

A CONTRIBUTION TO THE MOSSFLORA OF WESTERN HIMALAYA-II

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ABSTRACT

55 species of mosses collected from Western Himalaya are enumerated, with notes on distribution etc. This includes one new species *Campylium gollanii* C. Muell. ex Vohra, which is described and illustrated, one new record for India, namely *Polytrichum juniperinum* Willd. ex Hedw. ssp. *strictum* (Brid.) Nyl. et Sael, and 9 species new to Western Himalaya.

INTRODUCTION

During 1968-1970, collections of mosses were received by me, from time to time, from Northern Circle of Botanical Survey of India, for determination and incorporation in the cryptogamic herbarium. These have since been determined. Among them were found 55 species, which have not been included in my earlier communication and under the same title (Vohra, 1969). These have been enumerated in the present paper, with data on distribution and notes where necessary.

Most of them have been collected from Tehri Garhwal, Mussoorie and Dehra Dun. A few from Nepal and Varanasi have also been added.

Among the interesting species included, is 1 new species *Campylium gollanii* C. Muell. ex Vohra, which is fully described and illustrated, one new record for India, namely *Polytrichum juniperinum* Willd. ex Hedw. ssp. *strictum* (Brid.) Nyl. et Sael, and 9 new records for Western Himalaya viz. *Campylopus ericoides* (Griff.) Jaeg., *Dicranum gymnostomum* Mitt., *Oxystegus stenophyllus* (Mitt.) Gangulee, *Hydrogonium consanguineum* (Thwait et Mitt.) Hilp., *Rhodobryum giganteum* (Schwaegr.) Par., *Fleischerobryum longicolle* (Hamp.) Loesk., *Macromitrium sulcatum* (Hook.) Brid., *Thuidium meyenianum* (Hamp.) Doz. et Molk. and *Stereophyllum indicum* (Bel.) Mitt.

The sequence of families and genera is after Brotherus (1924-1925). Nomenclature has been made upto date in accordance with Index Muscorum (Wijk, Margadant and Florschütz, 1959-1969).

ENUMERATION

FISSIDENTACEAE

Fissidens nobilis Griff.

KUMAON: Shandev, 1800 m, G. M. Arora 755, Aug. 1968.

Distribution: Nepal, Sikkim, Darjeeling, Abor, Khasia, Burma, Ceylon, Thai, Indonesia, Yunnan, Hongkong, Philippines.

F. sylvaticus Griff.

DEHRA DUN: Mohand, 600 m, on ground, C. I. Malhotra 504, 26 June, 1968.

Distribution: Mussoorie, Kumaon, Sikkim, Khasia, South India, Western Ghats, Ceylon, Burma, Indonesia, Siam, Tonkin, Philippines, Hongkong.

DICRANACEAE

Campylopus ericoides (Griff.) Jaeg.

GARHWAL: Mandakini Valley, 2500 m, M. A. Rau 601, Aug. 1968.

Distribution: Nepal, Bengal Himalaya, Khasia Hills, Manipur, Ceylon, Java, Philippines.

This is the first record from Western Himalaya. The plants are somewhat darker in colour and smaller in size—upto $\frac{1}{2}$ cm tall, but otherwise agree with Eastern Himalayan collections.

Dicranum gymnostomum Mitt.

GARHWAL: Mandakini Valley, 2500 m, M. A. Rau 577, Aug., 1968.

Distribution: Eastern Nepal, Sikkim, Yunnan. New to Western Himalaya.

The collection consists of a few 'sterile' plants, but they compare well with Mitten's description and the illustration given by Takaki (1966).

Mitrobryum koelzii Robins.

GARHWAL: Mandakini Valley, 2500 m, M. A. Rau 613, Aug. 1968.

Distribution: Tehri Garhwal.

This genus was described by Robinson (1968) from a specimen collected by Koelz from Tehri. It is distinct from other genera of Dicranaceae in calyptra having clusters of erect hairs arising from its outer surface, and not from its margin and 16 undivided papillose peristome teeth. The present specimen which was found in fruiting condition in association

with *Campylopus* sp., and *Grimmia* sp., completely agrees with Robinson's drawings and description.

POTTIACEAE

***Barbula asperifolia* Mitt.**

HIMACHAL PRADESH: Narkanda, Hatu Peak, 3000 m, on stones and rocks, *Vohra* 522, 525, 526, 15 Oct., 1960. TEHRI GARHWAL: Hanuman-Chetty, 1750 m, on slopes in open, *C. M. Arora* 29, 28 April, 1968, in association with *Pogonatum aloides*.

Distribution: Kashmir, Sikkim, Alatau, Alps, Mountains of Central Africa, Arctic part of North America, Greenland, Siberia.

This species was described by Mitten (1859) from Sikkim, based on the material collected by J. D. Hooker. Since then the only other report from India, has been by *Vohra* (1966) from Kashmir. Its occurrence in Narkanda (Himachal Pradesh) and Garhwal, indicates its wider distribution in Western Himalaya. At Narkanda, the reddish-looking plants, form large patches on rocks and boulders at Hatu Peak, in exposed places, in association with *Bryum* sp., and *Pseudoleskea* sp. None of the specimens, however, were bearing any fruits.

***Gymnostomum aeruginosum* Sm.**

KASHMIR: Sedau-Kungwattan, 3500 m, on soil, *Vohra* 751, 17 Sept., 1961.

Distribution: Europe, Canaries, Asia Minor, Syria, Caucasus, Iran, North Africa, Siberia, China, Japan, North America.

The only previous report of this species, from the subcontinent, is from West Pakistan, by *Noguchi* (1956). The plants which are $\frac{1}{2}$ cm tall, were collected in profusely fruiting condition. These were comparable with a European specimen (without data), present in CAL, except for their smaller size.

***Hydrogonium consanguineum* (Thwait et Mitt.) Hilp.**

VARANASI: On soil, *J. S. Datta Munshi* 1-5, Aug-Dec., 1968.

Distribution: W. Bengal, Orissa, South India, Ceylon, Singapur, Annam, Java, Philippines. New to Northern India.

Five gatherings made from Varanasi, all with fruits, indicate that the species is fairly common at Varanasi. The plants are distinct in long lanceolate leaves, pale excurrent nerve, which is rough at back, papillose, obscure laminar cells and cylindric capsule with spirally twisted peristome.

***H. dicranelloides* Gangulee**

DEHRA DUN: Rajpur, 900 m, in moist place, on soil, *C. L. Malhotra* 566, 24 Oct., 1968, in association with *Philonotis turneriana*.

Distribution: Dehra Dun, Darjeeling, Sikkim, Bhutan.

This species was described by Prof. Gangulee (1966), from Dehra Dun, from the material collected by P. W. Mackinon in 1897. The species is distinct from all the known species of the genus, in its habit and the leaf-shape, which gives the impression of a *Dicranella*. The present specimen was collected in fruits—the cylindrical capsules bearing spirally twisted peristome teeth.

***H. gangeticum* (C. Muell.) Chen**

WEST BENGAL: Birbhum. *R. K. Basak* s.n., Oct., 1969. In young capsules.

Distribution: Bengal, Uttar Pradesh, Delhi.

***H. gracilentum* (Mitt.) Chen**

DEHRA DUN: Sahasradhara, 600 m, *C. L. Malhotra* 631, 15 Nov., 1968; MUSSOORIE: Mossy Falls, 1200 m, on rock, *Surendra Singh* 445, 447, 23 April, 1968.

Distribution: Western Himalaya, Chhotanagpur, Darjeeling.

***Hymenostyliella involuta* (Card. et Ther.) Bartr.**

DEHRA DUN: Sahasradhara, 800 m, on stones, *C. L. Malhotra* 506, 27 June, 1968.

Distribution: Dehra Dun, Philippines.

This species was first described under *Hymenostylium* by Cardot & Theriot, from Philippines. Bartram (1939), transferred it to a new genus *Hymenostyliella*. The species which was so far thought to be endemic to Philippines, appears now to be quite frequent at Dehra Dun, around Sahasradhara. Previous report (*Vohra*, 1969) is also from the same locality.

***Hyophila rosea* Williams**

GARHWAL: Mandakini Valley, 2500 m, *M. A. Rau* 578, Aug., 1968.

Distribution: Kumaon, Gujrat, Orissa, South India, Philippines.

A few sterile plants found in a patch of fertile *Hyophila involuta*.

This species is distinct from the other Indian species of the genus in papillose leaf cells, with pellucid incrassate cell walls and the nerve at the back rough due to papillae. The plants are identical with the Nilgiri specimens, present in the cryptogamic herbarium, but the degree of roughness at the back of nerve is more in the latter.

***H. spatulata* (Harv.) Jaeg.**

DEHRA DUN: Sahasradhara, 800 m, on walls, *C. L. Malhotra* 508, 27 June, 1968; Mohand forest, 600 m, *C. L. Malhotra* 556, 11 Oct., 1968. VARANASI: On soil, *J. S. Datta Munshi* 3.

Distribution: Delhi, Uttar Pradesh, Nepal, Darjeeling, South India, Ceylon, China.

In habit the plants look like *Hyophila involuta* and are hard to separate when growing mixed with it, but are distinct in entire leaf margin and wider laminar cells.

Oxystegus stenophyllus (Mitt.) Gangulee

DEHRA DUN: Mohand forest, 600 m. C. L. Malhotra 557, 11 Oct., 1968; C. L. Malhotra 664, 666, 21 March, 1969.

Distribution: Sikkim, Nilgiris, Palnis. New to Northern India.

The species seems quite common at Mohand. All the gatherings, which were sterile, were identical with the material from Palni Hills, collected and determined by Late Rev. Father Foreau, and present in the herbarium of the Cryptogamic unit.

Tortella fragilis (Hook. et Wils.) Limpr.

KASHMIR: Sedau-Kungwattan, 3500 m, on damp soil, by the side of stream, Vohra 750, 17 Sept., 1961.

Distribution: Western Himalaya. Alpine Sikkim, North, East and Central Europe, Caucasus, Siberia, Morocco, North and Central Asia, China, Northern part of North America.

FUNARIACEAE

Funaria nutans (Mitt.) Broth.

VARANASI: On soil, J. S. Datta Munshi 1, 6.

Distribution: Panjab, Uttar Pradesh, Rajasthan (Jaipur), Sudan.

The species has recently been reported from West Bengal by Prof. Gangulee (1969) and from Khandala by Dhabade.

Physcomitrium cyathicarpum Mitt.

VARANASI: On soil, J. S. Datta Munshi 1, 2.

Distribution: Punjab, Uttar Pradesh, Nepal, Delhi. Gangulee (1969) has reported this moss from West Bengal where it is common in the Gangetic delta.

P. eurystomum Sendtn.

VARANASI: On soil, J. S. Datta Munshi 2.

Distribution: Uttar Pradesh, Sikkim, Central to South East Asia, Formosa, Korea and Japan.

This species was first reported from Northern India (Ranikhet, Gorakhpur) by Ochi (1968). The present specimen, in which leaves are bordered by a single row of elongated cells agrees with Ochi's drawings and description, but the spores are 35 μ in diameter, whereas Ochi describes them as 22-28 μ in diameter.

BRYACEAE

Anomobryum nitidum (Mitt.) Jaeg.

MUSSOORIE: Balansar, 1800 m, on wall, C. L. Malhotra 422, 3 April, 1968.

Distribution: Western Himalaya, Simla, Sikkim, Ceylon, Tonkin, Yunnan.

Brachymenium exile (Doz. et Molk.) Bosch et Lac.

MUSSOORIE: Jharipani Valley, 1200 m, along stream, C. M. Arora 49, 19 April, 1969.

Distribution: Mussoorie, Delhi, Eastern Nepal, Darjeeling, Naga Hills, South India, Ceylon, Indonesia, Formosa, Korea, Japan, Hawaii, Philippines.

Bryum klinggraeffii Schimp.

VARANASI: On soil, J. S. Datta Munshi 1, in association with *Physcomitrium cyathicarpum*.

Distribution: Europe, China, Japan, Canada, U.S.A., Argentina (Crandwell & Nyholm, 1964).

This species was unknown in India until 1966, when Chopra reported it from Delhi. The plants are sterile, upto 3 mm tall, with abundant gemmae on pale rhizoids. The gemmae are crimson in colour, spherical, with protruding cells and about 75 μ in diameter.

B. pallens Sw.

GARHWAL: Mandakini Valley, 2500 m, M. A. Rau 622, Aug., 1968.

Distribution: Europe, Central Asia, China, Japan, North America, Greenland.

The species has once been reported from Kashmir, by Robinson (1965). The plants are distinct in oval-oblong, decurrent leaves, revolute margin, with thickened border and shortly decurrent nerve.

B. recurvulum Mitt.

GARHWAL: Mandakini Valley, 2500 m, M. A. Rau 587, 589, Aug., 1968.

Distribution: Nepal, Western Himalaya, China, Formosa, Japan.

Pohlia cruda (Hedw.) Lindb.

GARHWAL: Tapoban, 4000 m, B. D. Naithani 3, Oct., 1967.

Distribution: Western Himalaya, Nepal, Sikkim, Khasia, West, Central and East Asia, Japan, Europe, Algeria, North America, Chile, Patagonia, Australia, Tasmania, New Zealand.

The plants lack the familiar metallic sheen, so obviously present in the collections from Kashmir. Also the margin in some of the leaves tends to become revolute and gives an impression of *P. crudoides*. However, Mr. Norkett, to whom the material was referred, feels that the plants fall well within the range of variation of *P. cruda*.

Rhodobryum giganteum (Schwaegr.) Par.

TEHRI-GARHWAL: Hanuman-Chetty, 1750 m, near stream in shade, *C. M. Arora* 32, 28 April, 1968, in association with *Mnium heterophyllum*, *Barbula reflexa*, *Oxystegus cylindricus*, *Rhynchostegium planiusculum*, *Taxiphyllum taxirameum* and a few fertile plants of *Homomallium simalaense* bearing horizontal arcuate capsules.

Distribution: Nepal, Sikkim, Khasia, Manipur, South India, Ceylon, Burma, Annam, Laos, Indonesia, South China, Japan, Hawaii, Madagaskar. New to Western Himalaya.

The species is distinct from *Rhodobryum roseum*, which is a fairly common species in Western Himalaya, in larger size of plants and teeth in two rows at the margin of the leaves.

MNIACEAE

Mnium marginatum (With.) P. Beauv.

TEHRI-GARHWAL: Hanuman-Chetty, 1750 m, on slopes, under shade, *C. M. Arora* 38, 28 April, 1968, with *Timmiella anomala*.

Distribution: Western Himalaya, Eastern Nepal, Caucasus, Siberia, Europe, North America.

BARTRAMIACEAE

Bartramia halleriana Hedw.

GARHWAL: Tapoban, 4000 m, *B. D. Naithani* 4, Oct., 1967.

Distribution: Kumaon, Sikkim, NEFA, Naga Hills, Yunnan, Caucasus, Europe, North America, New Zealand.

Fleischerobryum longicolle (Hamp.) Loesk.

TEHRI-GARHWAL: Shiana-Chetty, 1650 m, on soil, near stream, *C. M. Arora* 24, 26 Apr., 1968; Mandakini Valley, 2500 m, *M. A. Rau* 599, Aug., 1968, with *Platyhypnidium riparioides*.

Distribution: Nepal, Sikkim, Darjeeling, Indonesia, China, Formosa and Japan. New to Western Himalaya.

Plants robust and upto 7 cm tall, tufts dense, dull-yellowish-green above, covered below with brownish tomentum almost to their entire length. Abundantly fruiting.

Philonotis fontana (Hedw.) Brid.

GARHWAL: Mandakini Valley, 2500 m, *M. A. Rau* 615, Aug., 1968.

Distribution: Western Himalaya, Nepal, Sikkim, Tibet, Persia, Caucasus, Europe, Mountains of East Africa, North and Central Asia, North America, Mexico, Greenland.

ERPODIACEAE

Aulacopilum abbreviatum Mitt.

DEHRA DUN: Sahasradhara, 800 m, on stem of *Mangifera indica*, *C. L. Malhotra* 509, 27 June, 1968.

Distribution: North Western Himalaya.

ORTHOTRICHACEAE

Macromitrium sulcatum (Hook.) Brid.

KUMAON: Didihat, Pithoragarh District, 2000 m, *C. M. Arora* 40, 30 Aug., 1968.

Distribution: Naga Hills, South India, Ceylon, Malay Peninsula, Borneo, Philippines. New to Western Himalaya.

CRYPTHAEACEAE

Acrocryphaea concavifolia (Griff.) Bosch et Lac.

NEPAL: Nagarkot, 2100 m, *M. A. Rau* 440, 17 Apr., 1968.

Distribution: Nepal, Assam, Manipur, South India, Ceylon, Burma, Indonesia, Philippines, Celebes.

TRACHYPODACEAE

Diaphanodon blandus (Harv.) Ren. et Card.

GARHWAL: Shiana-Chetty, 1650 m, on dry rock, *C. M. Arora* 23, 26 Apr., 1968, with *Brachythecium plumosum*; Mandakini Valley, 2500 m, *M. A. Rau* 600, Aug., 1968.

Distribution: Himalaya, Ceylon, Burma, Yunnan, Indonesia, Formosa. Both the collections were fertile, with rounded capsules.

METEORIACEAE

Papillaria fuscescens (Hook.) Jaeg.

NEPAL: Nagarkot, 2100 m, *M. A. Rau* 440, 17 Apr., 1968.

Distribution: Nepal, Sikkim, Bhutan, Khasia, Burma, Nilgiris, Palnis, Coorg, Ceylon, Laos, Thai, Malaya, Indonesia, Yunnan, Philippines.

THUIDIACEAE

Claopodium nervosum (Harv.) Fleisch.

GARHWAL: Mandakini Valley, 2500 m, *M. A. Rau* 598, Aug., 1968.

Distribution: Kashmir, Nainital, South India, Ceylon, Fiji, Burma, Philippines, East China, Formosa, Japan, Korea, Indonesia, Hawaii.

Haplocladium angustifolium (Hamp. et C. Muell.)

Broth.

TEHRI-GARHWAL: Hanuman-Chetty, 1750 m, on rocky slopes, near stream, *C. M. Arora* 39, 24 Apr., 1968.

Distribution: North Western Himalaya, Sikkim, Khasia, Burma, China, Japan, Korea, Europe, Africa, Mexico.

The species differs from *H. capillatum*, which is a common species in Western Himalaya, in having a papilla at the upper end of the leaf-cell, whereas in the latter, the papilla is in the middle of the lumen.

Herpetineuron toccoe (Sull. et Lesq.) Card.

MUSSOORIE: Balansar, 1800 m, C. L. Malhotra 427, 3 Apr., 1968, with *Anomodon minor* ssp. *integerrimus*.

Distribution: Himalaya, Manipur, Khasia, South India, Ceylon, Indonesia, Celebes, Tonkin, Formosa, Manchuria, Japan, North and South America.

Dark-green plants, usually occurring on tree stems, where they form extensive carpets. Tips of the branches, when dry, are curved.

Thuidium haplohymenium (Harv.) Jaeg.

MUSSOORIE: Lal Tibba, 2400 m, C. L. Malhotra 675, 4 June, 1969.

Distribution: Garhwal, Kumaon, Sikkim.

Fertile plants, with smooth seta and erect capsules. The plants in general agree, with the earlier collections from Western Himalaya, present in the herbarium, but the inner perichaetial bracts are not ciliate.

T. meyenianum (Hamp.) Doz. et Molk.

DEHRA DUN: Lachhiwala forest, 500 m, C. L. Malhotra 669, 31 May, 1969.

Distribution: Nepal, Sikkim, Assam, South India, Ceylon, Annam, Indonesia, New Guinea, Philippines, Solomon Islands. New to Western Himalaya.

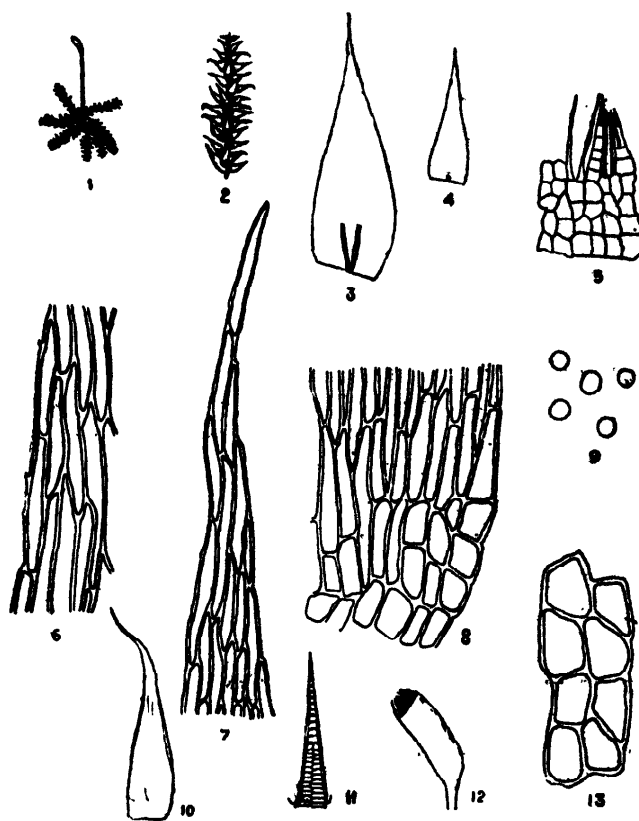
Fertile plants, with seta scabrous throughout. Perichaetial bracts filiform-acuminate, not ciliate.

AMBLYSTEGIACEAE

Campylium gollanii C. Muell. ex Vohra sp. nov.

Plantae autoicae, gracillissimae, fere minutae, caespitibus aureo-viridibus, nitentibus. Caules erecti vel ascendentes, irregulariter ramosi. Folia caulina erecto-patentia ad patentia, non multum congestae, saepe subsecundae ovato-lanceolatae, gradatim subtiliter acuminatae, apice saepe curvatae, in sicco vix mutatae, $0.7-1 \times 0.3$ mm; nervo debilo, flavido, furcato vel non, vix ad dimidium longitudinis foliae attingenti; margine integro, plano; cellulis laminaribus lineari-rhomboidalibus, laevibus, parietibus firmis, moderate incrassatis et flavidis, $7-9 \times 80-125 \mu$, cellulis unius vel duorum serierum ad basim latioribus, subrectangularibus; cellulis alaribus distinctis, quadrato-subrectangularibus, incrassatis, interdum inflatis. Folia ramulina parviora, ad 0.4×0.15 mm; nervo brevè et furcato vel nullo; cellulis alaribus

pluribus. Bractee perichaetiales lineari-lanceolatae ad ovato-lanceolatae, longi-acuminatae, fere enerves, $1.5-1.75 \times 0.25-0.5$ mm. Seta rubella, ad 0.8 cm alta. Capsula brunnea, cylindrica, curvata et inclinata, ad 2×0.8 mm, in sicco infra orificium constricta. Peristomii dentes 0.3 mm longi, marginati, supra hyalini et papilloso, infra vero flavidi ad flavido-brunnei et horizontaliter subtiliter striati. Peristomium internum flavidum membrana basali alta, segmentis vero anguste fassis; ciliis nodulosis, subtiliter papilloso. Sporae globosae, $8-11 \mu$ leves.



Campylium gollanii C. Muell. ex Vohra sp. nov.

Figs. 1-13: 1. Plant ($\times 1$). 2. Shoot ($\times 4$). 3. Stem leaf ($\times 30$). 4. Branch leaf ($\times 30$). 5. Inner peristome ($\times 50$). 6. Laminar cells ($\times 250$). 7. Cells at leaf apex ($\times 250$). 8. Basal cells ($\times 250$). 9. Spores ($\times 250$). 10. Perichaetial bract ($\times 20$). 11. Outer peristome ($\times 50$). 12. Capsule ($\times 7$). 13. Cells of exothecium ($\times 250$).

Campylium gollanii C. Muell. ex Vohra sp. nov.

Autoicous, very slender, almost minute plants, in shining golden-green tufts. Stems erect or ascending, irregularly branched. Stem leaves erect-spreading to spreading, not much crowded, often subsecund, ovate lanceolate, gradually finely acuminate, tips often curved, on drying hardly changed, $0.7-1 \times 0.3$

mm; nerve weak, yellowish, bifurcating or single, reaching less than halfway up the leaf; margin entire, plane; laminar cells linear-rhomboidal, smooth, firm-walled, moderately thickened with yellowish walls, $7.9 \times 80-125 \mu$, one or two rows of cells at base wider, subrectangular; alar cells distinct, incrassate, sometimes inflated, forming a group of quadrate-subrectangular cells. Branch leaves smaller, upto 0.4×0.15 mm; nerve short and bifurcating or absent, alar cells more numerous. Perichaetial bracts linear-lanceolate to ovate-lanceolate, longly acuminate, almost nerveless, $1.5-1.75 \times 0.25-0.5$ mm. Seta reddish, upto 8 mm tall. Capsule brown, cylindric, curved and inclined, upto 2×0.8 mm, constricted below the mouth when dry. Peristome teeth 0.3 mm long, bordered, hyaline and papillose above, yellowish to yellowish-brown and finely horizontally striate below. Inner peristome yellowish with tall basal membrane and narrowly split segments; cilia nodulose and finely papillose. Spores rounded $8-11 \mu$, smooth.

TEHRI-GARHWAL: Jamna-Chetty, on soil, 1600 m, C. M. Arora 19 [Holotype (CAL); Isotype (BSD)]. DEHRA DUN: Duthie (CAL, BM).

Drepanocladus uncinatus (Hedw.) Warnst.

GARHWAL: Tapoban, 4000 m, B. D. Naithani 1, Oct., 1967.

Distribution: North Western Himalaya, Nepal, Sikkim, North, Central and East Asia, China, Japan, Caucasus, Europe, North and South America, Australia, New Zealand.

BRACHYTHECIACEAE

Brachythecium plumosum (Hedw.) B.S.G.

MUSSOORIE: Company Bagh, 2000 m, on slopes, C. L. Malhotra 544, 15 July, 1968; Lal Tibba, 2400 m, on soil and branches of *Quercus*, C. L. Malhotra 474, 476, 22 May, 1968. GARHWAL: Shiana-Chetty, 1650 m, on soil, C. M. Arora 22, 26 Apr., 1968.

Distribution: Himalaya, Khasia, South India, Ceylon, Indonesia, China, Korea, Formosa, Japan, Algeria, Caucasus, Europe, New Zealand and North America.

ENTODONTACEAE

Erythrodontium julaceum (Schwaegr.) Par.

DEHRA DUN: Mohand, 600 m, C. L. Malhotra 500, 26 June, 1968, on *Casearia tomentosa*.

Distribution: North Western Himalaya, Nepal, Sikkim, Bhutan, Assam, Khasia, South India, Burma, Ceylon, Indonesia, Indochina, Celebes, Philippines, Tonkin, Yunnan.

PLAGIOTHECIACEAE

Stereophyllum anceps (Bosch et Lac.) Broth.

DEHRA DUN: Rajpur, 900 m, C. L. Malhotra 547, on stem of *Shorea robusta*.

Distribution: Western Himalaya, Assam, NEFA, Western Ghats, Indonesia, Philippines.

S. indicum (Bel.) Mitt.

RISHIKESH: 300 m, on stem of *Shorea robusta*, C. L. Malhotra 498, 24 June, 1968. DEHRA DUN: Sahasradhara, 600 m, on *Toona ciliata*, C. L. Malhotra 453, 3 May 1968; Mohand, 600 m, on *Trewia nudiflora*, C. L. Malhotra 505, 26 June, 1968.

Distribution: South India, Ceylon. New to Northern India.

SEMATOPHYLLACEAE

Struckia argentata (Mitt.) C. Muell.

MUSSOORIE: On way to Lal Tibba, 2200 m, on ground, C. L. Malhotra 489, 12 June, 1968.

Distribution: Kumaon, Eastern Nepal, Darjeeling, Yunnan. Slender whitish tufts with erect capsules.

Taxithelium nepalense (Schwaegr.) Broth.

WEST BENGAL: Birbhum, on soil. R. K. Basak s.n. Oct., 1969.

Distribution: Nepal, Bengal, Assam, Burma, Karwar, Kanara, Ceylon, Indonesia, Philippines.

HYPNACEAE

Bryosedgwickia aurea (Schimp.) Fleisch.

KUMAON: Didihat, 1900 m, C. M. Arora 749, 4 Aug., 1969.

Distribution: North Western Himalaya, Nepal, Khasia.

Fertile plants, with erect cylindrical capsules.

Ectropothecium cyperoides (Hook.) Jaeg.

DEHRA DUN: Lachhiwala forest, 500 m, C. L. Malhotra 748, 24 Sept., 1969. MUSSOORIE: Gularghati, 500 m, on stem of *Trewia nudiflora*, C. L. Malhotra 518, 29 June, 1968.

Distribution: Garhwal, Nepal, Abor, Assam, South India, Indonesia, Philippines.

Isopterygium distichaceum (Mitt.) Jaeg.

DEHRA DUN: Rajpur, 900 m, C. L. Malhotra 558, 24 Oct., 1968; Golekundi, 500 m, on stones, C. L. Malhotra 634, 11 Oct., 1968; Mohand forest, 600 m, C. L. Malhotra 665, 21 March, 1969, with *Stereophyllum indicum*.

Distribution: Nepal, North Western Himalaya.

The leaves in all the specimens have a distinct patch of alar cells, whereas collections of the same species, made from Kashmir, lack alar cells. Mitten

(1859) in his description of the species, also describes as alar cells lacking.

Vesicularia montagnei (Bel.) Broth.

DEHRA DUN: Sahasradhara, 600 m, hanging from a moist rock, C. L. Malhotra 448, 24 Apr., 1968, C. L. Malhotra 630, 15 Nov., 1968.

Distribution: Himalaya, Ceylon, Indonesia, Tonkin.

RHYTIDIACEAE

Rhytidium rugosum (Hedw.) Kindb.

GARHWAL: Tapoban, 4000 m, B. D. Naithani 1, Oct., 1967.

Distribution: Nepal (Noguchi, 1964, 1966), Caucasus, North and Central Asia, Japan, Europe, North Africa, North America. New to Western Himalaya.

POLYTRICHACEAE

Pogonatum aloides (Hedw.) P. Beauv.

TEHRI-GARHWAL: Hanuman-Chetty, 1750 m, on slopes, in open, C. M. Arora 29, 28 Apr., 1968, with a few reddish plants of *Barbula asperifolia*.

Distribution: Himalaya, Western Ghats, Nilgiris, Ceylon, Thailand, Indochina, Eastern Tibet, Japan, Siberia, Europe, North America, North and Central Africa.

Polytrichum juniperinum Willd. ex Hedw. ssp. **strictum** (Brid.) Nyl. et Sael.

GARHWAL: Tapoban, 4000 m, B. D. Naithani 2, Oct., 1967.

Distribution: North Asia, Europe, North America, New to India.

The stems are covered with dirty yellow rhizoids, almost to their entire length; in this respect it differs from ssp. *juniperinum*.

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