1979, *Grierson & Long* 1021 (E).

SIKKIM: Lingmuthang, 3050 m, 12 ix 1912, *Rohmoo Lepcha* 68 (E); Lingmuthang, 3960 m, 24 x 1916, *Cave* s.n. (E).

TIBET: Chumbi, 2745 m, 20 ix 1916, *Cave* s.n. (E).

Amongst the Himalayan members of the genus, *Myricaria albiflora* is most closely allied to *M. rosea* (the latter described in detail by Hara, 1972) from which it differs in its much larger, erect habit, its white flowers which, although similar in structure, are smaller in all parts, and in its smaller capsules. In habit it is more akin to some other Himalayan species, *M. wardii*, *M. elegans*, *M. bracteata*, *M. squamosa* and *M. davurica*, but differs in its inflorescence, flowers and seeds, and particularly in its lanceolate bracts with a very narrow scarious margin not becoming broader at the base. The following key illustrates these differences.

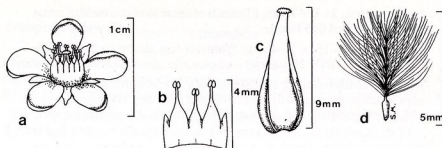


FIG. 1. *Myricaria albiflora* Grierson & Long: a, flower; b, segment of androecium; c, capsule prior to dehiscence; d, seed. a, b from Ludlow & Sherriff 85; c, d from Ludlow & Sherriff 19614.

In W Bhutan *Myricaria albiflora* inhabits stony stream-sides in the drier inner valleys at altitudes between 2100 and 3000 m, a habitat similar to that of *M. rosea* which is found at higher altitudes, between 3300 and 4300 m. *M. albiflora* is at present unknown west of Sikkim. Three specimens from Nepal, *Stainton, Sykes & Williams* 4665, 7208 and 8094 (all E), are, however, probably closely related to this species as shown in their erect habit and sessile coma but have reddish flowers and bear floral bracts with an expanded scarious margin towards the base. They may represent an undescribed taxon, but good flowering material is necessary to clinch the matter. As suggested by Hara (1972), further research is needed on the *M. davurica*-*M. squamosa* group in the Himalayan area as their distinction is not clear-cut.

KEY TO SPECIES OF MYRICARIA IN THE HIMALAYAN REGION

1. Floral bracts lanceolate with narrow scarious border not broadened towards base; coma sessile or subsessile on seed; prostrate subshrubs rarely over 50 cm tall (erect shrub 1–3 m in *M. albiflora*).....2.
- + Floral bracts ovate-lanceolate, ovate or suborbicular with broad scarious margin in lower half; coma distinctly stipitate on seed (sessile in *M. wardii*); erect shrubs 2–3 m.....4.
2. Inflorescence of short few-flowered racemes; floral bracts 3–4 mm; sepals 3–4 mm (W Tibet)*M. prostrata* Benth.
- + Inflorescence of dense many-flowered racemes; floral bracts 4–10 mm, sepals 3–6 mm.....3.
3. Prostrate shrub; floral bracts 6–10 mm; sepals 4.5–6 mm, petals 5–8 mm, pink or red; mature capsules 10–13 mm (NW Himalaya, Nepal, Sikkim, Bhutan, SE Tibet, W China)*M. rosea* W. W. Smith.
- + Erect shrub; floral bracts 4–7 mm; sepals 3–4 mm; petals 4–5 mm, white; mature capsules 8–10 mm (Sikkim, Tibet [Chumbi Valley], Bhutan)*M. albiflora* Grierson & Long
4. Racemes slender, lax-flowered, lateral; sepals ovate, c. 1.5 mm, less than half length of petals5.
- + Racemes compact, densely flowered, lateral or terminal; sepals oblong or lanceolate, 3–5 mm, more than half as long as petals.....6.

5. Leaves minute, $2-3 \times 1$ mm; filaments connate to above middle; coma subsessile on seed (SE Tibet) **M. wardii** Marquand
- + Leaves large, $5-15 \times 2-4$ mm; filaments free almost to base; coma stipitate on seed (NW Himalaya) **M. elegans** Royle
6. Racemes mostly terminal, 10–30 cm; floral bracts with long acuminate apex which is conspicuously exerted in bud (W Tibet, NW Himalaya)
M. bracteata Royle (*M. alopecuroides* Schrenk, *M. germanica* auct. p.p. non (L.) Desv.)
- + Racemes mostly lateral, 1.5–7 cm; floral bracts obtuse or acute, not exerted in bud 7.
7. Leaves 1.5–5 mm long; racemes not fasciculate; bracts broadly ovate to suborbicular (NW Himalaya, Tibet, Nepal) **M. squamosa** Desv.
(*M. hoffmeisteri* Klotzsch)
- + Leaves 4–10 mm long; racemes often densely fasciculate; bracts ovate-oblong (NW Himalaya, Tibet, Nepal) **M. davurica** (Willd.) Ehrenb.

Elatinaceae

Elatine ambigua Wight

BHUTAN: Lometsawa, W of Wangdu Phodrang, $27^{\circ}30'N$ $89^{\circ}47'E$, 2200 m, on wet mud and submerged in flooded paddy field, 12 vii 1979, *Grierson & Long* 2690; Thimphu Chu below Taba, Thimphu, $27^{\circ}30'N$ $89^{\circ}38'E$, 2300 m, common on damp mud in paddy fields, 22 vii 1979, *Grierson & Long* 2831.

New to E Himalaya; distribution: Europe (Cook, 1968), Fiji, Java (Backer, 1951), Japan (Hara, 1952), S India (Ramayya & Rajagopal, 1971), and Kashmir (Sharma, 1977). The closely allied *E. triandra* Schkuhr has also been reported from the NW Himalayas (Sharma, 1977) and Nepal (Hara & Williams, 1979).

Rutaceae

Citrus latipes (Swingle) Hook. f. & Thomson ex Tanaka

Syn.: *C. ichangensis* Swingle subsp. *latipes* Swingle; *C. cavaleriei* [Léveillé ex] Cavalerie var. *latipes* (Swingle) Koidzumi.

BHUTAN: 9 km SW of Tongsa, $27^{\circ}29'N$ $90^{\circ}30'E$, 2100 m, mixed broad-leaved forest slopes, 20 v 1979, *Grierson & Long* 1182.

New to Himalaya; previously known only from the Khasia Hills (*Hooker & Thomson*, K, type), N Burma (Swingle, 1943) and Naga Hills (*Bor* 2694, 2830, K). The closest relative appears to be *Citrus cavaleriei* [Léveillé ex] Cavalerie (*C. ichangensis* Swingle) of Western China, of which *C. latipes* has sometimes been considered a variety or subspecies. The differences between the two were enumerated by Swingle (1943) who considered them good species.

Celastraceae

Euonymus attenuatus [Wall. ex] Lawson

BHUTAN: Sarbhang-Chirang road, 16 km above Sarbhang, 26°55'N 90°15'E, 950 m, in dense hot mixed forest, 31 v 1979, *Grierson & Long* 1519.

New to Himalaya; known elsewhere only from Silhet (*Wallich Cat.* 4298, K, BM) and Khasia Hills (*Hooker & Thomson s.n.*, K; *Griffith s.n.*, NY).

Aceraceae

Acer pectinatum [Wall. ex] Pax subsp. **laxiflorum** (Pax) E. Murray

Syn.: *A. laxiflorum* Pax

BHUTAN: Valley above Taba, Thimphu, 27°30'N 89°39'E, 2520 m, in mixed forest, *Pinus* and *Quercus* dominant, 13 v 1979, *Grierson & Long* 981.

New to Himalaya. The Bhutan plant agrees well with specimens from Szechwan, W China, but shows slightly deeper serration of the leaf margin.

Subsp. **taronense** (Hand.-Mazz.) E. Murray

Syn.: *A. taronense* Hand.-Mazz.

BHUTAN: Longte Chu near Charikhachor Chorten, Chendebi, W of Tongsa, 27°27'N 90°21'E, 2450 m, on roadside bank amongst shrubs, 22 v 1979, *Grierson & Long* 1231; near large waterfall above Namning, SE of Sengor, 27°20'N 91°02'E, 2730 m, in ravine in wet broad-leaved forest, 6 vii 1979, *Grierson & Long* 2558.

New to Himalaya; known elsewhere only from W China (Yunnan, Szechuan), SE Tibet and N Burma. In Bhutan some specimens of *A. hookeri* Miq. approach it in having very small lateral lobes but in the latter species the leaf shape is more narrowly ovate and the lateral lobes much smaller or absent.

Leguminosae

Bauhinia glabrifolia (Benth.) Baker

BHUTAN: 12 km N of Deothang, 26°54'N 91°28'E, 1425 m, climbing over shrubs on steep rocky bank in hot forest, 22 vi 1979, *Grierson & Long* 2173.

New to Himalaya; this species was previously unknown in the wild; it was known only from the type specimen cultivated in the Calcutta Botanic Garden and of unknown wild origin. The Bhutan specimen differs from the type in being slightly larger in all its parts and in having slightly darker indumentum. For identification of this specimen and for the above information we are grateful to Prof. K. Larsen, Aarhus University, Denmark.

Entada pursaetha DC. subsp. **sinohimalensis** Grierson & Long, Plate 1.Syn.: *E. laotica* Gagnepain

BHUTAN: above Phuntsholing, 12 km along Thimphu road, 26°52'N 89°26'E, 750 m, margin of dense mixed forest, *Schima wallichii* etc., 4 v 1979, *Grierson & Long* 820; Gamri Chu below Lungten Zampa, E of Tashigang, 27°21'N 91°37'E, 1100 m, 19 vi 1979, *Grierson & Long* 2083; Samdrup Jongkhar, 26°50'N 91°28'E, 600 m, on large tree in hot jungle, 21 vi 1979, *Grierson & Long* 2151; above Zimgaon, Shongar Chu W of Mongar, 27°17'N 91°04'E, 1500 m, climbing on large forest trees in warm broad-leaved forest, 4 vii 1979, *Grierson & Long* 2474.

New to Bhutan; this recently described subspecies was reported from Nepal, Sikkim, India (Darjeeling district), Bangladesh and China (*Grierson & Long*, 1979), whilst Nielsen (1980) independently reported it under the name *E. laotica* Gagnepain additionally from Burma and Laos. Nielsen commented that the pods were unknown in this taxon and that its systematic position was therefore uncertain; three of the specimens cited above include mature pods (Plate 1) which display the following features: Mature pods oblong, compressed, 20–65 × 8–11 cm, slightly curved but not twisted, constricted between seeds and swollen above each seed, rigidly woody, surface dull, not glossy, greyish brown; segments 4–12, each 4–6 cm long, 1-seeded; sutures thick and smooth, 9–10 mm thick, remaining intact after disintegration of segments; epicarp hard, not chambered, 1–1.4 mm thick, becoming brittle at maturity; endocarp tough and woody 0.2–0.3 mm thick; seeds compressed orbicular 3.5–5 cm diam., 1.8–2 cm thick, dark reddish brown, glossy.

These mature pods show all the important characteristics of typical *E. pursaetha*, as discussed by Johnston (1949) and Brenan (1955), and agree very closely with the illustration of that species by Rheede tot Drakestein (1688, t. 32–34) under the name *Perim-kaku-valli*, and with a mature pod of *E. pursaetha* subsp. *pursaetha* from South Africa (Natal, *Strey* 9919, E). These features of the pods of the Bhutanese plant support the treatment of the plant as a subspecies of *E. pursaetha* as proposed by *Grierson & Long* (1979) rather than as a separate species, *E. laotica* Gagnep.

Pterolobium hexapetalum (Roth) Santapau & WaghSyn.: *P. indicum* A. Rich.

BHUTAN: Gamri Chu below Lungten Zampa, E of Tashigang, 27°21'N 91°37'E, 1080 m, amongst scrub in dry valley, 19 vi 1979, *Grierson & Long* 2075, det. J. E. Vidal.

New to Himalaya; according to Vidal & Hul Thol (1974) this species occurs throughout peninsular India, with an unlocalised N Indian record from W Bengal.

P. macropterum KurzSyn.: *P. indicum* A. Rich. var. *macropterum* (Kurz) Baker

BHUTAN: Mande Chu valley N of Shamgong, 25 km along Tongsa road, 27°16'N 90°38'E, 1325 m, hanging over rock face by road in mixed forest, 4 vi 1979, *Grierson & Long* 1624, det. J. E. Vidal.

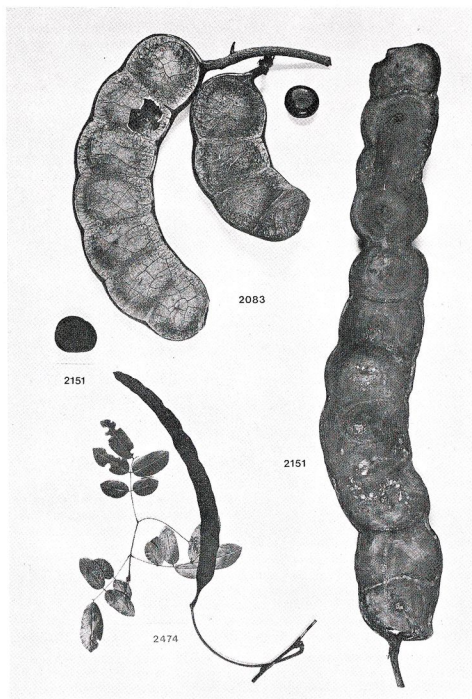


PLATE I. *Entada pursaetha* DC. subsp. *sinohimalensis* Grierson & Long. 2474, leaf and young pod; 2151, pod approaching maturity and ripe seed; 2083, ripe pods and seed. From Grierson & Long 2474, 2151 and 2083. All $\times \frac{1}{4}$.

New to Himalaya; Vidal & Hul Thol (1974) reported this species from S Burma, Andaman Islands, Thailand, Laos, S Vietnam, Java and Madura.

These collections constitute the first records of the genus in the Himalayan region, that of *P. macropterum* being a considerable extension of range from S Burma.

Rosaceae

Rubus preptanthus Focke

BHUTAN: Forest slopes above Khaling, S of Tashigang, 27°10'N 91°26'E, 2550 m, in mixed broad-leaved forest, 27 vi 1979, *Grierson & Long* 2311.

New to Himalaya; previously known only from Yunnan, W China: *Henry* 9598 (E, K, A, type), *Forrest* 7383 (E), 7385 (E), 7819 (E, K), 8272 (E, K). The Bhutanese plant closely resembles the type in most respects, differing only in the somewhat broader leaves and white, not brownish, indumentum.

Rubus sengorensis Grierson & Long, sp. nov. Fig. 2.

R. saxatilis L. affinis a quo stipulis profunde laciniatis, floribus axillaribus solitariis vel binis, petalis carneis differt.

Suffrutescens; caules repentes radicanes parce aculeolati et hirsuti, vetusti lignosi, rami floriferi ex axillis caulium vetustorum, erecti, 15–30 cm alti, simplices, hirsuti, aculeis paucis rectis instructi. Folia pinnato-ternata, interdum ad apicem caulium simplicia, ovata; petioli 2–7 cm longi, hirsuti et aculeolis rectis armati; stipulae in laciniis linearis 4–8 mm longis profunde fissae. Foliola obovata, penninervia, costulis 4–5-jugatis, utrinque parce pilosis et subtus secus nervos medios aculeolis paucis instructa, margine inaequaliter sed non profunde crenato-dentato; lateralibus 2.5–4 × 2–3 cm, obtusa, petiolulis 2–3 mm longis; terminale (2–)4–7 × 1.5–5.5 cm, acutum vel obtusum petiolulo 4–7 mm longo. Flores parvi, 1–2 in axillis foliorum gerentes, pedunculis 1.5–2 cm longis. Calyx extus parce pilosus, intus pubescens; sepala ovata 5–8 mm acuminata, integra vel basin versus 1–2 dentis linearis ferentia. Petala carnea, obovata, 4–5 × 2–3 mm, acuta vel obtusa. Stamina 15–25, erecto-patentia; filamenta 1.5–2 mm longa. Carpella c. 20–25, pubescentia, styli filamentis fere aequilongi. Fructus hemisphaericus (?); drupeolae (siccae) ovoideae 2.5 mm longae ad apices pubescentes, putamine ruguloso.

BHUTAN: Forest slopes below Sengor 27°22'N 91°01'E, 3000 m, 6 vii 1979, damp streamside in small ravine in *Tsuga* forest, prostrate subshrub, leafy shoots erect, calyx green, petals pink, *Grierson & Long* 2524 (holotype E; iso. BM, K, TI, THIMPHU); forest slopes above Sengor, NW of Mongar, 27°23'N 91°01'E, 3175 m, 14 vi 1979, *Grierson & Long* 1901 (E); Seemgong (near Shongar), 2745 m, 29 viii 1915, *Cooper* 4691 (E, BM).

This distinctive new species was first recognized from the incomplete fruiting specimen collected by R. E. Cooper in 1915 in a district we were able to visit in 1979. The plant was rediscovered in two localities and in one of them abundant flowering material was collected growing on mossy banks in wet *Tsuga dumosa*/*Rhododendron* forest. In the second locality the plant grew in a similar situation in *Abies densa*/*Rhododendron* forest.

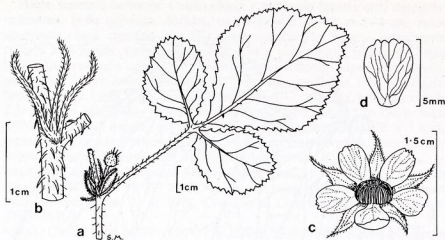


FIG. 2. *Rubus sengorensis* Grierson & Long: a, portion of stem with leaf; b, stipule; c, flower; d, petal. All from Grierson & Long 2524.

R. sengorensis displays a growth form found in several other Himalayan Rubi, *R. calycinus* D. Don, *R. pectinaroides* Hara, *R. saxatilis* L., *R. nepalensis* (Hook. f.) O. Ktze., *R. fragarioides* Bertol., and *R. fockeanus* Kurz, which produce horizontal perennial stems, growing amongst moss and leaf litter, from which erect annual shoots bearing leaves and inflorescences arise. *R. calycinus* and *R. pectinaroides* are distinguished from *R. sengorensis* in having unifoliate leaves, ovate-oblong, undivided stipules, and much larger petals, 10–15 mm long; *R. calycinus* also differs in its white flowers. The remaining four species are similar to *R. sengorensis* in having trifoliate leaves but differ in having white flowers, and ovate or elliptic stipules which are entire or shortly dentate. Likewise they have much larger flowers, with the exception of *R. saxatilis* where the flowers are similar to those of *R. sengorensis* in size but are borne in 3–6-flowered cymes, not solitary or paired in the leaf axils as in *R. sengorensis*. Although not strongly prickly, *R. sengorensis* is always more densely aculeolate than *R. saxatilis*.

Rubiaceae

Polyura geminata Hook. f.

BHUTAN: Near Tatapani, Gaylegphug, 26°57'N 90°32'E, 700 m, edge of steep jungle, 29 v 1979, Grierson & Long 1450.

New to Himalaya; known elsewhere only from Assam: Khasia & Mishmi Hills (Hooker, 1880); Naga Hills, Clarke 40832 (K); and Garo Hills, Parry 1206 (K).

Asclepiadaceae

Pentasacme pulcherrima Grierson & Long, sp. nov. Fig. 3.

P. wallichii Wight affinis, a quo floribus majoribus, antheris obovatis late acutis, stigmate sessile conico differt.

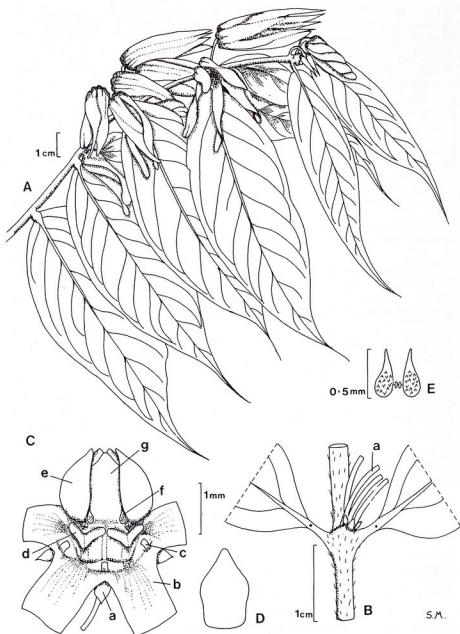


FIG. 3. *Pentasacme pulcherrima* Grierson & Long: A, flowering shoot; B, node showing interpetiolar insertion of inflorescence, a, pedicels; C, flower with one anther removed, a, sepal, b, corolla lobe (truncated), c, corona segment, d, gland, e, anther, f, pollinium, g, ovary; D, anther; E, a pair of pollinia. All from Grierson & Long 2137.

Herba perennis herbacea. Caules plures e radice sat lignosa orti, simplices, pubescens. Folia opposita, disticha, ovato-elliptica, 6–13 × 2–4 cm, apice acuminata, base cuneata, glandula nigra superficiali, integra, penninervia costulis 5–8-jugatis, margine et costulis subtus pubescentia, petiolo 4–7 mm longo. Inflorescentia umbelliformia, inter axillas foliorum superiorum gerens, pedunculis 2 mm longis. Umbellae 3–5-floribus, pedicellis 1–2 cm longis. Sepala ovata 2.5 mm longa, acuta. Corolla alba 2–3 cm longa, lobis lanceolatis 2.5–3.5 mm latis, basin versus connatis. Squamae coronae 5 in fundo tubo affixae c. 1.5 mm longae, oblongae, integrae. Antherae obovatae 2 × 1 mm, acutae, supra ovarium inflexae; pollinia pedicellata erecta ovoidea. Ovarium late ovatum, filamentis aequilongis, stigmatibus sessile, conico. Folliculi ignoti.

BHUTAN: Samdrup Jongkhar to Deothang road, 8 km above Samdrup Jongkhar, 26°49' N 91°29' E, 550 m, shaded steep bank in hot jungle, erect herb, flowers white, 21 vi 1979, *Grierson & Long* 2137 (holotype E; iso. THIMPHU).

NEPAL: Chula Chuli, 26°37' N 87°37' E, 230 m, 15 ix 1967, *Williams & Stainton* 8499 (BM, K).

The genus *Pentasacme** is distributed throughout the Himalayan region, India (Khasia Hills), Burma, China and Malaya. It can be subdivided into two main groups; firstly, those species with linear or linear-lanceolate leaves 4–13 mm broad and with small flowers having corolla lobes 4–10 mm long: *P. caudata* Wight (syn. *Spiladocorys angustifolia* Ridl.), *P. championii* Benth. and *P. shanensis* Macgregor & W. W. Smith; secondly, those species with elliptic to ovate leaves 15–40 mm broad and having larger flowers with corolla lobes 10–30 mm long: *P. wallichii* Wight and *P. pulcherrima*. (*P. esquirolii* Lévl. is now placed in *Heterostemma*; *P. glaucescens* Dcne. and *P. stauntonii* Dcne. (syn. *P. brachyantha* Hand.-Mazz.) are included in *Cynanchum*). *P. pulcherrima* is therefore most closely allied to *P. wallichii*, both species are distinctive in having opposite and distichous leaves which bear a prominent blackish gland on the upper surface at the base of the lamina, and in having each umbel borne in an interpetiolar position, one per node, on alternating sides of the axis. *P. wallichii* was illustrated by Delessert (1846, t. 87). Table 1 lists the important differences between the two.

TABLE 1

	<i>P. pulcherrima</i>	<i>P. wallichii</i>
Leaves	6–13 × 2–4 cm	5–8 × 1.5–2.5 cm
Corolla lobes	20–30 × 2.5–3.5 mm	10–13 × 2–3 mm
Anthers	broadly acute	acuminate
Stigma	conical, concealed by anthers	shortly rostrate, exerted above anthers

Tylophora rotundifolia [Ham. ex] Wight

BHUTAN: Lingmethang, Shongar Chu, 27°14' N 91°08' E, 950 m, on shrubs by roadside in dry valley, 2 vii 1979, *Grierson & Long* 2426.

New to E Himalaya; reported by Hooker (1883) from Assam, peninsular and NW India.

*Gender feminine, not neuter as traditionally treated.

Cuscutaceae

Cuscuta campestris Yuncker

BHUTAN: Samdrup Jongkar, 26°48'N 91°28'E, 500 m, parasite on *Eupatorium* and roadside herbs, 21 vi 1979, *Grierson & Long* 2114.

New to E Himalaya; a north American species (Yuncker, 1932) now almost cosmopolitan (Plitman, 1978).

Scrophulariaceae

Bacopa procumbens (Mill.) Greenman

Syn.: *Herpestes chamaedryoides* H.B.K.; *Mecardonia procumbens* (Mill.)

Small; *M. dianthera* (Sw.) Pennell

BHUTAN. Torsa River, Phuntsholing, 26°52'N 89°23'E, 200 m, damp muddy bank of stream, 1 v 1979, *Grierson & Long* 746; Samdrup Jongkhar, 26°48'N 91°28'E, 500 m, grassy roadside, 21 vi 1979, *Grierson & Long* 2108.

A native of tropical and warm-temperate America (Edwin, 1971) not previously reported from the Himalaya, but recently also collected in Nepal: Kathmandu, nr Bhagmati River, 27°42'N 85°20'E, 1300 m, 1 viii 1974, *de Haas* 2002 (BM). It was first reported in India from Bengal (Prain, 1903 a, b) and more recently from a few scattered localities throughout India (Thaker, 1971).

Bignoniaceae

STEREOSPERMUM & RADERMACHERA IN BHUTAN & SIKKIM

In recent reviews of these genera in Asia (Santisuk, 1973, and van Steenis, 1976) neither was reported from Bhutan; the former author included two species of *Stereospermum* from Sikkim and Darjeeling. Study of collections in British herbaria reveals that one species of *Radermachera* and two of *Stereospermum* occur in the East Himalaya but have been subjected to much taxonomic and nomenclatural confusion in the past.

Radermachera sinica (Hance) Hemsl.

Syn.: *Stereospermum sinicum* Hance; *Radermachera borii* Fischer

BHUTAN: s. loc., *Griffith*, Herb E.I.C. 2421 (BM), K.D. 4069 (K); Mirichoma, 914 m, 3 vii 1914, *Cooper* 1129 (E, BM); Buxa, 760 m, 20 vi 1914, *Cooper* 1040 (E, BM); Rinchu, Punakha, 1500 m, 2 vi 1915, *Cooper* 3947 (E); Mangde Chu valley, 1000 m, 9 v 1937, *Ludlow & Sherriff* 3003 (BM); nr Shali, Kulong Chu, S of Tashi Yangtse, 27°30' N 91°35' E, 1675 m, in warm broad-leaved forest on steep river bank, 28 vi 1979, *Grierson & Long* 2346.

No specimens or records for this genus appear to exist from Sikkim or Darjeeling. The specimens collected by Griffith can probably be equated with two published records of '*Bignonia* sp.' in his Itinerary Notes (Griffith, 1848): no. 87 from Dewangiri, '*Arbor mediocris foliis supradecompositis tripinnatis*', and no. 929 from Punakha, '*Arbuscula foliis supra decompositis*'.

Stereospermum personatum (Hassk.) ChatterjeeSyn.: *S. chelonoides* sensu Clarke non (L.f.) DC.; *S. tetragonum* DC.

BHUTAN: Phuntsholing Gompa, 26°52'N 89°23'E, 360 m, in garden (? natural remnant), 2 v 1979, *Grierson & Long* 754; Valley N of Shamgong, nr Wangdegong, 27°16'N 90°39'E, 1200 m, on hillside in hot dry valley, 4 vi 1979, *Grierson & Long* 1615; E bank of Dangme Chu between Cha Zam and Duksum, N of Tashigang, 27°23'N 91°35'E, 1050 m, amongst trees on river bank in arid valley, 29 vi 1979, *Grierson & Long* 2356; above Zimgaon, Shongar Chu, W of Mongar, 27°17'N 91°04'E, 1500 m, in warm broad-leaved forest, 4 vii 1979, *Grierson & Long* 2469.

SIKKIM: s. loc., *J. D. Hooker* s.n. (GH).

DARJEELING: Chunbati, 600 m, iv 1876, *Gamble* 652 (K, BM); Punkabari, 150 m, 15 xi 1870, *Clarke* 13835 (BM).

Cowan & Cowan (1929) and Santisuk (1973) recorded this species from Darjeeling and Sikkim, and Deb et al. (1968) from S Bhutan. Chatterjee (1948) showed that the epithet *chelonoides* had traditionally been misapplied to this plant.

***S. chelonoides* (L.f.) DC.**Syn.: *S. suaveolens* (Roxb.) DC.

DARJEELING: without locality, *Cowan* s.n. (E); Simalbhutia, Darjeeling terai, *Gamble* 3521A (K).

This species was first reported from this region by Cowan & Cowan (1929) and later by Santisuk (1973). It has not yet been found in Bhutan. Chatterjee (1948) treated *S. chelonoides* and *S. suaveolens* as distinct species but Santisuk (1973) demonstrated that they are conspecific.

Labiatae***Scutellaria dependens* Maxim.**

BHUTAN: 6 km N of Thimphu Dzong, 2450 m, in moist meadow, 9 vi 1975, *Grierson & Long* 117.

New to Himalaya; constituting a major extension of range from Japan, Korea, E Siberia and China (Inner Mongolia, Manchuria and Shantung). In 1979 the habitat of the original collection was found to have been destroyed.

Amaranthaceae***Alternanthera pungens* Kunth**Syn.: *A. repens* (L.) Link non Gmelin

BHUTAN: Tributary of Shiri Chu S of Tashigang, 27°18'N 91°26'E, 1300 m, stony streamside in arid valley, 17 vi 1979, *Grierson & Long* 2027; Lingmethang, Shongar Chu, 27°14'N 91°08'E, 950 m, by footpath on cultivated ground, 2 vii 1979, *Grierson & Long* 2407.

New to Himalaya; a native of tropical America, now a widespread weed in the palaetropics (Mears, 1978) including Ceylon and peninsular India north to the Punjab (Nair, 1978).

Polygonaceae

Bistorta griffithii (Hook. f.) Grierson, **comb. nov.**

Basionym: *Polygonum griffithii* Hook. f., Flora Brit. India 5: 54 (1886).

Persicaria barbata (L.) Hara var. **stagnina** (Meisner) Grierson, **comb. et stat nov.**

Basionym: *Polygonum stagninum* [Ham. ex] Meisner in Wallich, Plantae Asiat. Rariores 3: 56 (1831).

These combinations are necessary for the forthcoming volume of the *Flora of Bhutan*.

Lauraceae

Alseodaphne owdenii Parker

BHUTAN: Sarbhang—Chirang road, 11 km from Sarbhang, 26°54'N 90°15'E, 800 m, on steep slope in hot jungle, 31 v 1979, *Grierson & Long* 1503.

SIKKIM: Kalijhora, 1909, coll.? no. 614 (E).

New to Bhutan; a rare species known previously only from the type collection from Assam (Cachar, 1922, leg. J. S. Owden — K, A-photo) and Sikkim (Kostermans, 1973).

Cinnamomum bejolghota (Ham.) Sweet var. **pubescens** Grierson & Long, **var. nov.**

A varietate typica ramulis hornotinis, paniculis et foliis subtus dense albido-pubescentibus differt.

BHUTAN: Rani Camp, above Tama, lower Mangde Chu valley, 27°08'N 90°36'E, 1800 m, roadside bank in warm wet forest, tree 15–20 m in young fruit, 26 v 1979, *Grierson & Long* 1362 (holotype E; iso. THIMPHU); Chukka, 1200 m, 22 iv 1915, *Cooper* 3999 (E, BM, NY).

The widespread typical variety of *Cinnamomum bejolghota* has leaves, even when young, young shoots and main panicle branches quite glabrous, pubescence being restricted to the flowers and pedicels.

Cinnamomum tenuipilis Kostermans

Syn.: *Alseodaphne mollis* W. W. Smith.

BHUTAN: Dung Dung, lower Mangde Chu valley, 27°17'N 90°37'E, 1250 m, roadside bank in forest, 25 v 1979, *Grierson & Long* 1325.

DARJEELING: Lopchu, 1500 m, vii 1881, *Gamble* 9424 (K); s. loc., 600 m, 8 v 1923, *Cowan* s.n. (E); Malagiri, 1200 m, v 1904, *Haines* 840 (K), 2012 (K); ibidem, 300 m, i 1905, *Haines* 1047 (K).

MANIPUR: Nong Shong Rhong, 1200 m, 6 iv 1882, *Watt* 6287 (K).

New to Bhutan; the above records are additional to those cited by Kostermans (1970) from China (Yunnan), Thailand, Nepal, Assam (Garo Hills) and Darjeeling. In India the plant has been confused with two other *Cinnamomum* species, *C. glaucescens* (Wall. ex Nees) Drury (*C. cecicodaphne* Meissn.) and *C. porrectum* (Roxb.) Kosterm. (*C. glanduliferum* (Wall.) Meissn.). Table 2 lists the main differences between the three species.

TABLE 2

	<i>C. tenuipilis</i>	<i>C. porrectum</i>	<i>C. glaucescens</i>
Young shoots	whitish tomentose	glabrous	brownish tomentose
Leaf base	rounded	cuneate	weakly cuneate or rounded
Lateral veins	5-7 pairs	3-4 pairs	4-5 pairs
Glands in vein axils	absent	present	present
Indumentum on lower leaf	glabrous or whitish pubescent	glabrous	sparsely pubescent when young, becoming glabrous
Panicles	2-4 on young shoots, usually clustered	3-5 per shoot, not clustered	5-9, densely clustered on young shoots
Panicle branches	whitish tomentose	glabrous	brownish tomentose
Fruiting cupule length	13-18 mm	9-10 mm	8-10 mm
Fruiting cupule diameter	7-9 mm	6-8 mm	10-12 mm

Proteaceae

Heliciopsis terminalis (Kurz) Sleumer

Syn.: *Helicia terminalis* Kurz

BHUTAN: Sarbhang-Chirang road, 16 km above Sarbhang, 26°55'N 90°15'E, 1000 m, 31 v 1979, *Grierson & Long* 1532; 4 km below Sham Khara, N of Gaylephug, 27°01'N 90°34'E, 1450 m, 3 vi 1979, *Grierson & Long* 1581.

New to Himalaya; elsewhere known from Assam, Burma, China, Indochina and Thailand (Sleumer, 1955).

Loranthaceae

Viscum album L. subsp. *meridianum* (Danser) Long, stat. nov.

Basionym: *V. album* var. *meridianum* Danser, *Blumea* 4(2): 274 (1941).

Syn.: *V. costatum* Gamble, *Kew Bull.* 1913: 46 (1913).

This combination is required for the forthcoming volume of the *Flora of Bhutan*.

Urticaceae

Boehmeria macrophylla Hornem. var. *canescens* (Wedd.) Long, comb. nov.

Basionym: *B. platyphylla* D. Don var. *cuspidata* Wedd. subvar. *canescens* Wedd., *Monog. Urtic.* 365 (1856).

Syn.: *B. platyphylla* D. Don var. *canescens* (Wedd.) Wedd. in DC. *Prodr.* 16(1): 213 (1869).

B. macrophylla Hornem. var. *scabrella* (Roxb.) Long, comb. nov.

Basionym: *Urtica scabrella* Roxb., *Fl. Indica* 3: 581 (1832).

Syn.: *B. platyphylla* D. Don var. *scabrella* (Roxb.) Wedd., *Monog. Urtic.* 365 (1856).

B. macrophylla Hornem. var. **tomentosa** (Wedd.) Long, **comb. nov.**

Basionym: *B. tomentosa* Wedd., Ann. Sci. Nat. sér. 4, 1: 200 (1854).

Syn.: *B. platyphylla* D. Don var. *tomentosa* (Wedd.) Wedd., Monog. Urtic. 367 (1856).

B. penduliflora [Wedd. ex] Long, **nom. nov.**

Syn.: *B. macrophylla* D. Don, Prodr. Flor. Nepalensis: 60 (1825), *hom. illeg.* non Hornem., Hort. Reg. Bot. Hafniensis 2: 890 (1815). Lectotype: Nepal, Narainhetty, 5 ix 1802, *Buchanan* (BM).

B. penduliflora Wedd., Ann. Sci. Nat., sér. 4, 1: 199 (1854), *nom. nud.*

Urtica penduliflora Wall., Cat. 4595 (1831), *nom. nud.*

Study of the type of *Boehmeria macrophylla* Hornem. (C) by W. Marais and I. Friis (pers. comm.) shows that it is conspecific with and antedates *B. platyphylla* D. Don. The above combinations are therefore proposed for the varieties of this taxon present in Bhutan. The name *B. penduliflora* is proposed to replace *B. macrophylla* D. Don which is a later homonym of *B. macrophylla* Hornem.

Elatostema acuminatum (Poir.) Brongn.

BHUTAN: Forest slopes above Mongar, 27°16'N 91°17'E, 2300 m, on shady bank in moist *Quercus lamellosa* forest, 16 vi 1979, *Grierson & Long* 1997.

NEPAL: Bakkri Kharka, north of Pokhara, 1820 m, on shady banks, 25 iv 1954, *Stainton, Sykes & Williams* 5069 (BM).

New to Himalaya; widely distributed in SE Asia, in India reported from Ceylon, S India and Khasia Hills (Hooker, 1888).

E. caveanum Grierson & Long, **nom. et stat nov.** Fig. 4.

Syn.: *E. hookerianum* Wedd. var. ? *peduncularis* Hook. f., Flora Brit. India 5: 567 (1888).

BHUTAN: Loring Falls, 23 km above Sarbhang, 26°57'N 90°13'E, 1220 m, on wet rocks, 1 vi 1979, *Grierson & Long* 1569 (E, THIMPHU).

SIKKIM: regio subtrop., 4–6000 ft, *J. D. Hooker* s.n. (BM); without locality, 1200 m, 1878, *G. King* s.n. (BM); Sureil, 1800 m, 10 x 1912, *G. Cave* s.n. (E).

DARJEELING: Rishap, 1200 m, 21 viii 1869, *C. B. Clarke* 8774 (lectotype BM).

Similar to *E. hookerianum* Wedd. (Fig. 4) but differs in the following: less asymmetric, oblanceolate leaves 5–7(–9) × 1–2 cm, base cuneate on both sides, margins crenate in upper half, acumen subentire, linear cystoliths conspicuous all over upper surface, less strongly and more symmetrically 3-veined from the base; male flower heads borne on peduncles 5–10 mm long; female heads sessile.

The type in Hooker's herbarium at Kew was apparently destroyed while on loan to Breslau in the Second World War; a lectotype in BM has therefore been selected.

E. grandidentatum W. T. Wang

BHUTAN: Forest slopes above Mongar, 27°16'N 91°17'E, 2300 m, on wet rocks by waterfall in moist *Quercus lamellosa* forest, 16 vi 1979, *Grierson & Long* 1999; W side of Yuto La, E of Tongsa, 27°31'N 90°34'E, 3330 m, on wet rocks in ravine in *Abies/Tsuga* forest, 9 vii 1979, *Grierson & Long* 2618.

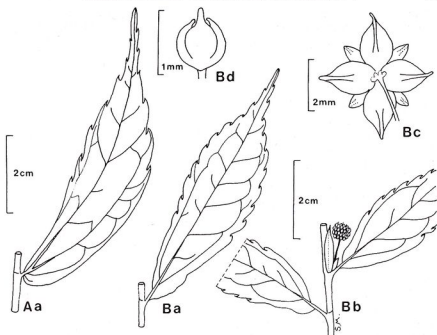


FIG. 4. A, *Elatostema hookerianum* Wedd.; B, *E. caveanum* Grierson & Long: a, leaf; b, portion of shoot with stipules and male inflorescence; c, bracts subtending flower cluster; d, male flower. Aa from *Cave* s.n.; Ba from *Clarke* 8774; Bb, c, d from *Cave* s.n.

New to Himalaya; previously known only from one locality in E Tibet (Wang & Chen, 1979). Although the type specimen has not been seen, the Bhutan plants agree well with the original description and illustration, and also with a photograph in E of a paratype (*Ying & Hong* 535). The Bhutan plants, however, have involucre bracts slightly larger than those described for *E. grandidentatum* but at present are best placed under that species. Although Wang compares *E. grandidentatum* with *E. sinense* Schröter it is quite distinct in lacking the reduced opposite leaves of the latter. In the E Himalaya *E. grandidentatum* is most closely allied to *E. sessile* Forst. from which it differs in its smaller more narrowly elliptic leaves with fewer but coarser serrations, much smaller stipules (4–5 mm long) and smaller flower heads with glabrous bracts.

***Elatostema* (subgenus *Pellionia*) *longicaudatum* Grierson & Long, sp. nov.** Fig. 5.

E. heterolobo (Wedd.) Hall. f. (*E. griffithiano* (Wedd.) Hall. f.) affinis sed glabra; caulis folia minuta foliis normalibus opposita gerens; bases foliorum cuneatae, marginibus in dimidio superio subtiliter serratis, venis basalibus longioribus; cymae subsessiles, binatae ad nodum; segmenta perianthii foeminei breviter rostrata, ea masculi erostrata. *E. heyneano* (Wedd.) Hall. f. et *E. latifolia* (Bl.) Schröter venatione similis sed foliis serrulatis glabris, stipulis deciduis, cymis subsessilibus differt.

Herba erecta, monoecia vel dioecia usque ad 1 m alta, glabra. Folia ut videtur alterna sed foliis minutis foliis normalibus oppositis. Folia normalia disticha, asymmetrica elliptica (9–)14–25 × (2.5–)4–8 cm, caudato-acuminata, acumine 2–5 cm remote serrulato, marginibus in dimidio inferiore integris, in

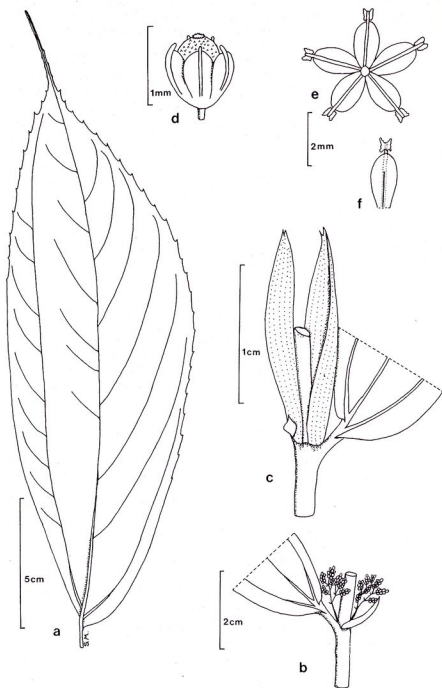


FIG. 5. *Elatostema longicaudatum* Grierson & Long: a, leaf; b, inflorescence; c, stipules and rudimentary leaf; d, female flower; e, male flower from above; f, perianth segment and stamen of male flower from below. All from Grierson & Long 2134.

dimidio superiore subtiliter serratis; venatio foliorum semipenninervis, basi inaequaliter trinervata, vena in angustiore latere fere ad apicem producta, in latere latiore venis lateralibus 7–9; cystolithi minuti, lineares, siccati albidii in pagina inferna solum manifesti; petioli 3–8 mm; stipulae membranaceae paribus oppositis ad nodum, oblongo-lanceolatae 13–16 × 2–4 mm, subcutae vel ad apicem emarginatae, una in axilla folii normalis gerens, alia oppositifolia sed folio rudimentali ovato, acuta vel apiculato 1–3.5 × 1 mm, prope basin ferens et cum stipula decidua. Flores in rhachidibus laxe dichotomis conferti; cymae subsessiles ad nodum binatim in axillis stipularum dispositae. Cymae masculae usque ad 3 cm diametro, bracteis elliptico-lanceolatis c. 2 mm longis ferentes; segmenta perianthii 5, obovata, obtusa, 2–2.5 × 1.5 mm, costa angusta, erostrata. Cymae foeminae 1.5–2.5 cm diametro, bracteis lanceolatis c. 1.5 mm ferentes; segmenta perianthii 5, elliptico-obovata, obtusa c. 1 × 0.7 mm, costa lata et prominenti in rostro obtuso brevi terminata; ovarium ellipsoideum compressum. Achenia late ellipsoidea c. 1 × 0.7 mm, minute exasperata, perianthio persistenti inclusa.

BHUTAN: Samdrup Jongkhar to Deothang road, 8 km above Samdrup Jongkhar, 26°49' N 91°28' E, shady bank by road in hot jungle, 550 m, 21 vi 1979, *Grierson & Long* 2134 (holotype E; iso. THIMPHU).

E. longicaudatum belongs to subgenus *Pellionia* of *Elatostema* (Schröter, 1935) and does not appear to be closely related to any other species in the Indian or Chinese regions. In leaf venation it resembles *E. heyneanum* (Wedd.) Hall. f. and *E. latifolium* (Bl.) Schröter but lacks the entire leaves and persistent stipules of those species. It can readily be distinguished from the only other Himalayan member of the subgenus, *E. heterolobum* (Wedd.) Hall. f. (*E. griffithianum* (Wedd.) Hall. f.), by its glabrous leaves with finely serrate margins, its very different venation and its almost sessile cymes.

E. papillosum Wedd.

BHUTAN: Shongar Chu valley below Zimgaon, W of Mongar, 27°16' N 91°05' E, 1300 m, in ravine in warm broad-leaved forest, 4 vii 1979, *Grierson & Long* 2459.

New to Himalaya; known elsewhere from Assam, Silhet, Chittagong (Hooker, 1888).

Pilea cavalieriei Léveillé

BHUTAN: Lingtsi [Lhuntsi], Kurted, 4500 ft, on exposed dry rock faces and gravel, 5 viii 1915, *R. E. Cooper* 4362 (E, BM); Tashigang, stream above town, 27°19' N 91°34' E, 1360 m, on shaded crumbling rocky bank above stream in arid valley, 18 vi 1979, *Grierson & Long* 2042.

New to Himalaya; previously known only from China (Yunnan, Hunan and Kweichow).

Juglandaceae

Engelhardia spicata Blume var. *integra* (Kurz) Grierson & Long, **comb. nov.**

Basionym: *E. villosa* Kurz var. *integra* Kurz, Forest Flora Brit. Burma 2: 492 (1877).

Syn.: *E. colebrookeana* Lindl. in Wallich, *Plantae Asiaticae Rariores* 3: 4(1831).
E. spicata var. *colebrookeana* (Lindl.) Koorders & Valetton, *Meded. Lands Plantentuin* 33: 169 (1900).

Jacobs (1960) and Manning (1966) treated *E. colebrookeana* Lindl. as a variety, but did not use the earliest name at that rank, var. *integra*, which must therefore replace it.

Fagaceae

***Lithocarpus listeri* (King) Grierson & Long, comb. nov.**

Basionym: *Quercus listeri* King, *Ann. Bot. Gard. Calcutta* 2: 89, t. 82 (1889).

Syntypes: Assam, Suddiya, *Griffith* K. D. 4464 (K), E.I.C. 1242 (K); Mishmee, *Griffith* K. D. 4472 (K); Makum forest, *Brandis* s.n. (n.v.); Dufra Hills, *Lister* 340 (n.v.); Upper Dehing forest, *Mann* s.n. (n.v.).

Syn.: *Quercus jenkinsii* Benth., *Hook. Ic. Pl.* 14: tt. 1312, 1313 (1880) p.p. excl. lectotype.

Q. sp., *Hook. f., Fl. Brit. Ind.* 5: 618 (1888).

BHUTAN: 2 km S of Shamgong, 27°14'N 90°39'E, 2000 m, at margin of warm mixed forest, 5 vi 1979, *Grierson & Long* 1642.

New to Bhutan; Hooker (1888) was the first to point out that *Quercus jenkinsii* Benth. was a mixture of three elements; the first of these [male plants, Assam, *Griffith* K. D. 4464, 4472] he retained in *Quercus*; the second [female plants, Burma, *Griffith* K. D. 4460, 4463] he tentatively placed under *Castanopsis*; the third [acorns only, Assam, *Jenkins* 122] he retained under *Quercus*. None of these was given a specific epithet by him but the three were merely included as imperfectly known species. King later (1889) described the first of these (the Assam element) as *Quercus listeri*, characterised by having female flowers 'in glomeruli of 3', while for the second (Burmese) element, which bore solitary female flowers, he retained the name *Quercus jenkinsii* in a restricted sense.

The Bhutanese plant agrees in all details with *Q. listeri* as described by King and bears both male panicles and young cupules, which are fused in groups of two or three and covered with numerous ovate, pubescent scales. Following the generic delimitation within Fagaceae of Hutchinson & Forman (1967), the plant clearly falls within the range of *Lithocarpus* on account of its having rigid, erect, male spikes bearing flowers with a rudimentary ovary and 10–12 stamens, each with a minute anther, and female inflorescences with scaly cupules, more or less fused and showing no vertical lines of division.

Pinaceae

***Picea brachytyla* (Franch.) Pritzl**

BHUTAN: Ohra, 2900–3350 m, 28 viii 1915, *Cooper* 4734 (E); W side of Ura La, SE of Byakar, 27°27'N 90°51'E, 3500 m, on moist slope in *Picea/Tsuga* forest, 13 vi 1979, *Grierson & Long* 1871; E side of Ura La, SE of Byakar, 27°27' N

90°52'E, 3400 m, margin of *Picea* forest, 13 vi 1979, *Grierson & Long* 1884; forest slopes E of Ura, 27°25'N 90°56'E, 3200 m, in mixed *Picea*, *Larix*, *Pinus wallichiana* and *Abies* forest, 13 vi 1979, *Grierson & Long* 1893; valley above Gyetsa, W of Bumtang, 27°31'N 90°37'E, 3040 m, on slope of river valley thinly forested with *Picea* and *Pinus wallichiana*, 9 vii 1979, *Grierson & Long* 2602.

New to Bhutan; in literature dealing with Coniferae of the East Himalaya only one spruce has hitherto been reported from Bhutan, *Picea spinulosa* (Griff.) Henry, a species based on material collected in Bhutan on the Rudo La by Griffith in 1838 (Griffith, 1848). Study of *Picea* specimens from Sikkim and Bhutan suggested that one collection (*Cooper* 4734) differed from the common E Himalayan plant in having more pointed cone scales with a blunt rather undulate tip. In 1979 it proved possible to collect specimens of both *Picea* taxa in the Ura and Bumtang districts of Bhutan. The two are clearly very closely allied, one entity having needles only weakly glaucous beneath, and rounded cone scales, the second (the plant collected by Cooper) foliage strongly glaucous-white beneath and cones with triangular tips on the scales. No type specimen of *P. spinulosa* has been located, but a vegetative specimen (*Ludlow & Sherriff* 18702, E) from the type locality and the two cones illustrated by Griffith (1847–54, t. 363) agree with the first of these entities. The second entity has been identified as *P. brachytyla*, closely resembling many specimens of that species from W China (e.g. *Forrest* 20103, 20131, 30909, all E). Several authorities, e.g. Stapf (1923), Orr (1933) and Dallimore & Jackson (1966) have emphasized the wide range and morphological diversity of this species. The Bhutan plants represent forma *rhombisquamea* Stapf. Elsewhere *P. brachytyla* is found in W China (Yunnan, Szechwan), N Burma and Assam (*Schmidt-Vogt*, 1977). *P. spinulosa* in Bhutan is likewise a variable species, especially in needle length which ranges between 1.2 and 2 cm, but never as long in the wild as the 2.5 cm quoted by Mitchell (1972).

Cycadaceae

Cycas pectinata Ham.

Syn.: *C. circinalis* L. var. *pectinata* (Ham.) Schuster, cf. Mabblerley (1977).

BHUTAN: E bank of Dangme Chu between Cha Zam and Duksum, N of Tashigang, 27°23'N 91°35'E, 1100 m, on steep rocky slope above river in arid valley, 29 vi 1979, *Grierson & Long* 2357; Shongar Chu near confluence with Kuru Chu, 27°14'N 91°09'E, 925 m, single plant on dry rocky hillside at foot of large cliff, 2 vii 1979, *Grierson & Long* 2405.

New to Bhutan; an interesting addition to the flora of Bhutan, but known from nearby Sikkim, central and eastern Nepal, the Khasia hills, Assam and Burma (Hooker, 1888; Shrestha, 1974). In Nepal Shrestha reported its habitat as sub-tropical forest, associated with *Shorea robusta* Gaertn., *Pandanus nepalensis* St John and *Lagerstroemia parviflora* Roxb. In Bhutan the habitat, although sub-tropical, was much more xerophytic, with associates including *Euphorbia royleana* Boiss., *Pinus roxburghii* Sarg., *Osyris lanceolata* Hochst. & Steud., *Trema politoria* Planch., and *Grewia sapida* DC.

OTHER PLANT RECORDS

Species known from Sikkim and Darjeeling

The Sikkim and Darjeeling hills have enjoyed a long history of intensive botanical exploration and study; many species discovered there have never been found in Bhutan (Hooker, 1872–1897; Cowan & Cowan, 1929). Many such species were collected for the first time in Bhutan in 1979; most are not particularly significant extensions of range and were expected to occur in Bhutan on the basis of their known geographical distribution. Others, although known from Sikkim and Darjeeling, are more restricted in range and therefore more noteworthy additions to the flora. The following is a selection of such species; numbers are those of Grierson and Long: *Actinodaphne obovata* Bl. (1526); *Aesculus assamica* Griff. (1534); *Alchornea mollis* (Benth.) Muell. Arg. (2435); *Capparis sikkimensis* Kurz (1684); *Casearia graveolens* Dalz. (2046, 2352); *Drypetes indicus* Pax & Hoffm. (1694); *Eriococcus hamiltonianus* (Muell. Arg.) Hurusawa & Tanaka (709); *Ficus hirta* Vahl (2156); *Firmiana colorata* (Roxb.) R.Br. (1329, 1343b); *Loranthus odoratus* Wall. (2289); *Marsdenia roylei* Wight (1644); *Meyna spinosa* Link (1415, 2098); *Persea clarkeana* (Hook. f.) Kostermans (2005, 2255); *Polyalthia simiarum* (Hook. f. & Thomson) Hook. f. & Thomson (1404, 1478); *Sarcochlamys pulcherrima* Gaud. (1427, 1525); *Saurauja griffithii* Dyer (1571); *Streblus asper* Lour. (801); and *Trewia nudiflora* L. (1370, 1477).

Tropical weed species widespread in India

The weed flora of Bhutan appears to have been largely neglected by previous collectors, especially in the southern subtropical zone. Mahapatra et al. (1965) recorded many species from Kalimpong, Darjeeling district, which are as yet unrecorded in Bhutan. The following are some such species discovered in S Bhutan in 1979: *Cassia alata* L. (811, 1481); *Croton bonplandianum* Baill. (2324); *Dentella repens* Forst. (734); *Eichhornia crassipes* (Mart.) Solms. (1435); *Euphorbia thymifolia* L. (702, 2080, 2111); *Glinus lotoides* L. (735); *Grangea maderaspatana* Poir. (723); *Heliotropium indicum* L. (1400); and *Polycarpon prostratum* (Forssk.) Aschers. & Schweinf. (720).

Temperate European weeds

In a few districts of central Bhutan, and notably in the Bumthang valley, experimental agricultural projects are in progress, as a result of which a number of European weeds appear to have been introduced within the last decade; these are as yet of very restricted distribution and include the following: *Agropyron caninum* (L.) P. Beauv. (1774); *Bromus mollis* L. (1773); *Lolium multiflorum* Lam. (1636, 1772); *Lolium perenne* L. (1771); *Lotus corniculatus* L. (1777); *Trifolium pratense* L. (1775); and *T. repens* L. (1094, 1776).

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