

# **Cryptogams of the Reserva Biológica San Francisco (Province Zamora-Chinchi, Southern Ecuador) I. Bryophytes**

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**Abstract** – A preliminary survey of the bryophyte flora of the Reserva Biológica San Francisco (1 800-3 150 m) in the Andes of southern Ecuador yielded 305 species: 190 hepatics, 112 mosses and 3 hornworts. 63 species are reported new to Ecuador, most of them hepatics. Noteworthy records of rare species include *Pleurozia paradoxa* (Jack) Schiffn. and *P. heterophylla* Steph. ex Fulford (Hepaticae: Pleuroziaceae), which are abundant in shrubby upper montane vegetation dominated by *Purdiaea nutans* Planch. (Cyrillaceae). About 70% of the species are widespread tropical ones (neotropical or pantropical), 21% are Andean species and 4% are of temperate origin. Endemism (1%) is very low. Species range sizes decrease towards higher elevations.

**Bryophytes / Ecuador / liverworts / mosses / Neotropics / phytogeography / tropical montane region**

**Resumen** – En un estudio preliminar sobre las briófitas de la Reserva Biológica San Francisco (1800-3150 m) en el sur de Ecuador se encontraron 305 especies: 190 hepáticas, 112 musgos y 3 anthocerotos. Entre estas, 63 especies son registros nuevos para Ecuador. Entre los nuevos registros con relevancia fitogeográfica se incluye a *Pleurozia paradoxa* (Jack) Schiffn. y *P. heterophylla* Steph. ex Fulford (Hepaticae: Pleuroziaceae), las que abundan en la vegetación alto-andino dominado por *Purdiaea nutans* Planch. (Cyrillaceae). Cerca del 70 % de las especies son ampliamente distribuidas en el trópico (neotropicales o pantropicales), 21% son andinos y 4% tienen un origen templado. El endemismo (1%) es muy bajo. Las áreas de distribución de las especies disminuyen conforme se incrementa elevación.

**Briófitas / Ecuador / hepáticas / musgos / Neotropico / fitogeografía / región montano tropical**

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## INTRODUCTION

The mountain forests of the northern Andes (Venezuela, Colombia, Ecuador, northern Peru) with estimated 40.000 species of vascular plants are the richest tropical formation in terms of numbers of plant species and one of the world's hotspots of biodiversity (Churchill *et al.*, 1995; Barthlott *et al.*, 1996; Myers *et al.*, 2000). These forests are also rich in cryptogams, including bryophytes (Churchill *et al.*, 1995; Gradstein, 1995), and much progress has been made in recent years in our knowledge of these organisms. As a result, identification of 80-90 % of the species is now possible (e.g., Churchill & Linares, 1995; Gradstein *et al.*, 2001). Nevertheless, our understanding of the biodiversity of the bryophytes of the Andes remains poor. Collecting has been punctual, species lists are usually outdated and ecological studies are very few and usually based on sampling of selected habitats (e.g., van Reenen & Gradstein, 1983; Frey, 1987; Wolf, 1993; Kürschner & Parolly, 1998a-c). Since deforestation in the northern Andes is very severe, with less than 10% of the natural forest remaining (Henderson *et al.*, 1991; Hamilton *et al.*, 1995; Jørgensen & León-Yáñez, 1999), there is an obvious need for more research on the cryptogams of the region.

This paper is the first of a series dealing with the cryptogams of the Reserva Biológica San Francisco, a tropical montane forest reserve in the Andes of southern Ecuador (Province Zamora-Chinchipe). The reserve is the research site of the multidisciplinary research project "Functionality in a tropical mountain forest: diversity, dynamic processes and use-potential under ecosystem aspects" funded by the German Research Foundation (DFG). Our investigations, carried out since May 2001, pertain to the following topics: 1) general inventory of bryophytes and lichens of the study area, 2) analysis of the impact of anthropogenic disturbance on bryophyte and lichen diversity, by sampling of selected trees in primary and secondary forest, and 3) analysis of epiphytic communities along the elevational gradient.

Knowledge of the bryophyte flora of Ecuador is still very incomplete, especially for liverworts. Floristic studies on mosses of Ecuador are by Bartram (1934, 1955, 1964), Crum (1957), Robinson *et al.* (1971, 1977), Steere (1982), Arts & Sollmann (1998) Churchill *et al.* (1991) and Churchill (1994); on liverworts by Spruce (1884-1885), Herzog (1952, 1957) and Arnell (1962). Gradstein & Weber (1982) analysed the bryophyte flora of the Galapagos Islands. Ecological papers treating bryophytes of Ecuador are very few and include work by Løjtant & Molau (1982) on páramo vegetation, Müller & Frahm (1998) on montane rain forest and Kautz & Gradstein (2001) and Andersson & Gradstein (submitted) on epiphyte vegetation of cacao plantations. A provisional checklist of the mosses of Ecuador lists 874 species (Churchill, 1994); a checklist for hepatics is lacking.

The present paper provides a preliminary list of the recorded species of bryophytes of the Reserva Biológica San Francisco and contributes to the improvement of our knowledge of the bryophyte diversity of the country of Ecuador.

## STUDY AREA

The Reserva Biológica San Francisco is located in the Eastern Cordillera of the Andes, Province Zamora-Chinchipe, southern Ecuador, at altitudes from 1800-3150 m, at the northern limit of the Podocarpus National Park, between

3° 58' 43" and 4° 0' 13" S, and 79° 3' 29" and 79° 5' 04" W. Research accommodation is provided at the *Estación Científica San Francisco* (ECSF), a fully-equipped research station with laboratories and sleeping facilities.

Geologically the area is made up of paleozoic rocks consisting of phyllites, quartzites and, in part, of metamorphic sand stones (Litherland *et al.*, 1994). The slopes are generally steep and instable, with landslides occurring frequently even in intact forest stands. Soils are acid Inceptisols, poor of nutrients (Wilcke *et al.*, 2001a-b). Towards higher elevations soils become less well developed, accumulation of organic material on the soil surface decreases, and hygrophytic soil properties become prominent (Schrumpf *et al.*, 2001). At 1950 m mean annual temperature is ca 16 °C and mean annual precipitation, measured during april 1998 until april 1999, ca 2200 mm (Wilcke *et al.*, 2001a).

The reserve includes about 1,000 hectares of evergreen montane forest and páramo, which may be classified into four elevational belts (Frahm & Gradstein, 1991; Bussmann, 2001, 2002): 1) lower montane forest (1800-2150 m; in quebradas up to 2300 m), 2) upper montane forest (2150-2650 m); 3) subalpine dwarfforest (2650-3000 m); and 4) the treeless páramo above 3000 m. The low elevation of the timberline in the reserve correlates with the low mountain elevation in the study area (3150 m) and is presumably caused by wind-shearing, water-saturated soils and the "Massenerhebungseffekt" (Frahm & Gradstein, 1991; Kessler, 2000). The lower montane forest, dominated by Lauraceae (*Ocotea* spp. and *Nectandra* spp.) and the subalpine forests in the study area are well-representative of the zonal vegetation of the northern Andes. The upper montane forest, however, is a very unusual, low-statured, shrubby, open woodland with trunks not higher than 5-10 m (sometimes up to 15 m tall) and dominated by the twisted-stemmed *Purdiaea nutans* (Cyrillaceae) and many other shrubs. This vegetation is very different from the "normal", higher-statured upper montane forests found in the nearby Podocarpus National Park and elsewhere in Ecuador (Madsen & Øllgaard, 1994; Jørgensen & León-Yáñez, 1999; Bussmann, 2001, 2002) and has also a noteworthy bryophyte vegetation (see below). Reasons for the development of the unusual upper montane forest vegetation in the study area are still unclear; a possible explanation may be the very hygromorphic soils present at these elevations (Schrumpf *et al.*, 2001). As shown by Hetsch & Hoheisel (1976), low-statured, shrubby vegetations may develop in tropical high mountains on permanently waterlogged, peaty soils. The causes of the occurrence of the *Purdiaea nutans* vegetation in the study area are intriguing and are a subject of future investigations.

## RESULTS AND DISCUSSION

This first inventory of the bryophyte flora of the Reserva Biológica San Francisco yielded 305 bryophyte species distributed among 151 genera and 60 families (Appendix 1). The majority are liverworts (190 spp.; 62%), with Lejeuneaceae (56 spp., in 27 genera) being the most speciose family followed by Lepidoziaceae (20 spp., in 6 genera), Plagiochilaceae (19 spp.) and Jubulaceae (17 spp.). *Plagiochila* and *Frullania* are the largest genera with 19 respectively 17 species recorded. The most species-rich families of mosses are the Macromitriaceae (12 spp.), Dicranaceae (12 spp.), Meteoriaceae (10 spp.) and Bryaceae (9 spp.). Hornworts (3 spp.) are very scarce.

Although inventorying is still incomplete and has been more intensive in the lower montane forest than in the higher elevation belts, our preliminary results indicate that the reserve has a very species-rich and noteworthy cryptogamic flora. Of 305 species recorded here (245 in the lower montane belt, 104 in the upper montane belt, dwarfforest and páramo) 61 or more than 20 % are new to Ecuador, most of them being hepatics (Table 1). Noteworthy finds of rare species include the moss *Macromitrium perreflexum* Steere, thus far only known from southern Ecuador with earlier reports from the provinces Loja (Steere, 1982) and Azuay (Arts & Sollman, 1998), and the liverworts *Nowellia evansii* Grolle (previously known from Colombia, Venezuela, Central America, West Indies), *Leptoscyphus intermedius* Grolle (Honduras, Venezuela), *Syzygiella setulosa* Steph. (Bolivia only), *S. tonduzana* Steph. (Costa Rica only), *Aureolejeunea fulva* R. M. Schust. (Costa Rica, Colombia, Venezuela and Serra de Itatiaia, Brazil), *Ceratolejeunea grandiloba* Jack & Steph. and *Cheilolejeunea choachina* (Gottsche) Gradst. (Andes only), *Cheilolejeunea revoluta* (Herzog) Grolle & Gradst. (SE

Tab. 1. Bryophyte species new to Ecuador.

HEPATICES	
<i>Albiellopsis dominicensis</i>	<i>Metzgeria lechleri</i>
<i>Anastrophyllum piligerum</i>	<i>Metzgeria neotropica</i>
<i>Aphanolejeunea angustissima</i>	<i>Metzgeria polytricha</i>
<i>Aphanolejeunea microscopica</i> var. <i>africana</i>	<i>Micropterygium campanense</i>
<i>Aphanolejeunea truncatifolia</i>	<i>Micropterygium reimersianum</i>
<i>Aureolejeunea fulva</i>	<i>Mytilopsis albifrons</i>
<i>Bazzania affinis</i>	<i>Nowellia evansii</i>
<i>Bazzania bidens</i>	<i>Odontoschisma denudatum</i>
<i>Bazzania cuneistipula</i>	<i>Omphalanthus wallisii</i>
<i>Bazzania denticulata</i>	<i>Oryzolejeunea saccatiloba</i>
<i>Calypogeia lechleri</i>	<i>Pleurozia heterophylla</i>
<i>Cephalozia crossii</i>	<i>Radula fendleri</i>
<i>Cephalozia</i> sp. nov.	<i>Radula mammosa</i>
<i>Ceratolejeunea brevinervis</i>	<i>Radula mazarunensis</i>
<i>Ceratolejeunea grandiloba</i>	<i>Radula mexicana</i>
<i>Cheilolejeunea choachina</i>	<i>Radula nudicaulis</i>
<i>Cheilolejeunea oncophylla</i>	<i>Radula tectiloba</i>
<i>Cheilolejeunea revoluta</i>	<i>Symphogyna bogotensis</i>
<i>Diplasiolejeunea pluridentata</i>	<i>Syzygiella setulosa</i>
<i>Drepanolejeunea granatensis</i>	<i>Syzygiella tonduzana</i>
<i>Frullania serrata</i>	<i>Tylimanthus striolatus</i>
<i>Frullania winteri</i> var. <i>vanderhammenii</i>	
<i>Frullanoides laciniatiflora</i>	MOSSES
<i>Harpalejeunea tridens</i>	<i>Acroporium estrellae</i>
<i>Lejeunea lepida</i>	<i>Actinodontium integrifolium</i>
<i>Lejeunea phyllobola</i>	<i>Bryum richardsii</i>
<i>Lepidozia incurvata</i>	<i>Campylium polygamum</i>
<i>Leptoscyphus cuneifolius</i>	<i>Holomitrium sinuosum</i>
<i>Leptoscyphus gibbosus</i>	<i>Octoblepharum erectifolium</i>
<i>Leptoscyphus intermedius</i>	<i>Orthostichella pentasticha</i>
<i>Metzgeria agnewii</i>	<i>Pseudosymblepharis schimperiana</i>
<i>Metzgeria herminieri</i>	<i>Schliephackea meteroides</i>
	<i>Vesicularia vesicularis</i> var. <i>rutilans</i>



Brazil and one record from northern Colombia), *Diplasiolejeunea pluridentata* Schäf.-Verw. (Costa Rica only), *Drepanolejeunea granatensis* (Jack & Steph.) Bischl. (northern Colombia and Serra de Itatiaia, Brazil), *Omphalanthus wallisii* (Jack & Steph.) Gradst. (only one record, from northwestern Colombia), *Oryzolejeunea saccatiloba* (Steph.) Gradst. (Venezuela, Central America and West Indies), *Symphyogyna bogotensis* (Gottsche) Steph. (Colombia, Bolivia), and an apparently undescribed species of *Cephalozia*. Most of the rare species were found at higher elevations, in the upper montane forest and/or páramo.

Undoubtedly the most noteworthy and exiting floristic feature of the reserve is the abundant occurrence of the liverworts *Pleurozia paradoxa* and *P. heterophylla*, the only neotropical members of the family Pleuroziaceae (Thiers, 1992). By their robust size and wine-red colour the two are very conspicuous in

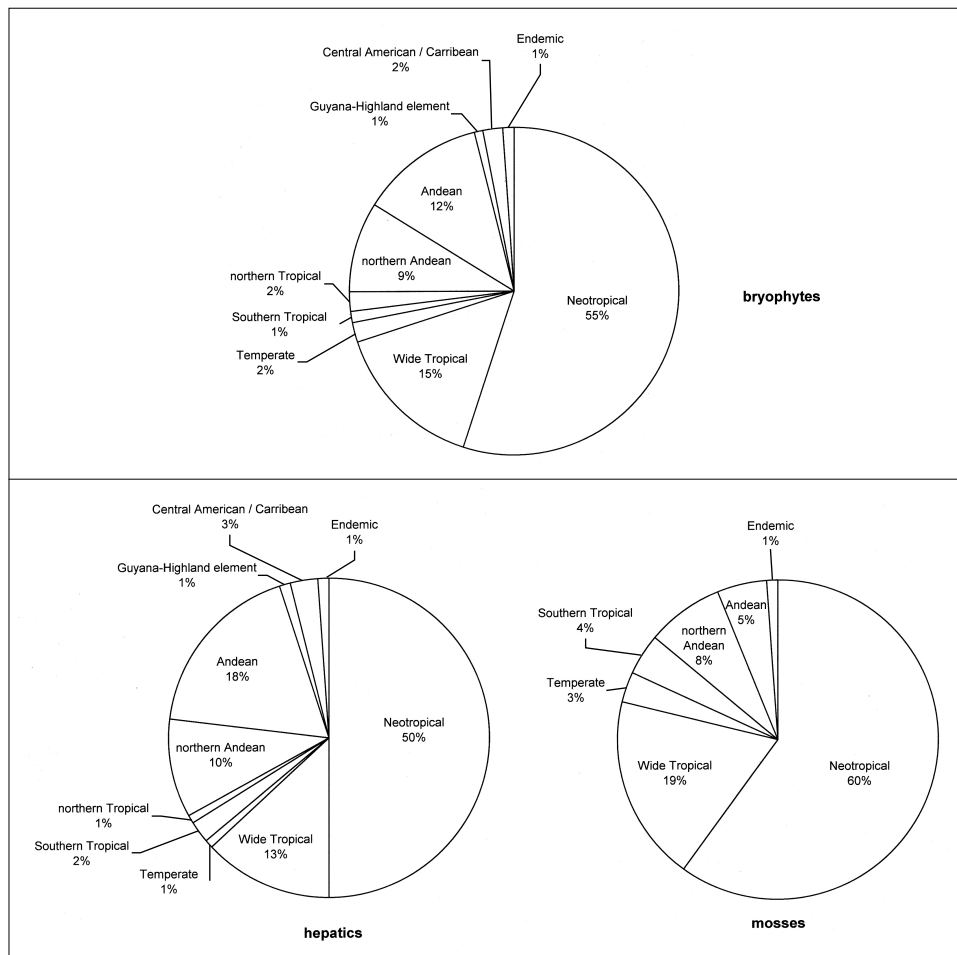


Fig. 1. Phytogeographical elements of the Reserva Biológica San Francisco.

the field, yet have thus far been little collected (Gradstein *et al.*, 2001). *Pleurozia heterophylla* is the rarest one of the two and was previously known from only two localities (Honduras and Mt. Roraima).

*Pleurozia paradoxa* and *P. heterophylla* are common in the upper montane woodland, between 2300-2750 m, and *P. paradoxa* extends to the páramo. The abundance of the two species in the upper montane woodland of the ECSF supports the notion that a very unusual vegetation is at hand.

A phytogeographical analysis of the species list shows that the majority of the species (70 %) are widespread neotropical (55%) or pantropical (15%) ones, 21% are restricted to the mountains of tropical America (12% Andean, 9% northern Andean), 4% are of temperate origin, 2% are Central American taxa and 1% are endemic to Ecuador (Fig. 1). Species with restricted range sizes (Andean, Central American, Guyana Highland element, endemic) gain in importance at higher elevations, in the upper montane forest, dwarfforest and páramo. About 30% of the species recorded from these higher elevations have restricted ranges or twice as many as in the lower montane belt (15%). It appears that range sizes are furthermore smaller in hepatics than in mosses; thus, the percentage of Andean species is significantly higher in hepatics than in mosses (18%; only 5% in mosses) whereas widespread neotropical species are more common in mosses (60%; in hepatics 50%) (Fig. 1). The phytogeographical make-up of the bryophyte flora of the reserve may be compared with that of the Parque de los Nevados in the Andes of Colombia (studied by Gradstein *et al.*, 1989) based on analysis of 350 species. The latter authors found that in montane forests below 3000 m about 80% of the bryophyte species are widespread tropical ones (neotropical or pantropical) and 15% are Andean in distribution (including endemic), having more restricted range sizes. Above 3000 m widespread tropical species are scarcer (50%) and Andean ones more common (30-45%). It thus appears that the bryophyte flora of the Reserva Biológica San Francisco is rather similar in terms of its biogeographical composition to that of montane forests below 3000 m in the Andes of Colombia. The increase of species with smaller ranges towards higher elevations is another marked biogeographical trend observed in the reserve and elsewhere in the Andes (Churchill *et al.*, 1995; Gradstein *et al.*, 1989; Gradstein, 1998). This pattern is probably due to the reduced total habitat area available in the mountains as compared with the lowlands and is also observed among higher plants (Balslev, 1988; Kessler, 2002).

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## APPENDIX 1

## List of Bryophyte species recorded from the Reserva Biológica San Francisco

**Localities (Loc.):** I = montane forest (1 800-2 150 m), II = upper montane forest (2,150-2,650 m), III = subalpine dwarf forest and páramo (2 650-3 150 m), IV = old field (former pasture), open vegetation (1 900 m).

**Habitat (Hab.):** b = bark, w = rotten wood, e = leaves (epiphylls), h = humus, s = soil, r = rock, a = artificial substrate (concrete).

**Geographical distribution (Distr.):** A = Andean, C = Central American and/or Caribbean, E = endemic to Ecuador, G = Guayana Highland element, N = Neotropical, nA = northern Andean (Costa Rica to northern Peru), T = wide Temperate, nT = northern Temperate, sT = southern Temperate, W = wide-tropical (= pantropical).

**Selected vouchers:** Nö = leg. N. M. NÖSKE, S. R. GRADSTEIN, I. HOLZ, M. SAUER and S. TORRACHI; Kü = leg. H. KÜRSCHNER, G. PAROLLY and S. SPORN. Up to 4 vouchers per species cited; existence of additional vouchers indicated by an asterisk. Specimens are deposited in the herbaria LOJA and QCA, with duplicates in GOET and B.

	<i>Loc.</i>	<i>Hab.</i>	<i>Distr.</i>	<i>Selected vouchers</i>
<b>HEPATICAE</b>				
<b>Acrobolbaceae</b>				
<i>Lethocolea glossophylla</i> (Spruce) Grolle	I	s	A	Nö 78
<i>Tylimanthus striolatus</i> Steph.	I	b	A	Nö 90
<b>Adelanthaceae</b>				
<i>Adelanthus decipiens</i> (Hook.) Mitt.	I-II	b, s	W	Kü 779a, 787, 831b* / Nö 1749
<i>Adelanthus lindenbergianus</i> (Lehm.) Mitt.	I, III	b	sT	Kü 528e, 879, 1013
<b>Aneuraceae</b>				
<i>Aneura pinguis</i> (L.) Dumort.	I	r	T	Nö 181
<i>Riccardia andina</i> (Spruce) Herzog	I	s	A	Nö 145-146
<i>Riccardia fucoidea</i> (Sw.) Mass.	III	h	N	Kü 1012
<i>Riccardia hansmeyerii</i> (Steph.) Meenks & De Jong	III	b	nA	Kü 691, 1014
<i>Riccardia pallida</i> (Spruce) Meenks & De Jong	I	w	nA	Kü 522
<b>Balantiopsidiaceae</b>				
<i>Neesioscyphus allionii</i> (Steph.) Grolle	I	r	nA	Nö 205
<b>Calypogeiaceae</b>				
<i>Calypogeia lechleri</i> (Steph.) Steph.	II	h	N	Nö 260
<i>Calypogeia oblata</i> Herzog	II	s	nA	Nö 247
<i>Calypogeia peruviana</i> Nees & Mont.	I	s	N	Nö 25, 182
<i>Mnioloma cyclostipa</i> (Spruce) R. M. Schust.	I-II	s	A	Kü 1119a / Nö 82
<b>Cephaloziaceae</b>				
<i>Albiellopsis dominicensis</i> (Spruce) Fulford	I	r	N	Nö 196
<i>Cephalozia crassifolia</i> (Lindenb. & Gottsche) Fulford	I	s, w	N	Kü 741b / Nö 31, 259
<i>Cephalozia crossii</i> Spruce	I	s	N	Nö 64
<i>Cephalozia</i> sp. nov.	II	s	E	Nö 247
<i>Nowellia evansii</i> Grolle	III	w	C	Nö 84
<i>Odontoschisma denudatum</i> (Nees) Dumort.	II	w	nT	Kü 930 / Nö 24, 107, 298
<b>Fossombroniaceae</b>				
<i>Fossombronia</i> sp.	I	s	–	Kü 1204 / Nö 209

	<i>Loc.</i>	<i>Hab.</i>	<i>Distr.</i>	<i>Selected vouchers</i>
<b>Geocalyceae</b>				
<i>Clasmatocolea vermicularis</i> (Lehm.) Grolle	I	s	sT	Nö 208
<i>Leptoscyphus amphibolius</i> (Nees) Grolle	I	b, s	N	Nö 54, 75, 187, 901
<i>Leptoscyphus cuneifolius</i> (Hook.) Mitt.	II	b	N	Nö 246
<i>Leptoscyphus gibbosus</i> (Taylor) Mitt.	II-III	b	N	Kü 854, 1003 / Nö 74
<i>Leptoscyphus intermedius</i> Grolle	I-II	b, e	A	Kü 832a, 1276d, 1278d / Nö 162
<i>Leptoscyphus porphyrius</i> (Nees) Grolle	I-II	b	N	Kü 684b, 979c, 1104a* / Nö 346
<i>Lophocolea bidentata</i> (L.) Dumort.	I	s	T	Nö 159, 185
<i>Lophocolea muricata</i> (Lehm.) Nees	I	b, e s	T	Kü 826b, 1191c, 1200a, 1202c*
<i>Lophocolea trapezoidea</i> Mont.	I	b, s	N	Kü 1202b / Nö 82
<b>Herbertaceae</b>				
<i>Herbertus acanthelium</i> Spruce	II	b	A	Kü 985
<i>Herbertus divergens</i> (Steph.) Herzog	II	b	N	Kü 647, 659, 790* / Nö 268
<i>Herbertus juniperoideus</i> (Sw.) Grolle	II	b	N	Kü 817, 859, 1116
<i>Herbertus pensilis</i> (Taylor) Spruce	I-III	b, s	N	Kü 856, 996* / Nö 51, 53*
<i>Herbertus serratus</i> Spruce	I-III	b	A	Kü 788, 846, 1004
<i>Herbertus subdentatus</i> (Steph.) Fulford	II	b	W	Kü 676, 994b
<i>Triandrophyllum subtrifidum</i> (Hook. & Taylor) Fulford & Hatch	I	r	sT	Kü 803, 804
<b>Jubulaceae</b>				
<i>Frullania apiculata</i> (Reinw., Blume & Nees) Dumort.	II, IV	b	W	Kü 644, 999 / Nö 297, 355
<i>Frullania arecae</i> (Spreng.) Gottsche	I	b	N	Kü 735, 757, 768 / Nö 194
<i>Frullania brasiliensis</i> Raddi	I-II, IV	b, r	N	Nö 311, 352* / Kü 649, 827*
<i>Frullania cuencensis</i> Taylor	I	b	A	Kü 973 / Nö 372
<i>Frullania ecklonii</i> (Spreng.) Gottsche	I	b	W	Nö 1705
<i>Frullania ericoides</i> (Nees) Mont.	IV	b	W	Nö 356, 364, 390
<i>Frullania intumescens</i> (Lehm. & Lindenb.) Lehm. & Lindenb.	I	b	N	Kü 539, 793* / Nö 309, 310*
<i>Frullania kunzei</i> Lehm. & Lindenb.	I, IV	b	N	Kü 957b / Nö 195, 316, 351*
<i>Frullania montagnei</i> Gottsche	I	b	A	Nö 322
<i>Frullania mucronata</i> (Lehm. & Lindenb.) Lehm. & Lindenb.	I, IV	b	A	Kü 527, 545b / Nö 363, 388
<i>Frullania peruviana</i> Gottsche	I	b	A	Nö 314
<i>Frullania riojaneirensis</i> (Raddi) Ångstr.	IV	b	W	Nö 1753 / Kü 506
<i>Frullania serrata</i> Gottsche	I-II	b	W	Nö 349, 376 / Kü 671, 814*
<i>Frullania</i> (sect. <i>Frullania</i> ) sp. 1	I,II	b	–	Nö 267, 378
<i>Frullania</i> (sect. <i>Diastoloba</i> ) sp. 2	I-II, IV	b	–	Nö 266, 375* / Kü 957, 1016
<i>Frullania</i> (sect. <i>Trachycolea</i> ) sp. 3	II	b	–	Nö 244
<i>Frullania winteri</i> Steph. var. <i>vanderhammenii</i> (Haarbrink) Yuzawa	I	b	nA	Kü 972
<b>Jungermanniaceae</b>				
<i>Anastrophyllum auritum</i> (Lehm.) Steph.	I	b, s	W	Nö 5 / Kü 688, 844, 1093
<i>Anastrophyllum piligerum</i> (Reinw. & Blume & Nees) Steph.	I	b	W	Nö 4

	<i>Loc.</i>	<i>Hab.</i>	<i>Distr.</i>	<i>Selected vouchers</i>
<i>Jamesoniella rubricaulis</i> (Nees) Grolle	I-III	b, s	N	Nö 62, 779* / Kü 669a, 816*
<i>Jungermannia callithrix</i> Lindenb. & Gottsche	I	r	N	Nö 200, 202
<i>Jungermannia sphaerocarpa</i> Hook.	I	s n	T	Nö 180
<i>Syzygiella anomala</i> (Lindenb. & Gottsche) Steph.	II	h	A	Kü 840
<i>Syzygiella manca</i> (Mont.) Steph.	I-II	b, s	nA	Nö 163 / Kü 1054, 1097a
<i>Syzygiella perfoliata</i> (Sw.) Spruce	I	r, w	N	Kü 931, 1061
<i>Syzygiella setulosa</i> Steph.	I-II	b	A	Kü 792, 812, 943, 1097b*
<i>Syzygiella tonduzana</i> Steph.	II	s	nA	Nö 289
<b>Lejeuneaceae</b>				
<i>Amphilejeunea reflexistipula</i> (Lehm. & Lindenb.) Gradst.	I	b	N	Kü 544, 551, 1196* / Nö 216
<i>Anoprolejeunea conferta</i> (C. F. W. C. F. W. Meissn. ex Spreng.) A. Evans	I, II	b, e	N	Kü 684c, 784* / Nö 434, 444*
<i>Aphanolejeunea angustissima</i> Steph.	I	e	N	Kü 1278t
<i>Aphanolejeunea microscopica</i> (Taylor) A. Evans var. <i>africana</i> (Pócs) Pócs & Bernecker	I	b	W	Kü 1200b
<i>Aphanolejeunea truncatifolia</i> Horik.	I	e	W	Kü 1277z
<i>Aureolejeunea fulva</i> R. M. Schust.	II	b n	A	Nö 10, 207
<i>Blepharolejeunea incongrua</i> (Lindenb. & Gottsche) van Slageren & Kruijt	I	e	A	Kü 1277q
<i>Brachiolejeunea laxifolia</i> (Taylor) Schiffn.	I	b	N	Nö 372
<i>Brachiolejeunea phyllorhiza</i> (Nees) Kruijt & Gradst.	I	b	N	Nö 211
<i>Bryopteris filicina</i> (Sw.) Nees	I	b	N	Kü 501, 733b, 1025* / Nö 18
<i>Ceratolejeunea brevinervis</i> (Spruce) A. Evans	I	b	C	Nö 451
<i>Ceratolejeunea filaria</i> (Taylor) Steph.	I,IV	b	A	Kü 779b, 1020* / Nö 32, 403*
<i>Ceratolejeunea grandiloba</i> Jack. & Steph.	I	b, e	nA	Kü 575aa, 933, 1107h* / Nö 366
<i>Ceratolejeunea patentissima</i> (Hampe & Gottsche) A. Evans	II	b, e	N	Kü 1014, 1015b / Nö 248, 262
<i>Cheilolejeunea acutangula</i> (Nees) Grolle	I	b	N	Nö 389
<i>Cheilolejeunea choachina</i> (Gottsche) Gradst.	II	b	nA	Nö 68
<i>Cheilolejeunea inflexa</i> (Hampe ex Lehm.) Grolle	I	b	N	Kü 1011, 1120b, 1134c
<i>Cheilolejeunea oncophylla</i> (Ångstr.) Grolle & Reiner	II	b	N	Kü 779c / Nö 245, 246
<i>Cheilolejeunea revoluta</i> (Herzog) Grolle & Gradst.	I-II	b	NA	Kü 544, 1127, 1196
<i>Colura tenuicornis</i> (A. Evans) Steph.	I	b	W	Nö 34
<i>Cyclolejeunea peruviana</i> (Lehm. & Lindenb.) A. Evans	I	b, e	N	Kü 1062, 1276a, 1278a
<i>Dicranolejeunea axillaris</i> (Nees. & Mont.) Schiffn.	I	b	N	Nö 40
<i>Diplasiolejeunea involuta</i> Winkler subsp. <i>andicola</i> Pócs	II	b n	A	Nö 250
<i>Diplasiolejeunea johnsonii</i> A. Evans	IV	b	C	Nö 1843
<i>Diplasiolejeunea pauckertii</i> (Nees) Steph.	I-II	b	A	Nö 38, 246
<i>Diplasiolejeunea pluridentata</i> Schäf.-Verw.	II	b	N	Nö 37, 264
<i>Diplasiolejeunea unidentata</i> (Lehm. & Lindenb.) Schiffn.	IV	b	N	Nö 1057
<i>Drepanolejeunea anoplanta</i> (Spruce) Steph.	II	b	N	Nö 1726
<i>Drepanolejeunea bidens</i> Steph.	II	b	N	Kü 683, 783b, 916 / Nö 372
<i>Drepanolejeunea campanulata</i> (Spruce) Steph.	I	e n	A	Kü 1277n
<i>Drepanolejeunea granatensis</i> (Jack & Steph.) Bischl.	IV	b	nA	Nö 407



	<i>Loc.</i>	<i>Hab.</i>	<i>Distr.</i>	<i>Selected vouchers</i>
<i>Drepanolejeunea inchoata</i> (C. F. W. Meissn.) Steph.	II	b, e	N	Kü 971, 1107a, 1276b / Nö 271
<i>Frullanooides densifolia</i> Raddi	I-IV	b	N	Kü 536, 762, 945 / Nö 1835
<i>Frullanooides laciniatiflora</i> (Loitl.) van Slageren	I	b	A	Kü 634, 936
<i>Harpalejeunea stricta</i> (Lindenb. & Gottsche) Steph.	I	b	N	Kü 832 / Nö 367, 905
<i>Harpalejeunea tridens</i> (Besch. & Spruce) Steph.	I	e	N	Kü 1107w, 1276l, 1277w
<i>Lejeunea cerina</i> Lehm. & Lindenb.	I	b	N	Nö 184, 425
<i>Lejeunea flava</i> (Sw.) Nees	I	b, e	W	Kü 1113, 1192a / Nö 412, 424*
<i>Lejeunea laetevirens</i> Nees & Mont.	I	b	N	Kü 592, 948b, 717
<i>Lejeunea lepida</i> Lindenb. & Gottsche	II	b	N	Kü 1234
<i>Lejeunea phyllobola</i> Nees & Mont.	I	b	N	Nö 204
<i>Lejeunea ramulosa</i> Spruce	I, IV	b	A	Kü 772, 1023* / Nö 409, 430*
<i>Lejeunea tapajosensis</i> Spruce	I	b	N	Nö 198
<i>Lepidolejeunea involuta</i> (Gottsche) Grolle	I	b	N	Nö 454
<i>Leptolejeunea</i> sp.	II	e	-	Nö 302
<i>Leucolejeunea xanthocarpa</i> (Lehm. & Lindenb.) A. Evans	IV	b	W	Kü 684a, 959* / Nö 878, 882*
<i>Lindigianthus cipaconeus</i> (Gottsche) Kruijt & Gradst.	I	b	nA	Nö 81
<i>Marchesinia brachiata</i> (Sw.) Schiffn.	I	r	W	Nö 199
<i>Marchesinia robusta</i> (Mitt.) Schiffn.	I	b	A	Nö 89
<i>Microlejeunea bullata</i> (Taylor) Steph.	I, IV	b	N	Kü 769a, 1200b / Nö 979, 1808*
<i>Odontolejeunea lunulata</i> (Nees) Schiffn.	I	e	N	Kü 1278v
<i>Omphalanthus filiformis</i> (Sw.) Nees	I-III	b	N	Nö 110, 178*; Kü 704, 737*
<i>Omphalanthus wallisii</i> (Jack & Steph.) Gradst.	I	b	nA	Nö 379
<i>Oryzolejeunea saccatiloba</i> (Steph.) Gradst.	II	b	N	Kü 532, 549
<i>Taxilejeunea cf. isocalycina</i> (Nees) Steph.	I	s	N	Nö 203
<i>Taxilejeunea pterigonia</i> (Lehm. & Lindenb.) Schiffn.	I	b	N	Kü 721, 802* / Nö 164, 165
<b>Lepicoleaceae</b>				
<i>Lepicolea pruinosa</i> (Taylor) Spruce	I-III	b	N	Kü 652, 666* / Nö 65, 66
<b>Lepidoziaceae</b>				
<i>Bazzania affinis</i> (Lindenb. & Gottsche) Trevis.	I	b	A	Nö 12, 15
<i>Bazzania bidens</i> (Nees) Trevis.	II	b	C	Nö 253-255
<i>Bazzania cuneistipula</i> (Gottsche & Lindenb.) Trevis.	I-II	b	N	Kü 777, 805, 925b* / Nö 268
<i>Bazzania denticulata</i> (Lindenb. & Gottsche) Trevis.	I-II	w	N	Kü 694, 913 / Nö 1849
<i>Bazzania diversicuspis</i> Spruce	I-II	b, h, e	N	Kü 1033, 1276g / Nö 252
<i>Bazzania gracilis</i> (Hampe & Gottsche) Steph.	II	s	N	Sauer MS-E 157
<i>Bazzania hookeri</i> (Lindenb.) Trevis.	I-II	b	N	Kü 661, 672* / Nö 13, 14*
<i>Bazzania jamaicensis</i> (Lehm. & Lindenb.) Trevis.	II	b	N	Kü 674, 693
<i>Bazzania longistipula</i> (Lindenb.) Trevis.	I-III	b	N	Kü 789, 813, 1002* / Nö 296
<i>Bazzania phyllobola</i> Spruce	I-II	b	N	Kü 668, 796, 990a, 1049b*
<i>Bazzania robusta</i> Spruce	I	b	N	Nö 16
<i>Bazzania taleana</i> (Gottsche) Fulford	I	b	N	Nö 306
<i>Kurzia capillaris</i> (Sw.) Grolle	I-II	b, s	N	Kü 778, 863 / Nö 83
<i>Lepidozia cupressina</i> (Sw.) Lindenb.	I	b, w	W	Kü 753, 807, 810* / Nö 307
<i>Lepidozia incurvata</i> Lindenb.	I-II	b	A	Nö 72-73
<i>Lepidozia macrocolea</i> Spruce	II	b	A	Nö 71
<i>Micropterygium campanense</i> Spruce	II	b	G	Kü 739 / Nö 285
<i>Micropterygium reimersianum</i> Herzog	II	s	G	Nö 276, 294
<i>Mytilopsis albifrons</i> Spruce	II	b	A	Kü 982
<i>Telaranea nematodes</i> (Gottsche ex Austin) M. Howe	II	b, s	W	Kü 698 / Nö 17, 261

	<i>Loc.</i>	<i>Hab.</i>	<i>Distr.</i>	<i>Selected vouchers</i>
<b>Marchantiaceae</b>				
<i>Dumortiera hirsuta</i> (Sw.) Nees	I	s	W	Nö 45
<i>Marchantia chenopoda</i> L.	I	s	N	Kü 627 / Nö 88, 213
<b>Metzgeriaceae</b>				
<i>Metzgeria agnewii</i> Kuwah.	I	b	W	Nö 1300
<i>Metzgeria decipiens</i> (C. Massal.) Schiffn.	I	b	W	Kü 730, 825* / Nö 98, 337*
<i>Metzgeria herminieri</i> Schiffn.	I	b	C	Nö 1250
<i>Metzgeria lechleri</i> Steph.	I	b	N	Kü 951 / Nö 1284, 1312, 1324*
<i>Metzgeria leptoneura</i> Spruce	I	b	W	Kü 740, 920, 1094* / Nö 334
<i>Metzgeria neotropica</i> Kuwah.	I	b	A	Nö 336
<i>Metzgeria polytricha</i> Spruce	I	b	A	Kü 1190 / Nö 95, 97
<b>Monocleaceae</b>				
<i>Monoclea gottschei</i> subsp. <i>elongata</i> Gradst. & Mues	I	s	N	Nö 100, 191
<b>Pallaviciniaceae</b>				
<i>Jensenia erythropus</i> (Gottsche) Grolle	I	b	N	Nö 193
<i>Symphogyna aspera</i> Steph.	I	s	N	Kü 731 / Nö 192
<i>Symphogyna brasiliensis</i> Nees	I	s	W	Nö 158
<i>Symphogyna brongniartii</i> Mont.	I	s	N	Nö 159, 183
<i>Symphogyna bogotensis</i> (Gottsche) Steph.	I	s	nA	Nö 210
<b>Pelliaceae</b>				
<i>Noteroclada confluens</i> Taylor	I	s	W	Nö 105
<b>Plagiochilaceae</b>				
<i>Plagiochila aerea</i> Taylor	I-III	b	N	Kü 561, 654, 811* / Nö 119
<i>Plagiochila bifaria</i> (Sw.) Lindenb.	I-III	b	N	Kü 630, 786b, 833* / Nö 121
<i>Plagiochila bryopteroides</i> Spruce	I	b, w	N	Kü 714 / Sauer MS-E 82, 164
<i>Plagiochila choachina</i> Gottsche	I-III	b	N	Kü 911, 914, 923c* / Nö 11
<i>Plagiochila deflexirama</i> Taylor	I	b	N	Kü 641, 747, 758* / Nö 122
<i>Plagiochila diversifolia</i> Lindenb. & Gottsche	I	b	A	Holz EC 01-17
<i>Plagiochila heterophylla</i> Lindenb. ex Lehm.	I	b	N	Kü 791, 1037 / Nö 304
<i>Plagiochila macrostachya</i> Lindenb.	I	b	N	Kü 537
<i>Plagiochila montagnei</i> Nees	I	b	N	Kü 725, 760, 767, 923b*
<i>Plagiochila oresitropha</i> Spruce	I	b	nA	Kü 670, 1105* / Nö 120, 212*
<i>Plagiochila pachyloma</i> Taylor	II	b	A	Kü 620, 623, 694b, 1026*
<i>Plagiochila papillifolia</i> Steph.	I	b	N	Nö 193, 292 / Kü 950
<i>Plagiochila patzschkei</i> Steph.	I	b	A	Nö 1275 / Kü 822
<i>Plagiochila raddiana</i> Lindenb.	I	b	N	Holz EC 01-45 / Kü 638, 1188
<i>Plagiochila rutilans</i> Lindenb.	I	b	N	Kü 507 / Nö 123, 126
<i>Plagiochila stricta</i> Lindenb.	I	h,r	N	Kü 726, 947, 983* / Sauer MS-E 44
<i>Plagiochila superba</i> (Nees ex Sprengel) Mont. & Nees	I	b	N	Kü 748, 751, 909* / Nö 126
<i>Plagiochila tabinensis</i> Steph.	I-III	b	A	Kü 923a, 991* / Nö 125, 281
<i>Plagiochila</i> (sect. <i>Vagae</i> ) sp. 1	I	b	-	Kü 642
<b>Pleuroziaceae</b>				
<i>Pleurozia heterophylla</i> Steph. ex Fulford	II	b	A	Kü 701, 711, 857* / Nö 288
<i>Pleurozia paradoxa</i> (Jack) Schiffn.	II-III	b	A	Kü 851, 1005 / Nö 173, 286

	<i>Loc.</i>	<i>Hab.</i>	<i>Distr.</i>	<i>Selected vouchers</i>
<b>Porellaceae</b>				
<i>Porella crispata</i> (Hook.) Trevis.	I	b	N	Kü 553 / Nö 547, 1777
<b>Radulaceae</b>				
<i>Radula fendleri</i> Gottsche	I	b	N	Nö 441, 920, 927
<i>Radula javanica</i> Gottsche	I	b, r	W	Kü 517, 565 / Nö 410
<i>Radula mammosa</i> Spruce	I	e	N	Kü 1107s, 1279a
<i>Radula mazarunensis</i> K. Yamada	I	b	G	Nö 1028
<i>Radula mexicana</i> Lindenb. ex Gottsche	I	b	N	Nö 1367
<i>Radula nudicaulis</i> Steph.	I	r	N	Nö 140
<i>Radula quadrata</i> Gottsche	I, IV	b	N	Nö 340, 1239, 1742, 1403*
<i>Radula tectiloba</i> Steph.	IV	b	N	Nö 1003, 1403
<i>Radula voluta</i> Taylor	I	b, r	N	Kü 505, 969* / Nö 201, 1790
<b>Scapaniaceae</b>				
<i>Scapania portoricensis</i> Hampe & Gottsche	II	b	N	Kü 645 / Nö 147
<b>Trichocoleaceae</b>				
<i>Trichocolea tomentosa</i> (Sw.) Gottsche	I	b	N	Kü 795, 928 / Nö 167, 168
<b>ANTHOCEROTAE</b>				
<b>Anthocerotaceae</b>				
<i>Anthoceros punctatus</i> L.	I	s	T	Nö 190
<i>Phaeoceros tenuis</i> (Spruce) Hässel	I	s	N	Kü 1203
<b>Dendrocerotaceae</b>				
<i>Megaceros vincentianus</i> (Lehm. & Lindenb.) Campb.	I	s	N	Nö 7
<b>MUSCI</b>				
<b>Adelotheciaceae</b>				
<i>Adelothecium bogotense</i> (Hampe) Mitt.	I	b	W	Kü 535 / Nö 2
<b>Amblystegiaceae</b>				
<i>Campylium polygamum</i> (Schimp.) C. E. O. Jensen	I	s	T	Nö 215
<b>Bartramiaceae</b>				
<i>Breutelia</i> sp.	II	s	-	Nö 283
<i>Leiomela bartramioides</i> (Hook.) Paris	I	s	W	Kü 567 / Nö 67
<i>Philonotis uncinata</i> (Schwägr.) Brid.	I	s	W	Nö 96, 111
<b>Brachytheciaceae</b>				
<i>Aerolindigia capillacea</i> (Hornsch.) Menzel	I	b	W	Nö 3
<b>Bryaceae</b>				
<i>Anomobryum julaceum</i> (Schrad. ex P. Gaertn., B. Mey. & Scherb.) Schimp.	I	s	A	Kü 1206 / Nö 6
<i>Brachymerium consimile</i> (Mitt.) A. Jaeger	I	b	N	Kü 1024
<i>Brachymerium speciosum</i> (Hook. & Wils.) Steere	I	b	N	Kü 662
<i>Bryum argenteum</i> Hedw.	I	s	T	Nö 19
<i>Bryum richardsii</i> Sharp	I	s	N	Kü 775 / Nö 20, 21
<i>Epipterygium immarginatum</i> Mitt.	I	s	N	Nö 46
<i>Pohlia elongata</i> Hedw.	I	s	n	T Nö 186
<i>Rhodobryum beyrichianum</i> (Hornsch.) Schimp.	I	h, s	N	Kü 503 / Nö 143
<i>Rhodobryum grandifolium</i> (Taylor) Schimp.	II	s	N	Nö 300
<b>Calymperaceae</b>				
<i>Calymperes palisotii</i> Schwägr.	I	b	W	Kü 967
<i>Syrrophodon gaudichaudii</i> Mont.	I, IV	b	W	Nö 161, 175, 688, 777*

	<i>Loc.</i>	<i>Hab.</i>	<i>Distr.</i>	<i>Selected vouchers</i>
<i>Syrrhopodon leprieurii</i> Mont.	I	b	N	Kü 927, 1040, 1047d / Nö 864
<i>Syrrhopodon lycopodioides</i> (Sw. ex Brid.) Müll. Hal	I	b	N	Nö 160
<i>Syrrhopodon prolifer</i> Schwägr.	I	b	W	Nö 844, 849
<b>Crypheaceae</b>				
<i>Schoenobryum rubricaula</i> (Taylor) Manuel	I-II	b	nA	Kü 703d / Nö 148
<b>Daltoniaceae</b>				
<i>Daltonia longifolia</i> Taylor	I	b	N	Kü 1191a, 1194b
<b>Dicranaceae</b>				
<i>Atractylorcarpus longisetus</i> (Hook.) Bartr.	II	h	nA	Kü 687, 906 / Nö 251
<i>Bryohumbertia filifolia</i> (Hornsch.) J.-P. Frahm	II	b	N	Kü 820, 926, 1047e, 1053
<i>Campylopus anderssonii</i> (Müll. Hal.) A. Jaeger	I	b	N	Kü 665a, 665b, 782b
<i>Campylopus arctocarpus</i> (Hornsch.) Mitt.	I-II	b	N	Kü 655, 690, 853
<i>Campylopus fragilis</i> (Brid.) Bruch & Schimp.	I	b	nT	Kü 566 / Nö 1060, 1079
<i>Campylopus huallagensis</i> Broth.	I	b, s	A	Kü 643, 667, 1045* / Nö 28
<i>Campylopus richardii</i> Brid.	I-II, IV	b, s	N	Kü 995 / Nö 44
<i>Holomitrium arboreum</i> Mitt.	I-III	b, s	N	Kü 681b, 843b* / Nö 42, 682
<i>Holomitrium pulchellum</i> Mitt.	I-IV	b	N	Kü 695, 837* / Nö 55, 290
<i>Holomitrium sinuosum</i> B.H. Allen	II	b, s	nA	Kü 653, 678, 703c* / Nö 41
<i>Pilopogon guadeloupensis</i> (Brid.) J.-P. Frahm	I	s	N	Nö 116
<i>Schliephackea meteroides</i> (Williams) Broth.	I	s	nA	Sauer MS-E 133
<b>Fissidentaceae</b>				
<i>Fissidens asplenioides</i> Hedw.	I	r	W	Kü 798a
<b>Funariaceae</b>				
<i>Entosthodon bonplandii</i> (Hook.) Mitt.	I	s	N	Kü 1092 / Nö 214
<b>Hookeriaceae</b>				
<i>Hookeria acutifolia</i> Hook.	I	s	W	Nö 56
<b>Hypnaceae</b>				
<i>Hypnum amabile</i> (Mitt.) Hampe	II	h	N	Nö 269
<i>Mittenothamnium reptans</i> (Hedw.) Cardot	I	e	N	Kü 521 / Sauer MS-E 188
<i>Vesicularia vesicularis</i> (Schwägr.) Broth. var. <i>rutilans</i> (Brid.) W. R. Buck	I	b	N	Kü 798b
<b>Hypopterygiaceae</b>				
<i>Hypopterygium tamarisci</i> (Sw.) Brid. ex Müll. Hal.	I	s	N	Nö 61
<b>Leucobryaceae</b>				
<i>Leucobryum antillarum</i> Schimp.	I, IV	b, s	N	Kü 526, 749, 907 / Nö 80, 617, 698
<i>Leucobryum giganteum</i> Müll. Hal.	I-II	s	N	Kü 564, 697, 929 / Nö 79
<i>Octoblepharum erectifolium</i> Mitt.	II	s	N	Kü 993 / Nö 106
<b>Macromitriaceae</b>				
<i>Groutiella apiculata</i> (Hook.) Crum & Steere	II	b	N	Kü 1047b, 1133
<i>Groutiella chimborazensis</i> (Spruce) Florsch.	I-II, IV	b	N	Kü 1128 / Nö 632, 640, 1747*
<i>Groutiella tomentosa</i> (Hornsch.) Wijk & Marg.	I, IV	b	W	Kü 724 / Nö 636, 1110, 1147*
<i>Macromitrium aureum</i> Müll. Hal.	I-II	b	nA	Kü 557, 1118 / Nö 645, 1396
<i>Macromitrium cirrosum</i> (Hedw.) Brid.	I-II	b	N	Kü 533, 657, 761* / Nö 1397

	<i>Loc.</i>	<i>Hab.</i>	<i>Dist.</i>	<i>Selected vouchers</i>
<i>Macromitrium guatemalense</i> Müll. Hal.	I	b	N	Kü 534a
<i>Macromitrium perreflexum</i> Steere	II	b	E	Kü 867, 992 / Nö 172, 278
<i>Macromitrium punctatum</i> (Hook. & Grev.) Brid.	II	b	N	Kü 637
<i>Macromitrium trichophyllum</i> Mitt.	I-II, IV	b	nA	Kü 681, 696b* / Nö 87, 279*
<i>Macromitrium ulophyllum</i> Mitt.	II	b	nA	Kü 696, 702, 835b* / Nö 280
<i>Schlotheimia angustata</i> Mitt.	I	b	N	Kü 534b / Nö 639, 661
<i>Schlotheimia torquata</i> (Hedw.) Brid.	IV	b	N	Kü 664 / Nö 619-621
<b>Meteoriaceae</b>				
<i>Meteoridium remotifolium</i> (Müll. Hal.) Manuel	I	b	N	Kü 511, 528a* / Nö 92; 1054
<i>Meteorium illecebrum</i> Sull.	I	b	N	Kü 543, 764a, 830 / Nö 91
<i>Orthostichella pentasticha</i> (Brid.) W. R. Buck	I	b	N	Kü 532, 722* / Nö 60, 94*
<i>Papillaria nigrescens</i> (Sw. ex Hedw.) A. Jaeger	I	b	N	Kü 529, 538, 639, 764c
<i>Pilotrichella flexilis</i> (Hedw.) Ångstr.	I-II	b	N	Kü 689a, 1126 / Nö 117
<i>Squamidium isocladum</i> (Ren. & Cardot) Broth.	I	b	N	Nö 702
<i>Squamidium leucotrichum</i> (Taylor) Broth.	I-II	b	N	Kü 528 b, 660* / Nö 93, 155
<i>Squamidium nigricans</i> (Hook.) Broth.	I	b	N	Kü 1029
<i>Toloxis imponderosa</i> (Taylor) W. R. Buck	I, IV	b, r	N	Kü 640 / Nö 189, 701, 1120*
<i>Zelometorium patulum</i> (Hedw.) Manuel	I	b	N	Kü 723, 736, 773
<b>Mniaceae</b>				
<i>Plagiomnium rynchophorum</i> (Hook.) T. J. Kop.	I	s	N	Kü 518 / Nö 127-128
<b>Neckeraceae</b>				
<i>Neckera scabridens</i> Müll. Hal.	I	b	N	Kü 729 / Nö 102
<i>Neckera urnigera</i> Müll. Hal.	I	b	N	Nö 103, 104
<i>Neckeropsis undulata</i> (Hedw.) Reichardt	I	b	N	Kü 502, 732 / Nö 101
<b>Orthotrichaceae</b>				
<i>Zygodon reinwardtii</i> (Hornsch.) A. Braun	I, IV	b	W	Kü 513, 966* / Nö 149, 171*
<b>Phyllogoniaceae</b>				
<i>Phyllogonium fulgens</i> (Hedw.) Brid.	II	b	N	Kü 576b / Nö 112
<i>Phyllogonium viscosum</i> (P. Beauv.) Mitt.	I	b	nA	Kü 558 / Nö 113
<b>Pilotrichaceae</b>				
<i>Actinodontium integrifolium</i> (Broth.) S. P. Churchill	I	b	N	Kü 1191b
<i>Cyclodictyon albicans</i> (Hedw.) O. Kuntze	I	s, w	N	Kü 559-560, 733a* / Nö 35
<i>Hypnella diversifolia</i> (Mitt.) A. Jaeger	I-II	b	N	Kü 689b, 743b, 1132 / Nö 58
<i>Lepidopilum diaphanum</i> (Hedw.) Mitt.	I	s	N	Kü 1194a / Nö 70
<i>Lepidopilum tortifolium</i> Mitt.	I	s	N	Kü 512
<i>Thamniopsis undata</i> (Hedw.) W. R. Buck	I	s	N	Kü 752 / Nö 22, 57
<b>Polytrichaceae</b>				
<i>Atrichum polycarpum</i> (Müll. Hal.) Mitt.	I	s	nT	Nö 9
<i>Polytrichastrum tenellum</i> (Müll. Hal.) G. L. Sm.	I	s	N	Nö 130
<i>Polytrichum juniperinum</i> Hedw.	II	s	T	Nö 282
<b>Pottiaceae</b>				
<i>Hyophila involuta</i> (Hook.) A. Jaeger	I	s	W	Nö
<i>Leptodontium viticulosoides</i> (P. Beauv.) Wijk & Margad.	II	s	W	Nö 76, 272
<i>Oxystegus tenuirostris</i> (Hook. & Taylor) A. J. E. Sm.	I	b	W	Kü 954

	<i>Loc.</i>	<i>Hab.</i>	<i>Distr.</i>	<i>Selected vouchers</i>
<i>Pseudosymblepharis schimperiana</i> (Paris) H. A. Crum	I	b	N	Kü 520
<i>Streptopogon calymperes</i> Müll. Hal. ex Geh.	I	b	W	Nö 157
<b>Prionodontaceae</b>				
<i>Prionodon densus</i> Hedw. (incl. <i>P. luteovirens</i> )	I-III	b	W	Kü 516, 636* / Nö 305, 741*
<i>Prionodon fuscoluteus</i> Hampe	II	b	N	Kü 658 / Nö 138
<b>Pterobryaceae</b>				
<i>Pirella trichomanoides</i> (Mitt.) Cardot	I	b	N	Kü 504b
<i>Pterobryon densum</i> (Schwägr.) Hornsch.	I, IV	b	N	Kü 556, 720* / Nö 135, 755*
<b>Racopilaceae</b>				
<i>Racopilum tomentosum</i> (Hedw.) Brid.	I	w	W	Kü 519
<b>Rhacocarpaceae</b>				
<i>Rhacocarpus purpurascens</i> (Brid.) Paris	II	s	W	Kü 841 / Nö 141
<b>Rhizogoniaceae</b>				
<i>Leptotheca boliviana</i> Herzog	II	b	A	Kü 1059a / Nö 77
<i>Pyrrhobryum spiniforme</i> (Hedw.) Mitt.	I	b	W	Nö 115, 137, 177, 769*
<i>Rhizogonium novae-hollandiae</i> (Brid.) Brid.	I	b	W	Kü 754, 908 / Nö 142
<b>Sematophyllaceae</b>				
<i>Acroporium estrellae</i> (Müll. Hal.) W. R. Buck & Schäf.-Verw.	I	b	N	Kü 546, 974, 1193a / Nö 1
<i>Acroporium pungens</i> (Hedw.) Broth.	I-II	b	N	Kü 685, 921, 1034, 1058*
<i>Aptychella prolifera</i> (Broth.) Herzog	I-II	b	N	Kü 707c, 986, 1098 / Nö 8
<i>Donnellia commutata</i> (Müll. Hal.) W. R. Buck	I	b	N	Kü 824
<i>Sematophyllum cuspidiferum</i> Mitt.	I	b	N	Kü 755, 1060
<i>Sematophyllum subsimplex</i> (Hedw.) Mitt.	I	w	N	Kü 1059b / Nö 150
<i>Sematophyllum</i> cf. <i>tequendamense</i> (Hampe) Mitt.	I	b	N	Kü 1195
<i>Trichosteleum papillosum</i> (Hornsch.) A. Jaeger	I	b	N	Kü 1193b, 1201
<b>Sphagnaceae</b>				
<i>Sphagnum</i> (sect. <i>Acutifolia</i> ) sp. 1	III	s	-	Nö 152
<i>Sphagnum sparsum</i> Hampe	I	s	nA	Nö 154
<b>Thamnobryaceae</b>				
<i>Porotrichodendron superbum</i> (Taylor) Broth.	I-II	b	A	Kü 504a, 515, 528c* / Nö 131
<i>Porotrichum expansum</i> (Taylor) Mitt.	I	r	nA	Kü 719, 800, 1056 / Nö 132
<i>Porotrichum korthalsianum</i> (Dozy & Molck.) Mitt.	I	b, r	N	Kü 801 / Nö 133
<b>Thuidiaceae</b>				
<i>Cyrtohypnum involvens</i> (Hedw.) W. R. Buck & Crum	I	s	N	Kü 509 / Nö 36
<i>Thuidium delicatulum</i> (Hedw.) Schimp.	I	s	nT	Kü 918 / Nö 170
<i>Thuidium tomentosum</i> Schimp.	I	b	N	Kü 715 / Nö 169