

# DIVERSITY AND STATUS OF BRYOPHYTES IN PANCH POKHARI REGION OF THE NORTHERN SINDHUPALCHOK DISTRICT OF CENTRAL NEPAL

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## ABSTRACT

This is the first exploration of bryophytes in Panch Pokhari of Sindhupalchok district of central Nepal vertically ranged from 850 to 4300 m asl. Of the total record of 151 species, 60 species were categorized as rare in status and two species *Jamesoniella automnalis* (D.C.) Steph. and *Campylopus recharidii* Brid were recorded as threatened species.

**Key Words:** altitude, rare, bryoflora, species richness

## INTRODUCTION

The changing pattern of climate along the altitudinal gradient is the characteristic feature of Nepal. This feature has created interesting and diverse ecosystems at various vertical pockets where number of habitat specific flora and fauna are accommodated under the influence of macro and micro-climatic conditions.

The coverage of bryophytes varies within catchment types; high altitude springs support dense mats, unlike streams fed by ice and glaciers. Taxa confined to low altitudes include characteristic of humid subtropical conditions (Ormerod *et al.* 1994). Nepal has represented good diversity of bryoflora, which counts 1205 species hitherto. This includes 428 species of liverworts and 11 species of hornworts (Pradhan and Joshi 2009). Pradhan recorded 766 species of mosses from Nepal (Pradhan 2000). Earlier, Kattel and Adhikari (1992) compiled a list of 559 species of mosses in Nepal. Integration of complex geographical regions and varied climatic types are the vital factors to bring changes in bryofloral species at varying altitudinal pockets of this country. Grau *et al.* (2007) reported a unimodal relationship between species richness and altitudes for both liverworts and mosses in Nepal with maximum species richness between 2500 and 2800 m of elevations. Many of the endemic species were recorded from 2500 to 3000 m of elevation.

This study was concerned mainly to make an extensive study of bryophytes of the remote Panch Pokhari region which was an unexplored area before. This study also recorded the diversity change and species decline of this plant with addition of altitudes at 1350 m to 4300 m.

## STUDY AREA

Panch Pokhari, a part of the Langtang National Park stands at 27° 36' to 28° 13' N and 85° 2' to 86° 06' E. (fig. 1). Being enriched with highly valued biodiversity, interesting terrains and mind blowing peaks, this area is still beyond the reach to prosperous tourism besides having incomplete documentation of the valuable natural history existing there.

Panch Pokhari, a high altitude lake, can be approached crossing tropical, subtropical and tem-

perate climatic types from the villages of Melamchi (850 m) to Dhap (1300 m), Botang (1600 m) and Nosim (3500 m). The temperate and subtropical zones displayed rich floral components including interesting bryophyte species. The sub tropical vegetation like the Oak forest (*Quercus lanata*) was observed at 1000 to 2000 m. A lower temperate Oak- *Rhododendron* forest constituted by *Quercus lanata* and *Rhododendron arboreum* can be seen below the village Dukhan (2200 m) at the dry rocky slope of Hingar Khola. The moist area in this place was dominated by *Alnus nepalensis* with *Lyonia ovalifolia*, *Rubus ellipticus*, *Oxyspora paniculata*, etc. Subalpine vegetation above the villages of Deurali to Nosim (3500-3800 m) represented *Rhododendron* (*R. campanulatum*) with associated species like *Abies spectabilis*, *Betula utilis*, *Juniperus recurva*, etc. The alpine zone at Panch Pokhari (4200 m) displayed lustrous green meadows with *Rhododendron lepidotum*, *R. anthopogon*, *R. setosum*, *Juniperus recurva* and *J. indica* (fig. 1).

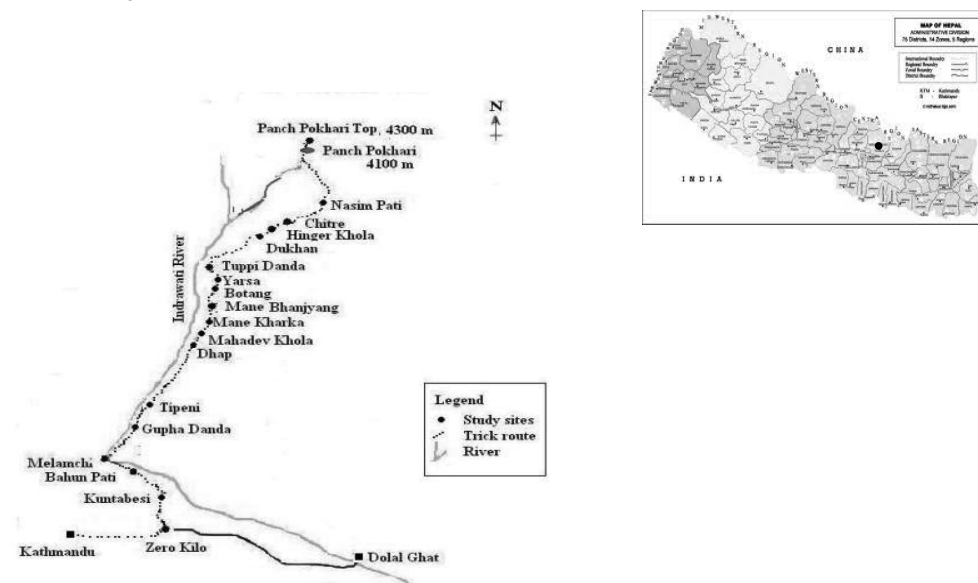


Figure 1. Survey route in the study area.

## MATERIALS AND METHODS

The bryophyte specimens were collected during 2010-2011 using pocket knife and placed safely into the paper packets. The hand lens with magnifying power (5X-20X) was used for field identification. Various relevant literatures like Allen *et al.* (2002), Chopra (1975), Eddy (1988, 1990, 1996), Gangulee (1969-1980), So (1995), Smith (1996) and Zhu and So (1996) were consulted for identification work. The author's names were checked consulting the book by Brummitt and Powell (1992).

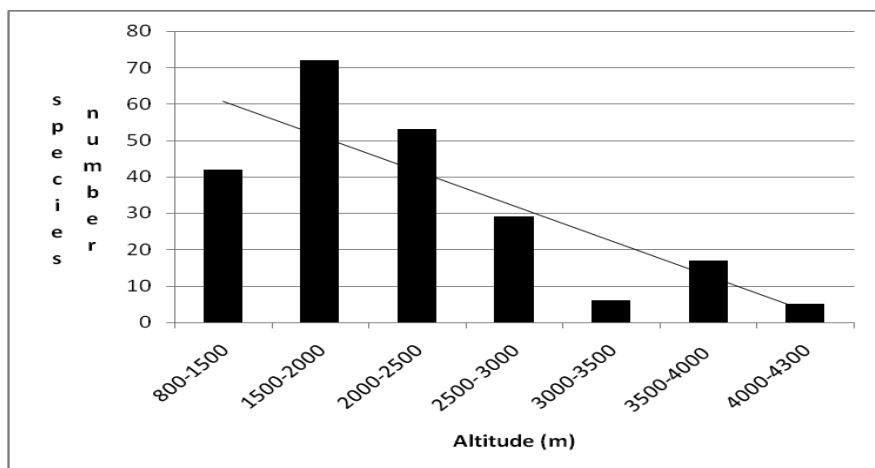
Quadrats of 5 x 5 m were set at different elevations to measure the species richness occurring

within each quadrat. Three quadrats were set in a gap of 500 m of elevation except at 800-1500 m where 4 quadrats and at 4300m two quadrats in a gap of 300 m were used. Overall 21 quadrates were set during entire study period.

Pearson's correlation coefficient ( $r$ ) was used to measure the strength of association between two variables (altitude and species of bryophytes) (Wessa 2012).

## RESULTS AND DISCUSSION

Bryophyte species and their status on local level were categorized at different elevations. This study was initiated at the lowermost elevation of 800 m in Melamchi village of Sindhupalchok district and species record was made at every 500 m of elevations upto the range of 4300 m. A detail list is provided in the appendix 1.



**Figure 2. Number of bryophyte species at different elevations.**

This study brought a list of 151 species of bryophytes under 43 families and three classes. The class Anthocerotae included 5 species, Hepaticae 48 species, and Musci 98 species. Among Hepaticae, the order Jungermanniales showed dominancy with 29 species belonging to 10 families; Metzgeriales with 3 species belonging to 3 families and thalloid liverworts (Marchantiales) with 16 species belonging to 6 families. Negative correlation ( $r=-0.763$ ) was found between the altitudes and species diversity of bryophytes at the vertical range of Panch Pokhari region.

Among the Musci, the dominant family was Bryaceae with the record of 17 species. Second dominant families observed were Dicranaceae and Pottiaceae with 8 and 7 species respectively. An interesting hairy capped moss called *Tayloria indica* (Four toothed Moss) of the family Splachnaceae was recorded in animal dung at 2460 m of elevation. *Bryum coronatum* which is a common moss at lowland Tarai was also recorded at 1200-1760 m of this region. Conservation status of every species was assessed on local level. This was done by direct count of the observed species patches at different altitudinal levels besides consulting available literatures. This brought a list of 72 rare species. Two species, like *Jamesoniella automnalis* (DC.) Steph. and *Campylopus recharidii* Brid. were assessed as very rare species (VR). Rest

84 species ranged from common to fairly common in their status. *Bryum argenteum*, *Funaria hygrometrica*, *Pohlia elongata* and *Entodontopsis tavoyensis* were widely spread species across lowland to the Himalayan regions.

Sun *et al.* (2013) studies the terrestrial bryophyte diversity and community structure along an altitudinal gradient from 2001 to 4221 m. in Gongga Mountain in Sichuan, China. The terrestrial bryophyte biomass and thickness displayed a clear humped relationship with the elevation with the maximum around 3,758 m. According to them, bryophyte distribution is primarily associated with the depth of litter, the air temperature and the precipitation.

According to Liu *et al.* (2008), the analysis of environmental factors and bark characteristics, for epiphytic bryophytes, atmospheric humidity gradient might be one of the major factors that affects the vertical distribution, and bark pH might be an explanation for the difference in the epiphytic cover among tree species, but bark water content has no relation to the distribution pattern. Finally, community structure of epiphytic bryophytes on the same tree species is also affected by forest types.

Bio-physical gradients like temperature, rainfall, humidity, altitude and forest canopy played controlling effect to distribute and bring species richness of bryophytes at different altitudinal pockets of Panch Pokhari region. Change in species community was also noticed at different altitudes under the influence of these gradients. Species diversity was noticed very low at 4300 m where favorable conditions of the bio-physical factors like temperature, humidity, rainfall, and soil were not prevailing. This study recorded a maximum diversity of 72 species at 1500-2000 m of elevation where warm and humid condition, optimum amount of precipitation, favorable temperature and good forest canopy prevailed. Next factor which acted to decline species level at higher elevation of Panch Pokhari is the lack of canopy for its dependent species. Epiphytic bryoflora was completely lacking at this range due to the absence of host tree species.

An extensive study is still necessary at the southern and central parts of the Sindhupalchok district in order to bring perfectness in findings on how this plant is distributed at different altitudinal pockets on the vertical ranges under the influence of varying degrees of bio-physical gradients.

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## Appendix I

Table 1. Distribution of Bryophytes at different elevations of northern Sindhupalchok district.

SN	Families	Scientific Names	Elevation in meter	Status
<b>Anthocerotae</b>				
1.	Anthocerotaceae	<i>Anthoceros chambensis</i> Kashyap	1300	FC
2.	Anthocerotaceae	<i>Anthoceros punctatus</i> L.	1480-3500	C
3.	Anthocerotaceae	<i>Anthoceros longii</i> St.	1450	FC
4.	Anthocerotaceae	<i>Folioceros assamicus</i> D. C. Bhardwaj	1300	R
5.	Anthocerotaceae	<i>Phaeoceros laevis</i> (L.) Prosk.	1700	FC
<b>Hepaticae</b>				
1.	Aneuraceae	<i>Riccardia multifida</i> (Linn.) Gray	1200-2850	FC
2.	Aytoniaceae	<i>Asterella multiflora</i> (Steph.) Pande <i>et al.</i>	1430	FC
3.	Aytoniaceae	<i>Asterella mussuriensis</i> (Kashyap) Verd.	1250	R
4.	Aytoniaceae	<i>Asterella wallichiana</i> (Lehm. & Linden.) Grolle	1350-1750	FC
5.	Aytoniaceae	<i>Plagiochasma appendiculatum</i> Lehm. & Lindenb.	1300-1700	FC
6.	Aytoniaceae	<i>Plagiochasma pterospermum</i> C. Massal.	1350-1750	C
7.	Aytoniaceae	<i>Reboulia hemispherica</i> (L.) Raddi	1600-3000	R
8.	Cephaloziellaceae	<i>Cephaloziella massalongi</i> (Spruce.) K. Muell.	1550-2000	R
9.	Conocephalaceae	<i>Conocephalum conicum</i> (L.) Underw.	1890-3800	FC

## Appendix 1 Contd ...

10.	Conocephalaceae	<i>Conocephalum japonicum</i> (Thunb.) Grolle	1800	R
11.	Frullaniaceae	<i>Frullania ericoides</i> (Nees) Montin	1740	R
12.	Frullaniaceae	<i>Frullania muscicola</i> Steph.	1280-1840	FC
13.	Frullaniaceae	<i>Frullania retusa</i> Mitt.	1720	FC
14.	Frullaniaceae	<i>Frullania tamarisci</i> (L.) Dumort.	1480-1840	FC
15.	Frullaniaceae	<i>Frullania yunnanensis</i> Steph.	2400	FC
16.	Geocalycaceae	<i>Heteroscyphus argutus</i> (Reinw. et al.) Schiffn,	1300-1800	R
17.	Geocalycaceae	<i>Heteroscyphus coliatius</i> (Hook.) Schiffn.	3000	R
18.	Geocalycaceae	<i>Heteroscyphus planus</i> (Mitt.) Schiff.	1300	R
19.	Jungermanniaceae	<i>Jamesoniella automnalis</i> (D.C) Steph.	2440	VR
20.	Jungermanniaceae	<i>Jungermannia appressifolia</i> Mitt.	2800	FC
21.	Jungermanniaceae	<i>Jungermannia atrovirens</i> Dumort.	1250-2800	FC
22.	Jungermanniaceae	<i>Jungermannia hyalina</i> Lyell	3500	R
23.	Jungermanniaceae	<i>Jungermannia tetragona</i> Lindenb.	1200-1300	FC
24.	Lejeuneaceae	<i>Lejeunea cavifolia</i> (Ehrh.) Lindb.	1766-1950	FC
25.	Lejeuneaceae	<i>Lejeunea flava</i> (Sw.) Nees	2420	FC
26.	Lepidoziaceae	<i>Bazzania tridens</i> (Reinw. et al.) Trev.	2440	R
27.	Lepidoziaceae	<i>Lepidozia reptans</i> (L.) Dumort.	2800-3000	FC

## Appendix 1 Contd ...

28.	Marchantiaceae	<i>Marchantia emarginata</i> Reinw. <i>et al.</i>	1200-1800	C
29.	Marchantiaceae	<i>Marchantia paleacea</i> Bertol.	1300-1800	R
30.	Marchantiaceae	<i>Marchantia polymorpha</i> L.	1300-1900	C
31.	Pelliaceae	<i>Pellia epiphylla</i> (L.) Corda	2420-2800	R
32.	Plagiochileaceae	<i>Plagiochila chinensis</i> Steph.	2460	R
33.	Plagiochileaceae	<i>Plagiochila cuspidata</i> Steph.	2800-3800	FC
34.	Plagiochileaceae	<i>Plagiochila denticulata</i> Mitt.	2400-3850	FC
35.	Plagiochileaceae	<i>Plagiochila flexuosa</i> Mitt.	2350	R
36.	Plagiochileaceae	<i>Plagiochila retusa</i> Mitt.	2400	R
37.	Porellaceae	<i>Porella arboria</i> (Taylor) Spruce	2300	FC
38.	Porellaceae	<i>Porella denticulata</i> (Kashyap & R.S. Chopra) J.X. Luo	2120	FC
39.	Porellaceae	<i>Porella nitens</i> (Steph.) S. Hatt.	1700	R
40.	Ricciaceae	<i>Riccia himalayensis</i> Steph.	1720	R
41.	Scapaniaceae	<i>Scapania ciliata</i> Sande Lac.	2400	R
42.	Scapaniaceae	<i>Scapania stephani</i> K. Muell.	2460	R
43.	Targioniaceae	<i>Cyathodium cavernarum</i> (Kunze) Lehm.	900	R
44.	Targioniaceae	<i>Cyathodium tuberosum</i> Kashyap	850-1766	R
45.	Targioniaceae	<i>Targionia hypophylla</i> L.	1300-1840	C
46.	Trichocoleaceae	<i>Trichocolea tomentaella</i> (Furh.) Dumort.	2440-2460	FC
47.	Wiesnerellaceae	<i>Dumortiera hirsuta</i> (SW.) Nees	1350-2440	FC
48.	Wiesnerellaceae	<i>Wiesnerella denudata</i> Steph.	1700	R



## Appendix 1 Contd ...

Musci				
1.	Amblystegaceae	<i>Calliergonella cuspidata</i> (Hedw.) Loesk.	1800	FC
2.	Amblystegaceae	<i>Campylium halleri</i> Hedw.	1800	R
3.	Bartramiaceae	<i>Fleischerobryum longicollis</i> (Hampe) Loesk.	1830	R
4.	Bartramiaceae	<i>Philonotis fontana</i> (Hedw.) Brid.	1650-2420	FC
5.	Bartramiaceae	<i>Philonotis hastata</i> (Duby) Wijk & Margad	1600	R
6.	Bartramiaceae	<i>Philonotis thwaitisii</i> Mitt.	1760-1850	FC
7.	Brachytheciaceae	<i>Brachythecium buchananii</i> (Hook.) A. Jaeger	1900-2000	FC
8.	Brachytheciaceae	<i>Bryhnia decurvans</i> (Mitt.) Dixon	2240-2800	R
9.	Brachytheciaceae	<i>Brachythecium recurvirostrum</i> (Hedw.) Chen	3800	FC
10.	Brachytheciaceae	<i>Eurhynchium proelongum</i> (Hedw.) Schimp. var. <i>rigidum</i>	1295-1816	FC
11.	Brachytheciaceae	<i>Eurhynchium ripariodes</i> (Hedw.) Richs.	1750-1825	C
12.	Brachytheciaceae	<i>Homalothecium nigheriensis</i> (Mont.) H. Rob.	2400	R
13.	Bryaceae	<i>Anomobryum auratum</i> (Mitt.) A. Jaeger	2300-2420	C
14.	Bryaceae	<i>Brachymnium acuminatum</i> Harv.	1550	FC
15.	Bryaceae	<i>Brachymnium exile</i> (Dozy & Molk.) Bosch & Lacey	2350	R
16.	Bryaceae	<i>Brachymnium nepalensis</i> Hook.	1560	R

## Appendix 1 Contd ...

17.	Bryaceae	<i>Brachymnium ptychothecium</i> (Besch.) Ochi	1825	R
18.	Bryaceae	<i>Bryum argenteum</i> Hedw.	1300-3900	C
19.	Bryaceae	<i>Bryum cellulare</i> Hook.	3100	R
20.	Bryaceae	<i>Bryum clavatum</i> (Schimp.) C. Muell.	3000	R
21.	Bryaceae	<i>Bryum coronatum</i> Schwaegr.	1250-1760	R
22.	Bryaceae	<i>Bryum pseudotriquetrum</i> (Hedw.) Gaertn.	4250	R
23.	Bryaceae	<i>Bryum recurvulum</i> Mitt.	4300	R
24.	Bryaceae	<i>Pohlia acuminata</i> Hoppe & Hornsch.	4150	R
25.	Bryaceae	<i>Pohlia elongata</i> Hedw.	1750-3900	MC
26.	Bryaceae	<i>Pohlia leucoloma</i> (Bosch. & Lacey) Fleisch.	1300-2500	FC
27.	Bryaceae	<i>Pohlia nutans</i> (Hedw.) Lindb	2360-2440	R
28.	Bryaceae	<i>Rhodobryum giganteum</i> (Schwaegr.) Paris	2460-3800	C
29.	Bryaceae	<i>Rhodobryum roseum</i> (Hedw.) Limpr.	1765-3800	FC
30.	Calymperaceae	<i>Calymperes erosum</i> C. Muell.	1720	C
31.	Calymperaceae	<i>Syrrophodon gardneri</i> (Hook.) Schwaegr.	1650	C
32.	Campylopodaceae	<i>Campylopodium khasianum</i> (Griff.) Paris	2100-4000	R
34.	Dicranaceae	<i>Campylopus ericoides</i> (Griff.) A. Jaeger	1360	FC
35.	Dicranaceae	<i>Campylopus recharidii</i> Brid.	1934-2120	VR

## Appendix 1 Contd ...

36.	Dicranaceae	<i>Campylopus subfragilis</i> Ren. & Cardot	1770	R
37.	Dicranaceae	<i>Dicranella heteromalla</i> (Hedw.) Schimp.	1940	R
38.	Dicranaceae	<i>Dicranum himalayanum</i> Mitt.	2850	R
39.	Dicranaceae	<i>Symblepharis reinwardtii</i> (Dozy & Molk.) Mitt.	3500-4000	FC
40.	Dicranaceae	<i>Trematodon longicolle</i> Michx.	1600-2160	C
41.	Entodontaceae	<i>Entodon flavescens</i> (Hedw.) A. Jaeger	2050	FC
42.	Entodontaceae	<i>Entodon rubicundus</i> (Mitt.) A. Jaeger	1400-2220	R
43.	Entodontaceae	<i>Entodon veridulus</i> Cardot	2430	FC
44.	Entodontaceae	<i>Erythrodontium julaceum</i> (Hook. ex Schwaegr.) Paris	1760	FC
45.	Fissidentaceae	<i>Fissidens cristatus</i> Wils. ex Mitt.	2440	FC
46.	Fissidentaceae	<i>Fissidens ceylonensis</i> Dozy & Molk.	1900-2200	FC
47.	Fissidentaceae	<i>Fissidens grandifrons</i> Brid.	2500-2550	FC
48.	Fissidentaceae	<i>Fissidens nobilis</i> Griff.	1300	FC
49.	Fissidentaceae	<i>Fissidens sylvaticus</i> Griff.	1750	R
50.	Fissidentaceae	<i>Fissidens taxifolius</i> Hedw.	2000-2900	R
51.	Funariaceae	<i>Funaria hygrometrica</i> Hedw.	1300-3800	C
52.	Grimmiaceae	<i>Grimmia affinis</i> Hornsch.	3450	FC
53.	Grimmiaceae	<i>Grimmia ovalis</i> (Hedw.) Lindb.	3400	R
54.	Hylocomiaceae	<i>Leptohymenium tenue</i> (Hook.) Schwaegr.	2460	R

## Appendix 1 Contd ...

55.	Hypnaceae	<i>Ectropothecium sikkimense</i> (Ren. & Cardot) Ren. & Cardot	2000	FC
56.	Hypnaceae	<i>Ectropothecium nervosum</i> Dixon	1765	R
56.	Hypnaceae	<i>Hypnum pleumaforme</i> W. Wilson	1800-4000	C
57.	Hypnaceae	<i>Isopterigium albiscens</i> (Hook.) A. Jarger	1200-1300	FC
58.	Hypnaceae	<i>Ptilium crista-castrensis</i> (Hedw.) De Not.	1700-4250	R
59.	Hypnaceae	<i>Taxiphyllum taxirameum</i> (Mitt.) Fleisch.	1410-2700	FC
60.	Leucobryaceae	<i>Leucobryum juniperoideum</i> (Brid.) C. Muell.	2500	FC
61.	Leucobryaceae	<i>Leucobryum mittenii</i> Besch.	900	FC
62.	Leucobryaceae	<i>Octoblepharum albidum</i> Hedw.	1200-1300	FC
63.	Meteoriaceae	<i>Barbella stevensii</i> (Ren. & Cardot) M. Fleisch.	1720-2500	FC
64.	Mniaceae	<i>Mnium laevinerve</i> Cardot	2600	R
65.	Mniaceae	<i>Mnium lycopodioides</i> Schwaegr.	3000	C
66.	Mniaceae	<i>Mnium punctatum</i> Hedw.	2800-3850	FC
67.	Mniaceae	<i>Mnium rostratum</i> Schrad.	1890	R
68.	Mniaceae	<i>Orthomnium bryoides</i> (Griff.) Norkett	1820	R
69.	Plagiomniaceae	<i>Plagiomnium cuspidatum</i> (Hedw.) T. Kop.	2650	R
70.	Plagiomniaceae	<i>Plagiomnium succulenteum</i> (Wils.) Lindb.	1250	FC
71.	Plagiotheciaceae	<i>Plagiothecium nemorale</i> (Mitt.) A. Jaeger	1766	FC

## Appendix 1 Contd ...

72.	Polytrichaceae	<i>Pogonatum aloides</i> (Hedw.) P. Beauv.	1700	R
73.	Polytrichaceae	<i>Pogonatum junghunianum</i> (Dozy & Molk.) Dozy & Molk.	1300	FC
74.	Polytrichaceae	<i>Pogonatum microstomum</i> (Schwaegr.) Brid.	1480-2060	MC
75.	Polytrichaceae	<i>Pogonatum microphyllum</i> (Dozy & Molk.) Dozy & Molk,	1950-3800	C
76.	Polytrichaceae	<i>Pogonatum nudiusculum</i> Mitt.	2040	FC
77.	Polytrichaceae	<i>Pogonatum submacrophyllum</i> Herzog.	2460-2550	FC
78.	Polytrichaceae	<i>Polytrichum commune</i> Hedw.	1760-2800	FC
79.	Polytrichaceae	<i>Polytrichum urnigerum</i> Hedw.	2600	FC
80.	Pottiaceae	<i>Barbula constricta</i> Mitt.	2800	R
81.	Pottiaceae	<i>Barbula tenuirostries</i> Brid.	1760-1950	FC
82.	Pottiaceae	<i>Bryoerythrophyllum nogochianum</i> Gangulee	2460	FC
83.	Pottiaceae	<i>Bryoerythrophyllum recurvirostre</i> (Hedw.) P.C. Chen	2420	FC
84.	Pottiaceae	<i>Hydrogonium arcuatum</i> (Griff.) Wijk. & Margad	1480	FC
85.	Pottiaceae	<i>Hyophila involuta</i> (Hook.) A. Jaeger	1510-2500	FC
86.	Pottiaceae	<i>Oxystegus cylindricus</i> (Brid.) Hilp. ex Beih.	1755-2449	C
87.	Sphagnaceae	<i>Sphagnum cuspidatum</i> C. Muell.	2100-3000	FC
88.	Sphagnaceae	<i>Sphagnum junghuhnianum</i> Dozy & Molk.	2200	R

## Appendix 1 Contd ...

89.	Splachnaceae	<i>Tayloria indica</i> Mitt.	2460	R
90.	Stereophyllaceae	<i>Entodontopsis leucostega</i> (Brid.) W.R. Buck & Ireland	1750	R
91.	Stereophyllaceae	<i>Entodontopsis tavoyense</i> (Hook. F.) W. R. Buck & Ireland	1816	MC
92.	Stereophyllaceae	<i>Entodontopsis wightii</i> (Mit.) W. R. Buck & Ireland	2000	C
93.	Thuidaceae	<i>Actinothuidium hookeri</i> (Mitt.) Broth.	3600	R
94.	Thuidaceae	<i>Haplocladium angustifolium</i> (Hampe. & C.Muell.) Broth.	1350	R
95.	Thuidaceae	<i>Herpetineurion toccoae</i> (Sull.& Lesq.) Cardot	1350-3200	FC
96.	Thuidaceae	<i>Thuidium cambifolium</i> (Dozy & Molk.) Dozy & Molk.	1880-4100	C
97.	Thuidaceae	<i>Thuidium glaucinum</i> (Mitt.) Bosch.	1700-2440	FC
98.	Thuidaceae	<i>Thuidium tamariscellum</i> (C. Muell.) Bosch. & Lacey	1500	C

C = common; FC = fairly common; MC = most common; R = rare; VR = very rare

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