

A Collection of Hypnaceous Mosses from the East Himalaya and Yunnan, II

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Abstract Thirty four species of the family Hypnaceae are reported from the East Himalaya and Yunnan. Among them, *Gollania turgens* and *Macrothamnium leptohymenioides* are new additions to the moss flora of India. *Pseudotaxiphyllum pohliaecarpum* and *Rhytidiadelphus subpinnatus* are new to Nepal. *Gollania schensiana* and *Isopterygiopsis muelleriana* are new to West Bengal and Kashmir respectively.

Key words: bryophytes, mosses, Hypnaceae, Himalayas, Yunnan.

This is a report on the hypnaceous mosses collected mainly by D. G. Long in Nepal, India, Bhutan and China (Yunnan) in 1991–1993, following the report based on the collection in 1975–90 (cf. Higuchi & Long, 1996). A few collections made by R. J. D. McBeath in Himachal Pradesh, India, and C. Chadwell in Kashmir, India, are included. Among the collection, a new species, *Gollania longii* Higuchi, has been described (Higuchi 2001), and moreover we recognized 34 species of hypnaceous mosses. *Gollania turgens* and *Macrothamnium leptohymenioides* are new additions to the moss flora of India. *Pseudotaxiphyllum pohliaecarpum* and *Rhytidiadelphus subpinnatus* are new to Nepal. *Gollania schensiana* and *Isopterygiopsis muelleriana* are new to West Bengal and Kashmir respectively. All specimens cited here are deposited in the herbarium of Royal Botanic Garden, Edinburgh (E), and the duplicates in the herbarium of the National Science Museum, Tokyo (TNS).

Enumeration of species

1. *Campylophyllum halleri* (Hedw.) M. Fleisch., Nov. Guinea 12 Bot. 2: 123 (1914).
Nepal. Sankhuwasabha District, Nehe Khar-

ka, S side of Barun Khola, 3725 m, on rock face at steep calcareous gully under huge cliffs (Long 20786); upper Barun Khola valley, cliffs on S side of lower Barun Glacier opposite Mera, 4390 m, on boulder at foot of base-rich cliff (Long 20879); upper Barun Khola valley, N bank of Barun Khola at foot of lower Barun Glacier, 4390 m, on rock face at calcareous SW-facing cliffs (Long 20977).

India. Sikkim, West district, Samiti Lake (Bungmoteng Chho), foot of Onglakthang Glacier, 4240 m, on shady faces of boulders at grassy hillside with large calcareous schist boulders (Long 22788).

China. Yunnan Prov., Diqing Pref., Bai Ma Shan, mountains N of W pass, 4515 m, on cliff in shady recesses at vertical limestone cliffs (Long 24021); Bai Ma Shan, slopes below E pass, 4205 m, on trunk of *Rhododendron phaeochrysum* (Long 24173); Zhongdian County, forested ridge above Na Pa Hai (N of Zhongdian), 3905 m, on limestone boulders in steep mossy *Abies-Rhododendron* forest (Long 24240); Tian Shu Lake above Xiaozhongdian, 3825 m, on dead *Abies* trunk in dying *Abies-Rhododendron* forest by lake (Long 24301); valley below Tian Shu Lake above Xiaozhongdian, 3710 m, on limestone

boulders at rocky limestone valley with open *Abies-Rhododendron* forest (Long 24340); Ge Zao area (15 km N of Zhongdian), 3550 m, on damp limestone slab at small rocky limestone hill (Long 18692); Da Xue Shan, N of Geza, large valley 5 km W of pass, 4380 m, on boulders with limestone scree (Long 23843); Lijiang County, Mt. Yulong Shan, upper part of Gang Ho Ba Valley, 3370 m, on rock face at vertical limestone cliffs (Long 18840); Mt. Yulong Shan, head of valley above Baishui, 3210 m, on boulders by stream in steep limestone ravine (Long 18913); Mt. Yulong Shan, Xie Ren Ji Valley above Mu Shou Go Valley, 3550 m, on shady limestone blocks at steep limestone valley with scree under degraded *Abies* forest (Long 19105).

Distribution. Europe, Caucasus, Himalayas, China, Japan and N. America.

2. *Ectropothecium sikkimense* (Renauld & Cardot) Renauld & Cardot, Bull. Soc. R. Bot. Belg. 41(1): 109 (1905).

Nepal. Sankhuwasabha District, E side of Arun Valley, Chichila, 1890 m, on wet rocks by stream in mossy *Castanopsis* forest (Long 20425); forested slopes below Tashigaon, 1980 m, on boulder in damp mossy evergreen *Daphniphyllum*-dominated forest (Long 20523); forested slopes above Tashigaon, 2240 m, on rock slab in degraded evergreen *Quercus lamellosa* forest (Long 20539); Pemathang Kharka, S side of Barun Khola, 3390 m, on sandy ground amongst boulders at bouldery river bank (Long 20709); slopes between Hatiya and Arun River, 1580 m, on wet rock face at degraded scrubby hillside (Long 21193); S slopes of Pawa Khola, W of Panch Pokhari Khola, 1890 m, on boulder at degraded hillside (Long 21264).

India. Sikkim, South District, 10 km S of Rabangla, 1615 m, on rock face by road in degraded warm broad-leaved forest (Long 22957); Rathong Chhu Valley of Yoksam, between Yoksam and Paha Khola, 1890 m, on wet rocks in *Castanopsis* forest (Long 22428).

Distribution. India (Mussoorie, W. Bengal, Sikkim), Nepal and Bhutan.

3. *Gollania cylindricarpa* (Mitt.) Broth. in Engler & Prantl, Nat. Pfl. 1(3): 1055 (1908).

Nepal. Sankhuwasabha District, Nehe Kharaka, S side of Barun Khola, 3735 m, on damp grassy ledge on rock slabs at steep eroding calcareous slopes of gully (Long 20772).

Distribution. Nepal, Bhutan, China (Yunnan) and Taiwan.

This species is similar to *G. schensiana* and *G. turgens* with its well recurved lower leaf margins, but is distinguished from the two by having straight stem leaves and long-decurrent leaf bases.

4. *Gollania japonica* (Cardot) Ando & Higuchi, Hikobia Suppl. 1: 192 (1981).

China. Yunnan Prov., Diqing Pref., between Deqin and Xiang Yang Po, 18 km S of Deqin, 3185 m, on large mossy boulder by stream at valley with mixed conifer/broad-leaved forest (Long 24157).

Distribution. Nepal, China (Yunnan, Sichuan), Taiwan and Japan.

This species resembles *G. varians* in its blunt apices and short laminal cells of stem leaves, but is easily separated from *G. varians* by its subjulaceous leafy stems, smooth laminal cells and shorter costae.

5. *Gollania neckerella* (Müll.Hal.) Broth. in Engl. & Prantl, Nat. Pfl. 1(3): 1055, f. 755 (1908).

China. Yunnan Prov., Kunming Pref., Xishan (Western Hills) Forest Park, SW of Kunming, 2220 m, on dry rocks in dry mixed forest on steep limestone slope (Long 23518).

Distribution. China (Yunnan, Sichuan, Shaanxi, Hubei) and Japan.

This rare species has been recorded in limestone areas of cool-temperate deciduous broad-leaved forests in China and Japan (Higuchi 1985).

6. *Gollania revoluta* Higuchi, Bull. Natn. Sci. Mus., Tokyo, Ser. B, 22(1): 16 (1996).

China. Yunnan Prov., Diqing Pref., Chung

Jiang He Valley, below Zhongdian plateau, 3240 m, on bank of gully at steep valley with *Abies*-bamboo forest (Long 24456).

Distribution. China (Yunnan).

This species is distinguished from the other species of the genus by having leaves long-decurrent, leaf margins recurved throughout (except for the apical part) and costae distinct, 1/2–3/5 the leaf length. This is the third locality for this species (Higuchi & Long 1996).

7. *Gollania ruginosa* (Mitt.) Broth. in Engl. & Prantl, Nat. Pfl. 1(3): 1055 (1908).

China. Yunnan Prov., Chuxiong Pref., 10 km W of Yipingland, 1775 m, on shady boulder under trees at dry valley with secondary forest, *Catalpa*, etc. (Long 23569).

Distribution. N. W. India, Bhutan, China (Yunnan, Zhejiang, Shaanxi, Jilin, Heilongjiang), Korea, Russia Far East, Taiwan and Japan.

8. *Gollania schensiana* Higuchi, J. Hattori Bot. Lab. 59: 29 (1985).

Nepal. Rasuwa District, N bank of Langtang Khola, Ghora Tabela, 2990 m, at edge of flush at damp grassy slope (Long 22071).

India. West Bengal, Darjeeling District, between Ghoom and Tiger Hill, 2465 m, on shady mossy wall at slopes with *Cryptomeria* and degraded oak scrub (Long 22370).

Distribution. N. W. India, Nepal, Bhutan and China (Sichuan, Shaanxi). New to West Bengal, India.

This species resembles *G. longii* in plant size and leaf shape (Higuchi 2001), but differs from *G. longii* by having subjulaceous leafy stems, entire leaf margins, thin-walled median laminal cells and short double costae.

9. *Gollania turgens* (Müll.Hal.) Ando, Bot. Mag. Tokyo 79: 769 (1966).

Nepal. Sankhuwasabha District, upper Barun Khola Valley, N bank of Barun Khola at foot of lower Barun Glacier, 4390 m, on boulder below calcareous SW-facing cliffs (Long 20973).

India. Sikkim, West District, Samiti Lake

(Bungmoteng Chho), foot of Onglakthang Glacier, 4240 m, amongst boulders at grassy hillside with large calcareous schist boulders (Long 22786).

China. Yunnan Prov., Diqing Pref., N slope of Xiao Xue Shan, N of Geza, 3845 m, on litter on steep bank in *Abies-Rhododendron* forest (Long 23771); between Deqin and Xiang Yang Po, 3245 m, on shady log at valley with mixed conifer/broad-leaved forest (Long 24168); Zhongdian County, forested ridge above Na Pa Hai, N of Zhongdian, 3780 m, on cliff ledges in steep limestone ravine in *Abies-Rhododendron* forest (Long 24265); forested ridge, Sang Shang Ya, E of Xiaozhongdian, 3470 m, on mossy tree trunk in limestone ravine in mixed forest with *Abies* (Long 24413).

Distribution. Nepal, China (Yunnan, Sichuan, Gansu, Shaanxi), Russia Far East, Japan, Alaska and W. Canada. New to India (Sikkim).

This species is distributed from Himalayas through East Asia to northern North America, showing an Amphi-Beringian distribution pattern (cf. Higuchi 1985, 1991).

10. *Homomallium simlaense* (Mitt.) Broth. in Engl. & Prantl, Nat. Pfl. 1(3): 1027 (1908).

China. Yunnan Prov., Diqing Pref., Bai Ma Shan, valley N of plateau between mid and W passes, 4195 m, on boulder under shrubs by stream at limestone gorge (Long 24121).

Distribution. Pakistan, N. W. India and China (Yunnan).

This species is distinguished from other members of the genus by large size of plants, ovate-lanceolate leaves and longer laminal cells (40–60 μm). This is the second record of the species in Yunnan, China (cf. Higuchi & Suga 1991).

11. *Hondaella caperata* (Mitt.) Ando, B.C.Tan & Z.Iwats., J. Hattori Bot. Lab. 74: 357 (1993).

Nepal. Kathmandu District, Gokarna forest, Kathmandu Valley, 1350 m, on tree trunk in mixed deciduous forest (Long 22288).

Distribution. N. W. India, Nepal, Thailand,

Laos and Myanmar.

Stereodon caperatus was described from Kumaon, N. W. India, by Mitten in 1859. In 1969 it was treated as a variety of *Hondaella brachytheciella*, known from Japan, as *H. brachytheciella* (Broth. & Paris) Ando var. *caperata* (Mitt.) Mizush. & Ando (cf. Ando 1969). Later, a new combination, *Hondaella caperata* (Mitt.) Ando, B.C.Tan & Z.Iwats., was proposed (Tan & Iwatsuki 1993). Higuchi & Takaki (1988) have reported this species from Kathmandu Valley, Nepal.

12. *Hypnum cupressiforme* Hedw., Spec. Musc. 291 (1801).

China. Yunnan Prov., Diqing Pref., Bai Ma Shan, mountains N of W pass, 4530 m, amongst limestone blocks at foot of vertical limestone cliffs (Long 24018).

Distribution. Cosmopolitan.

13. *Hypnum hamulosum* Schimp. in B.S.G., Bryol. Eur. 6: 96 (1854).

Nepal. Sankhuwasabha District, upper Barun Khola Valley, tributary valley below Peak 3, above Mera, 4530 m, in scree below cliffs at open rocky valley (Long 20873); Makalu Base Camp, 4710 m, under large boulder at open rocky hillside (Long 20953); mountain ridge N of Barun Khola, opposite Shipton La, 4260 m, on grassy slope at exposed rocky ridge (Long 21097).

India. Sikkim, West District, foot of E Rathong Glacier above Chaunrikhiang, 4575 m, at base of boulders at moraine slopes (Long 22595); tributary of Prek Chhu opposite Lambi, N of Thangshing, 4080 m, on stony bank at bouldery gully (Long 22740); ridge S of Gocha La, 4830 m, on sandy bank at crest of stable moraine ridge (Long 22822).

China. Yunnan Prov., Diqing Pref., Da Xue Shan, N of Geza, large valley 5 km W of pass, 4380 m, under dwarf *Rhododendron* at limestone scree (Long 23844); between Deqin and Xiang Yang Po, 18 km S of Deqin, 3230 m, on stone on bank at valley with mixed conifer/broad-leaved forest (Long 24164).

Distribution. Widely distributed in arctic-alpine areas of the Northern Hemisphere.

14. *Hypnum lindbergii* Mitt., J. Bot. 2: 123 (1864).

Nepal. Sankhuwasabha District, upper Barun Khola Valley, cliffs on S side of lower Barun Glacier opposite Mera, 4390 m, on boulder at foot of gully below base-rich cliffs (Long 20880).

China. Yunnan Prov., Diqing Pref., Chung Jiang He Valley, N of Yangtze River, 2975 m, on silty base of *Hippophae* by river (Long 24480); Weixi County, W side of Litiping Plateau, 3220 m, on turfey bank by stream at open valley (Long 24544).

Distribution. Widely distributed in temperate to arctic areas of the Northern Hemisphere and disjunctively in S. America (Brasil).

15. *Hypnum macrogynum* Besch., Ann. Sc. Nat. Bot. sér. 7, 15: 91 (1892).

Nepal. Rasuwa District, slopes of Trisuli Khola below Dhunche, 1980 m, on rocky bank at terraced cultivated hillside (Long 22005); Terathum District, between Gupha Pokhari and Sikdim, 2890 m, on open grassy bank (Long 21585); Sankhuwasabha District, E side of Arun Valley, ridge between Bhotabas and Chichila, 1945 m, on boulder by path in shady mossy evergreen oak (*Castanopsis*) forest (Long 20398); Pemathang Kharka, S side of Barun Khola, 3400 m, amongst boulders on river bank at forested river valley (Long 20705); upper Barun Khola Valley, Shershon below Makalu Base Camp, 4550 m, amongst boulders on bank at open dry rocky valley (Long 20940); upper Barun Khola Valley, N bank of Barun Khola at foot of lower Barun Glacier, 4390 m, in mossy cleft between huge calcareous boulders on river bank (Long 21005).

China. Yunnan Prov., Chuxiong Pref., Xiaohewan, SE of Yipinglang, 1890 m, on side of ditch at open cultivated slopes with scattered *Calocedrus* (Long 23560); Diqing Pref., Bai Ma Shan, by logging road on N-facing slopes below W pass, 3820 m, on log at gully in degraded *Abies-Betula* forest (Long 24102); above Jiulong,

70 km SE of Zhongdian, 3265 m, on mossy bank at valley with mixed *Tsuga*-, *Abies-Quercus* forest (Long 24373).

Distribution. East and South Africa, Madagascar, Mascarene Is., Nepal, India (Sikkim, Assam), Bhutan, Burma, Malaysia, China (Xizang, Yunnan, Sichuan) and Taiwan.

16. *Hypnum pallescens* (Hedw.) P.Beauv., Prodr. 67 (1805).

Nepal. Sankhuwasabha District, Repu Kharka, Barun Khola Valley, N bank, 3860 m, on stems of *Rhododendron* in *Abies-Rhododendron* forest (Long 21025).

Distribution. Europe, Caucasus, Pakistan, Kashmir, Nepal, China, Korea, Siberia, Taiwan, Japan and N. America.

In Nepal this species has been only reported from the Annapurna Himal area (Ando & Noguchi 1979).

17. *Hypnum revolutum* (Mitt.) Lindb., Oefv. K. Vet. Ak. Foerh. 23: 542 (1867).

India. Himachal Pradesh, Miha Nulla, Lahul, (McBeath 84-3); Gangpu Valley, 3900 m, at base of rock (McBeath 2362); Sikkim, West District, Choktsering Chhu, between Bikbari and Chaunrikhiang, 3990 m, on soil under boulder at bouldery river bank (Long 22587); tributary of Prek Chhu opposite Lambi, N of Thangshing, 4055 m, on bank in bouldery gully (Long 22727).

Distribution. Europe, Caucasus, Turkey, Pakistan, Himalayas, China, Siberia, N. America, Greenland, Iceland and Antarctic Peninsula.

18. *Isopterygiopsis muelleriana* (Schimp.) Z. Iwats., J. Hattori Bot. Lab. 33: 379 (1970).

India. Kashmir, between Gongosa and Naramag, 3330 m alt., on rotting tree-stump (Chadwell B93); Sikkim, West District, tributary of Prek Chhu opposite Lambi, N of Thangshing, 4065 m, on shady banks amongst boulders at bouldery gully (Long 22735); on deep shady calcareous rock crevice in steep rocky ravine (Long 22759).

Distribution. Europe, Pakistan, E. Himalaya, China, Russia Far East, Japan and N. America. New to Kashmir.

This species is characterized by its large, thin walled cortical cells of stem, lacking of pseudoparaphyllia, papillose rhizoids emerging from leaf-axils, and is distinguished from *I. pulchella* by having complanate leafy stems, ovate leaves and distinctly differentiated cortical cells of stem.

19. *Isopterygiopsis pulchella* (Hedw.) Z.Iwats., J. Hattori Bot. Lab. 63: 450 (1987).

Nepal. Sankhuwasabha District, upper valley of tributary N of Barun Khola, NE of Pemathang Kharka, 4170 m, on mossy rocks under large boulder at open rocky alpine valley (Long 21076); W bank of upper Saldim Khola, near ridge, NW of Hatiya, 2920 m, on shady tree trunk in mossy *Tsuga* forest (Long 21151); Taplejung District, forested ridge at Manebhanjang, N end of Milke Danda ridge, 3425 m, on dead trunk of *Rhododendron* in mossy *Rhododendron* forest (Long 21491).

India. Sikkim, West District, tributary of Prek Chhu opposite Lambi, N of Thangshing, 4065 m, on crumbling soil amongst boulders at bouldery gully (Long 22728); Samiti Lake (Bungmoteng Chho), foot of Onglakthang Glacier, 4260 m, on turf overhang by lake at grassy hillside with calcareous schist boulders (Long 22841); between Mon Lapcha and Phedang, S of Dzongri, 3770 m, on stump in *Abies densa-Rhododendron* forest (Long 22896).

China. Yunnan Prov., Diqing Pref., N slope of Xiao Xue Shan, N of Geza, 3845 m, in mossy cleft on rock face in *Abies-Rhododendron* forest (Long 23767); Deqin County, side valley between Deqin and Mekong River, 3370 m, on rotten log in *Abies-Rhododendron* forest (Long 23966).

Distribution. Europe, Africa, C. & N. Asia, Pakistan, Himalayas, Japan, N. America and New Zealand.

20. *Leptocradiella psilura* (Mitt.) M.Fleisch., Musci Fl. Buitenzorg 4: 1205 (1923).

China. Yunnan Prov., Zhongdian District, Na Pa Hai forest, 3550 m, on log in shady *Picea*-, *Acer*-bamboo forest (Long 18645).

Distribution. W. Himalaya, Nepal, Bhutan, Thailand and China (Yunnan).

21. *Macrothamnium leptohymenioides* Nog., Kumamoto J. Sc. Biol. 11: 6 (1972).

Nepal. Sankhuwasabha District, tributary valley on N side of Barun Khola NE of Pemathang Kharka, 3400 m, on tree trunk in steep *Abies-Rhododendron* forest (Long 21034).

India. Sikkim, West District, between Mon Lapcha and Phedang, S of Dzongri, 3795 m, on trunk of *Sorbus* in *Rhododendron* forest (Long 22893).

Distribution. Nepal. New to India (Sikkim).

This species is characterized by erect, symmetrical capsules and endostome without cilia, and it has been only known from three localities in Nepal (cf. Higuchi & Long 1996).

22. *Macrothamnium macrocarpum* (Reinw. & Hornsch.) M.Fleisch., Hedwigia 44: 308 (1905).

Nepal. Sankhuwasabha District, between Shidua and Tashigaon, 1795 m, on boulder in fragment of mossy *Castanopsis* forest (Long 20495); slopes between Hatiya and Arun River, 1580 m, on wet rock face at degraded scrubby hillside (Long 21194); N slope of lower Pawa Khola, above Karmanam, 1500 m, on shady rocks at dry degraded valley slopes (Long 21259).

India. Sikkim, West District, Dzongri, 3965 m, at margin of flush at small marshy valley (Long 22629).

Bhutan. E bank of Thimphu Chu 10 km N of Thimphu Dzong, 2600 m, on humus at tree base (Grierson & Long 638); Sarbhang District, Chirang road between Noonpani and Tori Bari, 18 km post, 1020 m, on rocky bank in warm broad-leaved forest (Long 10565).

Distribution. Nepal, India, Bhutan, Sri Lanka, Thailand, China (Yunnan), Java, Philippines, Taiwan and Japan.

23. *Macrothamnium submacrocarpum* (Reinwald & Cardot) M.Fleisch., Hedwigia 44: 308 (1905).

Nepal. Rasuwa District, N bank of Langtang Khola between Ghora Tabela and Lama Hotel, 2750 m, on top of large mossy boulder in *Quercus semecarpifolia* forest (Long 22100).

Distribution. W. Himalaya, Nepal, India, Bhutan, Myanmar, Thailand and Taiwan.

24. *Orontobryum hookeri* (Mitt.) M.Fleisch. in Broth. in Engl. & Prantl, Nat. Pfl. ed. 2, 11: 261 (1925).

Nepal. Taplejung District, Milke Danda ridge between Manebhanjang and Suke Pokhari, 3405 m, on mossy boulder top in *Abies-Rhododendron* forest (Long 21506); between Sing Gompa and Laurebina village, 3550 m, on branch of *Juniperus* at *Juniperus recurva* woodland (Long 22183).

India. Sikkim, West District, Jamlinghang, Chhuring Chhu valley below Dzongri, 3710 m, on twigs of *Rhododendron lepidotum* at steep rocky side-valley (Long 22521); above Prek Chhu bridge N of Dzongri, 3720 m, on twigs of *Sorbus* in *Abies densa-Rhododendron* forest on river bank (Long 22873); between Mon Lapcha and Phedang, S of Dzongri, 3740 m, on trunk of *Sorbus* in *Abies densa-Rhododendron* forest (Long 22897).

Distribution. Nepal, India (Sikkim) and Bhutan.

Orontobryum is monotypic and endemic to the Himalayas. The familial position of the genus has been not stable. Ando (1979) stated that this genus is not ascribable to any of the families Hookeriaceae, Pilotrichaceae and Entodontaceae, and should be placed between the Hypnaceae (s. lato) and the Hylocomiaceae (s. stricto). *Orontobryum* is connected with *Hylocomium* by the presence of paraphyllia, but in *Orontobryum*, the paraphyllia are usually not branched and not so many on the stem. Although further study is needed, it is included here in the Hypnaceae.

25. *Platygyriella aurea* (Schwaegr.) W.R.Buck, Brittonia 36: 86 (1984).

Nepal. Between Yamphudin and Mamamkhe, 1830 m, on *Ficus* roots on rock face at open hillside (Long 17432); Rasuwa District, between Bharkhu and Syabru, 1940 m, on *Lyonia ovalifolia* by stream in *Pinus wallichiana*-*Rhododendron arboreum* forest (Long 22014).

Distribution. Nepal, India (Sikkim, Khasia) and Bhutan.

26. *Platygyrium repens* (Brid.) Bruch & Schimp. in B.S.G., Bryol. Eur. 5: 98, f. 458 (1851).

China. Yunnan Prov., Diqing Pref., top of Chung Jiang He valley, N of Yangtse Valley, 3290 m, on stump in partly cleared *Quercus-Rhododendron* forest (Long 23619).

Distribution. Widely distributed in temperate to arctic areas of the Northern Hemisphere.

Plants in the specimen (Long 23619) have branchlets at leaf-axils near tip of branches, but their reddish-brown color of plants is unusual for this species.

27. *Pseudotaxiphyllum pohliaecarpum* (Sull. & Lesq.) Z.Iwats., J. Hattori Bot. Lab. 63: 449 (1987).

Nepal. Sankhuwasabha District, E side of Arun Valley, forested ridge SW of Bhotabas, 2000 m, on steep bank in steep mossy *Castanopsis* forest (Long 20375); Terathum District, forested slope above Chauki, N side of Tinjure Danda, 2690 m, on shady rock face in ravine in partly cleared *Rhododendron arboretum-Quercus semecarpifolia* forest (Long 21614).

Distribution. S. E. Asia, China and Japan. New to Nepal.

This species has been known from tropical and subtropical regions in Asia (Iwatsuki 2001). As far as we know, it has never been recorded in Nepal.

28. *Ptilium crista-castrensis* (Hedw.) De Not., Cronac. Briol. Ital. 2: 17 (1867).

Nepal. Sankhuwasabha District, near Kauma,

S of Shipton La, 3570 m, on grassy bank in clearing in mossy *Rhododendron* forest (Long 20628); Pemathang Kharka, S side of Barun Khola, 3420 m, on bank in steep ravine in *Betula-Rhododendron* forest (Long 20731); between Sing Gompa and Laurebina village, 3840 m, under dwarf *Rhododendrons* at steep rocky hillside (Long 22196).

India. Sikkim, West District, Jamlinghang, Chhurong Chhu valley below Dzongri, 3660 m, amongst large mossy boulders in *Abies densa-Rhododendron* forest (Long 22504); between Dzongri and Prek Chhu, 4075 m, under *Rhododendron lepidotum* at open hillside with dwarf *Rhododendron* (Long 22649); E slopes of Prek Chhu valley, W-facing cliffs NE of Thangshing, 4425 m, in wet mossy block scree at mossy boulder scree below cliffs (Long 22865).

China. Yunnan Prov., Diqing Pref., N slopes near pass, Da Xue Shan, N of Geza, 4350 m, on litter at N-facing slope with *Abies-Rhododendron* forest (Long 23734); Bai Ma Shan, mountains S of W pass, 4295 m, amongst dwarf *Rhododendron* at boggy moorland slopes (Long 24048); Zhongdian County, forested ridge above Na Pa Hai, N of Zhongdian, 3920 m, in litter in steep mossy *Abies-Rhododendron* forest (Long 24247); above Jiulong, 70 km SE of Zhongdian, 3265 m, on mossy bank at valley with mixed *Tsuga-Abies-Quercus* forest (Long 24361).

Distribution. Europe, Caucasus, Nepal, India (Sikkim), Bhutan, Burma, China, Taiwan, Japan, Korea, Siberia, N. America and Greenland.

29. *Pylaisia brotheri* Besch., Ann. Sc. Nat. Bot. sér. 7, 17: 369 (1893).

China. Yunnan Prov., Diqing Pref., Chung Jiang He valley, N of Yangtse Valley, 2510 m, on tree trunk in degraded warm broad-leaved forest (Long 23613); Weixi County, by Chan Chung River near Weixi, 2265 m, on old *Salix* on roadside (Long 24517).

Distribution. China, Korea, Siberia and Japan.

30. *Pylaisia extenta* (Mitt.) A.Jaeger, Ber. S. Gall. Naturw. Ges. 1876–77: 306 (1878).

China. Yunnan Prov., Diqing Pref., Bai Ma Shan, by logging road on N-facing slopes below W pass, 3820 m, on log across stream at gully in degraded *Abies-Betula* forest (Long 24106).

Distribution. Nepal and China (Yunnan, Sichuan).

31. *Pylaisia falcata* Schimp. in B.S.G., Bryol. Eur. 5: 89 (1851).

Bhutan. Thimphu Chu, Taba, Thimphu; scrub on river bank, 2300 m, on stem of *Berberis* (Long 7880).

China. Yunnan Prov., Diqing Pref., top of Chung Jiang He valley, N of Yangtse Valley, 3290 m, on *Quercus* trunk in partly cleared *Quercus-Rhododendron* forest (Long 23618); Xia Geza, by Liutung He River, 3095 m, on base of *Malus* in woodland on river bank (Long 23695); between Wong Shui and Da Xue Shan, N of Geza, 3575 m, on dead branch amongst shrubs at steep valley with mixed forest (Long 23720); side valley between Deqin and Mekong River, 3240 m, on *Quercus* sapling in mixed *Quercus* woodland (Long 23947); Zhongdian County, between Zhongdian and Xiaozhongdian, 3330 m, on trunk of *Prinsepia* at swampy valley floor with scrub (Long 23624); Sitone tributary valley NE of Xiaozhongdian, 3355 m, on *Prunus* in mixed woodland in ravine below waterfalls (Long 23652); forested ridge above Na Pa Hai, N of Zhongdian, 3920 m, on trunk of *Sorbus* in steep mossy *Abies-Rhododendron* forest (Long 24248); 3880 m alt., on *Lonicera* in logged *Abies* forest (Long 24390); Tian Shu Lake above Xiaozhongdian, 3825 m, on dead tree trunk in dying *Abies-Rhododendron* forest by lake (Long 24309); valley below Tian Shu Lake above Xiaozhongdian, 3720 m, on *Salix* at rocky limestone valley with open *Abies-Rhododendron* forest (Long 24336); forested ridge, Sang Shang Ya, E of Xiaozhongdian, on *Salix* at valley with dense *Abies* forest (Long 24433).

Distribution. Nepal, Bhutan, Assam, China (Xizang, Yunnan, Sichuan), Mexico, Guatemala,

Colombia, Ecuador, Bolivia, Costa Rica and Venezuela.

32. *Pylaisia polyantha* (Schreb.) Schimp. in B.S.G., Bryol. Eur. 5: 88 (1851).

China. Yunnan Prov., Diqing Pref., Diqin County, W side of Deqin valley, 3450 m, on *Osteomeles* in evergreen oak scrub on rocky hillside (Long 23919).

Distribution. Europe, Caucasus, N. Asia, N. W. India, China, Japan and N. America.

33. *Rhytidiadelphus subpinnatus* (Lindb.) T.J. Kop., Hikobia 6: 19 (1972).

Nepal. Sankhuwasabha District, Pemathang Kharka, S side of Barun Khola, 3500 m, on bank under cliff in ravine in dense *Rhododendron*-, *Betula-Abies* forest (Long 20766).

Distribution. Europe, China, Korea, Japan and N. America. New to Nepal.

This species is closely allied to *R. squarrosus* (Hedw.) Warnst. According to Koponen (1971), it is distinguished from *R. squarrosus* by its pinnate branching (irregularly pinnate in *R. squarrosus*), less pronounced stem-apex, lowest branch leaves clearly differentiated from stem leaves and woodland plants (restricted to habitats in which human activities are carried out in *R. squarrosus*). As far as we know, this species has never been recorded in Nepal.

34. *Taxiphyllum taxirameum* (Mitt.) M. Fleisch., Musci Fl. Buitenz. 14: 1435 (1923).

India. Himachal Pradesh, mountain ridge N of Mandi, 2000–3000 m, in *Quercus*-, *Rhododendron*-, *Pinus wallichiana-Cedrus* forest (McBeath 85–1).

China. Yunnan Prov., Chuxiong Pref., 10 km W of Yipinglang, 1775 m, on base of *Catalpa* at dry valley with secondary forest (Long 23564); Kunming Pref., Lunan County, Stone Forest near Shilin, SE of Kunming, 1760 m, on shady earth bank in limestone karst area (Long 24598).

Distribution. Widely distributed in Southeast Asia, east to Japan, west to Pakistan, north to Russia Far East and N. & S. America.

Acknowledgements

This study was partly supported by a Grant-in-Aid (no. 13640707) from the Ministry of Education, Science, Sports and Culture, Japan.

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