

Epiphytes in Wooded Pastures: Isolation Matters for Lichen but not for Bryophyte Species Richness

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Supporting information:

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Fig. A. Aerial photo of the study site Grosser Ahornboden (Tyrol, Austria). © G. Haslwanter/Naturpark Karwendel.

Table A. The six study sites. Location, area of the surveyed sycamore maple wooded pastures, number of trees at the sites, number of sampled trees (randomly selected trees + additional trees with occurrence of *Tayloria rudolphiana*) and altitudinal range of the sampled trees.

Code, Site	Location	Area [km ²]	No. of trees	No. of sampled trees	Altitudinal range [m a.s.l.]
RB , Reichenbachtal	Schattenhalb and Grindelwald, Bern, Switzerland	2.91	636	16 + 3	1295 - 1529
MG , Meniggrund	Diemtigen, Bern, Switzerland	1.69	606	16	1261 - 1444
GA , Grosser Ahornboden	Vomp, Tyrol, Austria	1.97	1867	12 + 4	1119 - 1228
WF , Wanker Fleck	Halblech, Bavaria, Germany	0.43	93	12	1128 - 1155
GN , Gnadenalm	Untertauern, Salzburg, Austria	1.02	148	12 + 3	1048 - 1439
GT , Glemmtal	Saalbach-Hinterglemm, Salzburg, Austria	0.26	55	12	1181 - 1394

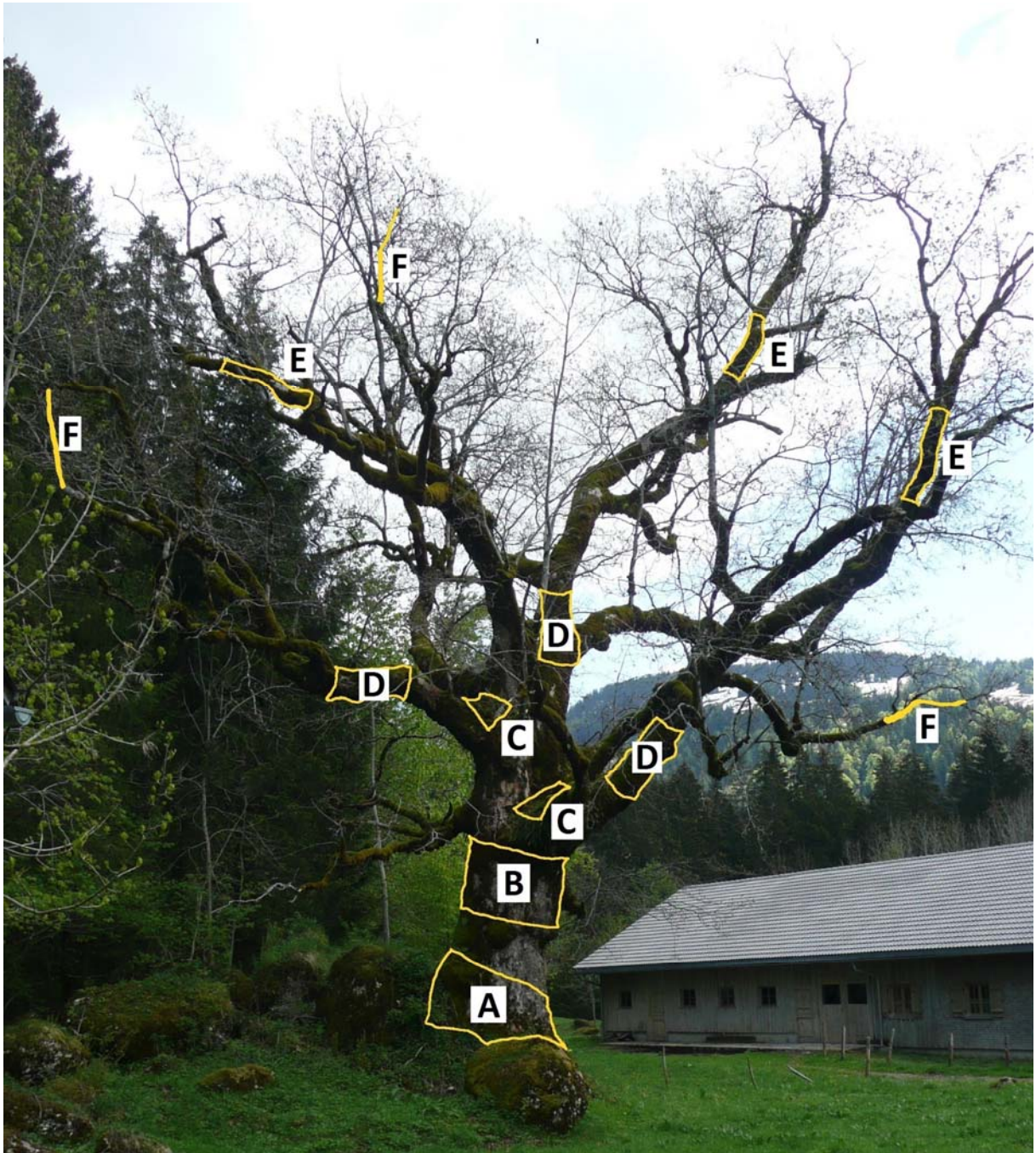


Fig. B. Sampling design applied to record the per tree richness of bryophytes and lichens on sycamore maple trees. A total of 13 plots were placed in the different microhabitats of each focal tree: one plot was placed on the tree base (A), one on the stem below the crown (B), two in the major crutches (C), three on the major branches (D), three on branches of intermediate thickness (E), and three on thin branches in the outer crown (F). Within each plot, the presence of all bryophyte and lichen species was recorded.

Table B. Bryophyte and lichen species recorded on 90 sycamore maple trees (*Acer pseudoplatanus*) at six sites in the northern European Alps. Red-list status (RL) according to Schnyder et al. (2004) and Scheidegger et al. (2002): CR critically endangered, EN endangered, VU vulnerable, NT near threatened, LC least concern, DD data deficiency, NE not evaluated. Species not included in Schnyder et al. (2004) or Scheidegger et al. (2002) are listed as NE*. Red-listed species (CR, EN or VU) are printed in bold. Size of predominant diaspores: l large diaspores, s small diaspores. Habitat preference: E epiphyte, nE non-epiphyte, uc unclassified.

No.	Taxon	RL	Diaspore size	Habitat preference
Bryophytes				
1	<i>Abietinella abietina</i> (Hedw.) M.Fleisch.	LC	l	nE
2	<i>Amblystegium serpens</i> (Hedw.) Schimp.	NE	s	nE
3	<i>Amblystegium subtile</i> (Hedw.) Schimp.	LC	s	E
4	<i>Anomodon attenuatus</i> (Hedw.) Huebener	LC	l	nE
5	<i>Anomodon longifolius</i> (Brid.) Hartm.	LC	l	nE
6	<i>Anomodon viticulosus</i> (Hedw.) Hook. & Taylor	LC	l	nE
7	<i>Antitrichia curtipendula</i> (Hedw.) Brid.	NE	l	E
8	<i>Apometzgeria pubescens</i> (Schrank) Kuwah.	LC	l	nE
9	<i>Atrichum undulatum</i> (Hedw.) P.Beauv.	LC	s	nE
10	<i>Barbilophozia barbata</i> (Schreb.) Loeske	LC	l	nE
11	<i>Barbilophozia lycopodioides</i> (Wallr.) Loeske	LC	l	nE
12	<i>Barbula unguiculata</i> Hedw.	LC	s	nE
13	<i>Bartramia halleriana</i> Hedw.	LC	s	nE
14	<i>Blepharostoma trichophyllum</i> (L.) Dumort. subsp. <i>trichophyllum</i>	LC	s	nE
15	<i>Brachytheciastrum velutinum</i> (Hedw.) Ignatov & Huttunen	LC	s	nE
16	<i>Brachythecium albicans</i> (Hedw.) Schimp.	LC	l	nE
17	<i>Brachythecium campestre</i> (Müll.Hal.) Schimp.	VU	s	nE
18	<i>Brachythecium geheebii</i> Milde	CR	l	nE
19	<i>Brachythecium glareosum</i> (Spruce) Schimp.	LC	l	nE
20	<i>Brachythecium rivulare</i> Schimp.	LC	s	nE
21	<i>Brachythecium rutabulum</i> (Hedw.) Schimp.	LC	s	nE
22	<i>Brachythecium salebrosum</i> (F.Weber & D.Mohr) Schimp., nom. cons.	LC	s	nE
23	<i>Brachythecium tommasinii</i> (Boulay) Ignatov & Huttunen	LC	l	nE
24	<i>Bryoerythrophyllum ferruginascens</i> (Stirt.) Giacom.	LC	l	nE
25	<i>Bryoerythrophyllum recurvirostrum</i> (Hedw.) P.C.Chen	LC	s	nE
26	<i>Bryum caespiticium</i> aggr.	NE*	s	nE
27	<i>Bryum capillare</i> Hedw.	LC	s	nE
28	<i>Bryum elegans</i> Nees	NE*	l	nE
29	<i>Bryum moravicum</i> Podp.	LC	l	E
30	<i>Calliergonella cuspidata</i> (Hedw.) Loeske	LC	l	nE
31	<i>Calliergonella lindbergii</i> (Mitt.) Hedenäs	LC	l	nE
32	<i>Calypogeia azurea</i> Stotler & Crotz	LC	l	nE
33	<i>Campyliadelphus chrysophyllus</i> (Brid.) R.S.Chopra	LC	l	nE
34	<i>Campylium stellatum</i> aggr.	LC	l	nE
35	<i>Cephalozia spec.</i> (Dumort.) Dumort.	NE*	uc	nE
36	<i>Chiloscyphus pallescens</i> (Hoffm.) Dumort.	LC	s	nE
37	<i>Cirriphyllum piliferum</i> (Hedw.) Grout	LC	l	nE
38	<i>Climacium dendroides</i> (Hedw.) F.Weber & D.Mohr	LC	l	nE
39	<i>Conocephalum salebrosum</i> Szweyk. & al.	NE*	l	nE
40	<i>Cratoneuron filicinum</i> (Hedw.) Spruce	LC	l	nE
41	<i>Ctenidium molluscum</i> (Hedw.) Mitt.	LC	l	nE
42	<i>Dichodontium pellucidum</i> (Hedw.) Schimp.	LC	l	nE
43	<i>Dicranella varia</i> (Hedw.) Schimp.	LC	s	nE
44	<i>Dicranum scoparium</i> Hedw.	LC	s	nE
45	<i>Didymodon cf. fallax</i> (Hedw.) R.H.Zander	NE*	uc	nE
46	<i>Didymodon cf. ferrugineus</i> (Besch.) M.O.Hill	NE*	uc	nE

47	<i>Ditrichum gracile</i> (Mitt.) Kuntze	NE*	I	nE
48	<i>Encalypta streptocarpa</i> Hedw.	LC	I	nE
49	<i>Entodon concinnus</i> (De Not.) Paris	LC	I	nE
50	<i>Eurhynchium angustirete</i> (Broth.) T.J.Kop.	LC	I	nE
51	<i>Fissidens bryoides</i> aggr.	NE*	s	nE
52	<i>Fissidens dubius</i> P.Beauv.	LC	s	nE
53	<i>Fissidens taxifolius</i> Hedw.	NE	s	nE
54	<i>Frullania dilatata</i> (L.) Dumort.	LC	s	E
55	<i>Frullania tamarisci</i> (L.) Dumort.	NT	s	E
56	<i>Hedwigia ciliata</i> (Hedw.) P.Beauv.	LC	s	nE
57	<i>Homalothecium philippeanum</i> (Spruce) Schimp.	LC	I	nE
58	<i>Homalothecium sericeum</i> (Hedw.) Schimp.	LC	I	nE
59	<i>Homomallium incurvatum</i> (Brid.) Loeske	LC	s	nE
60	<i>Hygrohypnum luridum</i> (Hedw.) Jenn.	LC	s	nE
61	<i>Hylocomiastrum pyrenaicum</i> (Spruce) M.Fleisch.	LC	I	nE
62	<i>Hylocomium splendens</i> (Hedw.) Schimp.	LC	I	nE
63	<i>Hypnum andoi</i> A.J.E.Sm.	LC	s	E
64	<i>Hypnum cupressiforme</i> Hedw.	LC	s	nE
65	<i>Isopterygiopsis muelleriana</i> (Schimp.) Z.Iwats.	LC	I	nE
66	<i>Isopterygiopsis pulchella</i> (Hedw.) Z.Iwats.	LC	s	nE
67	<i>Isothecium alopecuroides</i> (Dubois) Isov.	LC	s	E
68	<i>Jungermannia spec. L.</i>	NE*	uc	nE
69	<i>Leiocolea collaris</i> (Nees) Schljakov	LC	I	nE
70	<i>Leiocolea heterocolpos</i> (Hartm.) H.Buch	LC	I	nE
71	<i>Lejeunea cavifolia</i> (Ehrh.) Lindb.	LC	s	E
72	<i>Lescurea saxicola</i> (Schimp.) Molendo	LC	I	nE
73	<i>Leucodon sciuroides</i> (Hedw.) Schwägr.	LC	I	E
74	<i>Lophocolea bidentata</i> (L.) Dumort.	LC	s	nE
75	<i>Lophocolea heterophylla</i> (Schrad.) Dumort.	LC	s	nE
76	<i>Lophocolea minor</i> Nees	LC	I	nE
77	<i>Lophozia excisa</i> (Dicks.) Dumort.	LC	s	nE
78	<i>Marchantia polymorpha</i> subsp. <i>montivagans</i> Bischl. & Boissel.-Dub.	NE*	I	nE
79	<i>Metzgeria furcata</i> (L.) Dumort.	LC	I	E
80	<i>Metzgeria violacea</i> (Ach.) Dumort.	LC	I	E
81	<i>Mnium lycopodioides</i> Schwägr.	NT	s	nE
82	<i>Mnium marginatum</i> (Dicks.) P.Beauv.	LC	s	nE
83	<i>Mnium spinosum</i> (Voit) Schwägr.	LC	s	nE
84	<i>Mnium stellare</i> Hedw.	LC	I	nE
85	<i>Mnium thomsonii</i> Schimp.	LC	s	nE
86	<i>Neckera complanata</i> (Hedw.) Huebener	LC	I	E
87	<i>Orthotrichum affine</i> Brid.	LC	s	E
88	<i>Orthotrichum alpestre</i> Bruch & Schimp.	EN	s	E
89	<i>Orthotrichum lyellii</i> Hook. & Taylor	LC	I	E
90	<i>Orthotrichum obtusifolium</i> Brid.	LC	I	E
91	<i>Orthotrichum pallens</i> Brid.	LC	s	E
92	<i>Orthotrichum pumilum</i> Sw. ex anon.	NE*	s	E
93	<i>Orthotrichum rogeri</i> Brid.	VU	s	E
94	<i>Orthotrichum scanicum</i> Gronvall	CR	s	E
95	<i>Orthotrichum schimperi</i> Hammar	NE*	s	E
96	<i>Orthotrichum speciosum</i> Nees	LC	s	E
97	<i>Orthotrichum stellatum</i> Brid.	CR	s	E
98	<i>Orthotrichum stramineum</i> Brid.	LC	s	E
99	<i>Orthotrichum striatum</i> Hedw.	LC	s	E
100	<i>Oxyrrhynchium hians</i> (Hedw.) Loeske	LC	I	nE
101	<i>Oxyrrhynchium schleicheri</i> (R.Hedw.) Röhl	LC	I	nE
102	<i>Oxystegus tenuirostris</i> (Hook. & Taylor) A.J.E.Sm.	LC	I	nE

103	<i>Paraleucobryum sauteri</i> (Bruch & Schimp.) Loeske	DD	s	E
104	<i>Pellia</i> cf. <i>endiviifolia</i> (Dicks.) Dumort.	NE*	l	nE
105	<i>Plagiochila asplenioides</i> (L. emend. Taylor) Dumort.	LC	l	nE
106	<i>Plagiochila britannica</i> Paton	VU	l	nE
107	<i>Plagiochila porelloides</i> (Nees) Lindenb.	LC	l	nE
108	<i>Plagiomnium affine</i> (Funck) T.J.Kop.	LC	s	nE
109	<i>Plagiomnium cuspidatum</i> (Hedw.) T.J.Kop.	LC	s	nE
110	<i>Plagiomnium elatum</i> (Bruch & Schimp.) T.J.Kop.	LC	l	nE
111	<i>Plagiomnium medium</i> (Bruch & Schimp.) T.J.Kop.	LC	s	nE
112	<i>Plagiomnium rostratum</i> (Schräd.) T.J.Kop.	LC	s	nE
113	<i>Plagiomnium undulatum</i> (Hedw.) T.J.Kop.	LC	s	nE
114	<i>Plagiothecium cavifolium</i> (Brid.) Z.Iwats.	LC	l	nE
115	<i>Plagiothecium denticulatum</i> (Hedw.) Schimp.	LC	s	nE
116	<i>Plagiothecium laetum</i> Schimp.	LC	s	E
117	<i>Plagiothecium succulentum</i> (Wilson) Lindb.	LC	l	nE
118	<i>Platydictya jungermannioides</i> (Brid.) H.A.Crum	LC	l	nE
119	<i>Platygyrium repens</i> (Brid.) Schimp.	LC	l	E
120	<i>Pleurozium schreberi</i> (Brid.) Mitt.	LC	l	nE
121	<i>Pogonatum urnigerum</i> (Hedw.) P.Beauv.	LC	s	nE
122	<i>Pohlia cruda</i> (Hedw.) Lindb.	LC	l	nE
123	<i>Pohlia longicolla</i> (Hedw.) Lindb.	LC	s	nE
124	<i>Pohlia</i> cf. <i>nutans</i> (Hedw.) Lindb.	NE*	s	nE
125	<i>Pohlia wahlenbergii</i> (F.Weber & D.Mohr) A.L.Andrews	LC	l	nE
126	<i>Polytrichastrum alpinum</i> (Hedw.) G.L.Sm.	LC	s	nE
127	<i>Polytrichastrum formosum</i> (Hedw.) G.L.Sm.	LC	s	nE
128	<i>Polytrichum commune</i> Hedw.	LC	s	nE
129	<i>Polytrichum piliferum</i> Hedw.	LC	s	nE
130	<i>Porella platyphylla</i> (L.) Pfeiff.	LC	l	E
131	<i>Preissia quadrata</i> (Scop.) Nees	LC	l	nE
132	<i>Pseudoleskea incurvata</i> (Hedw.) Loeske	LC	l	nE
133	<i>Pseudoleskeella catenulata</i> (Schräd.) Kindb.	NE	l	nE
134	<i>Pseudoleskeella nervosa</i> (Brid.) Nyholm	LC	l	E
135	<i>Pterigynandrum filiforme</i> Hedw.	LC	s	E
136	<i>Ptilidium pulcherrimum</i> (Weber) Vain.	LC	l	nE
137	<i>Ptychodium plicatum</i> (F.Weber & D.Mohr) Schimp.	LC	l	nE
138	<i>Pylaisia polyantha</i> (Hedw.) Schimp.	LC	s	E
139	<i>Racomitrium canescens</i> (Hedw.) Brid.	LC	l	nE
140	<i>Radula complanata</i> (L.) Dumort.	LC	s	E
141	<i>Rhizomnium punctatum</i> (Hedw.) T.J.Kop.	LC	s	nE
142	<i>Rhodobryum roseum</i> (Hedw.) Limpr.	LC	l	nE
143	<i>Rhynchostegium murale</i> (Hedw.) Schimp.	LC	s	nE
144	<i>Rhytidiadelphus squarrosus</i> (Hedw.) Warnst.	LC	l	nE
145	<i>Rhytidiadelphus subpinnatus</i> (Lindb.) T.J.Kop.	LC	l	nE
146	<i>Rhytidiadelphus triquetrus</i> (Hedw.) Warnst.	LC	l	nE
147	<i>Sanionia uncinata</i> (Hedw.) Loeske	LC	s	nE
148	<i>Scapania aequiloba</i> (Schwägr.) Dumort.	LC	l	nE
149	<i>Scapania aspera</i> Bernet & M.Bernet	LC	l	nE
150	<i>Scapania scandica</i> (Arnell & H.Buch) Macvicar	LC	l	nE
151	<i>Schistidium apocarpum</i> (Hedw.) Bruch & Schimp.	DD	s	nE
152	<i>Schistidium dupretii</i> (Thér.) W.A.Weber	NE*	s	nE
153	<i>Schistidium lancifolium</i> (Kindb.) H.H.Blom	NE*	s	nE
154	<i>Schistidium trichodon</i> var. <i>nutans</i> H.H.Blom	NE*	s	nE
155	<i>Sciuro-Hypnum plumosum</i> (Hedw.) Ignatov & Huttunen, nom. cons.	LC	s	nE
156	<i>Sciuro-Hypnum populeum</i> (Hedw.) Ignatov & Huttunen	LC	s	nE
157	<i>Sciuro-Hypnum reflexum</i> (Starke) Ignatov & Huttunen	LC	s	nE
158	<i>Sciuro-Hypnum starkei</i> (Brid.) Ignatov & Huttunen	LC	s	nE

159	<i>Syntrichia norvegica</i> F.Weber	LC	s	nE
160	<i>Syntrichia ruralis</i> (Hedw.) F.Weber & D.Mohr	LC	s	E
161	<i>Syntrichia virescens</i> (De Not.) Ochyra	LC	l	E
162	<i>Tayloria rudolphiana</i> (Garov.) Bruch & Schimp.	VU	s	E
163	<i>Tayloria serrata</i> (Hedw.) Bruch & Schimp.	LC	l	nE
164	<i>Thamnobryum neckeroides</i> (Hook.) E.Lawton	NE*	l	nE
165	<i>Thuidium assimile</i> (Mitt.) A.Jaeger	LC	l	nE
166	<i>Thuidium delicatulum</i> (Hedw.) Schimp.	LC	l	nE
167	<i>Tortella bambergeri</i> (Schimp.) Broth.	LC	l	nE
168	<i>Tortella tortuosa</i> (Hedw.) Limpr.	LC	l	nE
169	<i>Tortula subulata</i> Hedw.	LC	s	nE
170	<i>Trichodon cylindricus</i> (Hedw.) Schimp.	LC	l	nE
171	<i>Ulota bruchii</i> Brid.	LC	s	E
172	<i>Ulota coarctata</i> (P.Beauv.) Hammar	CR	s	E
173	<i>Ulota crispa</i> (Hedw.) Brid.	LC	s	E
174	<i>Weissia controversa</i> Hedw.	LC	s	nE
175	<i>Zygodon dentatus</i> (Limpr.) Kartt.	NT	l	E
176	<i>Zygodon rupestris</i> Lorentz	VU	l	E

Lichens

1	<i>Agonimia tristicula</i> (Nyl.) Zahlbr.	LC	l	E
2	<i>Anaptychia ciliaris</i> (L.) Körb.	VU	s	E
3	<i>Arthonia atra</i> (Pers.) A. Schneid.	LC	s	E
4	<i>Arthonia didyma</i> Körb.	LC	s	E
5	<i>Arthonia punctiformis</i> Ach.	NE*	s	E
6	<i>Arthonia radiata</i> (Pers.) Ach.	LC	s	E
7	<i>Arthopyrenia</i> cf. <i>carneobrunneola</i> Coppins	NE*	s	E
8	<i>Arthopyrenia</i> cf. <i>salicis</i> A. Massal.	NE*	s	E
9	<i>Bacidia arceutina</i> (Ach.) Arnold	LC	l	E
10	<i>Bacidia arnoldiana</i> aggr.	NE*	s	uc
11	<i>Bacidia beckhausii</i> Körb.	NT	l	E
12	<i>Bacidia circumspecta</i> (Vain.) Malme	EN	l	E
13	<i>Bacidia rubella</i> (Hoffm.) A. Massal.	LC	l	E
14	<i>Bacidia subincompta</i> (Nyl.) Arnold	LC	l	E
15	<i>Bacidia</i> cf. <i>vermifera</i> (Nyl.) Th. Fr.	NE*	l	E
16	<i>Bacidia</i> cf. <i>viridifarinoso</i> Coppins & P. James	NE*	s	uc
17	<i>Biatorea chrysantha</i> (Zahlbr.) Printzen	LC	s	E
18	<i>Biatorea efflorescens</i> (Hedl.) Räsänen	LC	s	E
19	<i>Biatorea flavopunctata</i> (Tønsberg) Hinter. & Printzen	LC	s	E
20	<i>Biatorea helvola</i> Hellb.	NT	s	E
21	<i>Biatoridium monasteriense</i> Körb.	LC	s	E
22	<i>Bilimbia sabuletorum</i> (Schreb.) Arnold	LC	s	nE
23	<i>Bryoria bicolor</i> (Ehrh.) Brodo & D. Hawksw.	VU	l	E
24	<i>Bryoria capillaris</i> (Ach.) Brodo & D. Hawksw.	NT	l	E
25	<i>Bryoria fuscescens</i> (Gyeln.) Brodo & D. Hawksw.	LC	l	E
26	<i>Bryoria implexa</i> (Hoffm.) Brodo & D. Hawksw.	NT	l	E
27	<i>Buellia erubescens</i> Arnold	VU	s	E
28	<i>Buellia griseovirens</i> (Sm.) Almb.	LC	s	E
29	<i>Buellia punctata</i> (Hoffm.) A. Massal.	LC	s	E
30	<i>Calicium</i> cf. <i>glaucellum</i> Ach.	NE*	s	E
31	<i>Callopisma</i> cf. <i>asserigenum</i> J. Lahm	NE*	s	E
32	<i>Caloplaca alnetorum</i> Giralt & al.	VU	s	E
33	<i>Caloplaca alstrupii</i> Søchting	NE*	s	E
34	<i>Caloplaca cerina</i> (Hedw.) Th. Fr.	LC	s	E
35	<i>Caloplaca cerinella</i> (Nyl.) Flagey	NT	s	E
36	<i>Caloplaca cerinelloides</i> (Erichsen) Poelt	NT	s	E

37	<i>Caloplaca chlorina</i> (Flot.) H. Olivier	LC	s	nE
38	<i>Caloplaca herbidella</i> (Hue) H. Magn.	LC	s	E
39	<i>Caloplaca hungarica</i> H. Magn.	NE*	s	E
40	<i>Caloplaca</i> cf. <i>obscura</i> (Körb.) Th. Fr.	NE*	s	E
41	<i>Candelaria concolor</i> (Dicks.) Stein	LC	l	E
42	<i>Candelariella efflorescens</i> aggr.	NE*	s	E
43	<i>Candelariella reflexa</i> (Nyl.) Lettau	LC	s	E
44	<i>Candelariella vitellina</i> (Hoffm.) Müll. Arg.	LC	l	nE
45	<i>Candelariella xanthostigma</i> (Ach.) Lettau	LC	l	E
46	<i>Catillaria nigroclavata</i> (Nyl.) Schuler	LC	s	E
47	<i>Cetraria sepincola</i> (Ehrh.) Ach.	EN	s	E
48	<i>Cetrelia olivetorum</i> (Nyl.) W. L. Culb. & C. F. Culb.	NT	s	E
49	<i>Chrysothrix candelaris</i> (L.) J. R. Laundon	LC	s	E
50	<i>Cladonia chlorophaea</i> (Sommerf.) Spreng.	NE*	l	nE
51	<i>Cladonia coniocraea</i> (Flörke) Spreng.	LC	s	E
52	<i>Cladonia fimbriata</i> (L.) Fr.	LC	s	nE
53	<i>Cladonia pocillum</i> (Ach.) Grognot	LC	l	nE
54	<i>Cladonia pyxidata</i> (L.) Hoffm.	LC	l	nE
55	<i>Collema fasciculare</i> (L.) F. H. Wigg.	EN	s	E
56	<i>Collema flaccidum</i> (Ach.) Ach.	LC	l	E
57	<i>Collema fragrans</i> (Sm.) Ach.	CR	s	E
58	<i>Collema</i> cf. <i>ligerinum</i> (Hy) Harm.	NE*	s	E
59	<i>Collema nigrescens</i> aggr.	VU	l	E
60	<i>Diploschistes muscorum</i> (Scop.) R. Sant.	LC	l	nE
61	<i>Diplotomma alboatrum</i> (Hoffm.) Flot.	EN	s	E
62	<i>Evernia divaricata</i> (L.) Ach.	NT	l	E
63	<i>Evernia prunastri</i> (L.) Ach.	LC	s	E
64	<i>Fellhanera subtilis</i> (Vezda) Diederich & Sérus.	VU	s	E
65	<i>Frutidella pullata</i> (Norman) Schmall	LC	s	E
66	<i>Heterodermia</i> cf. <i>japonica</i> (M. Satô) Swinscow & Krog	NE*	s	E
67	<i>Heterodermia speciosa</i> (Wulfen) Trevis.	CR	s	E
68	<i>Hypogymnia austerodes</i> (Nyl.) Räsänen	LC	s	E
69	<i>Hypogymnia bitteri</i> (Lyngé) Ahti	LC	s	E
70	<i>Hypogymnia farinacea</i> Zopf	LC	s	E
71	<i>Hypogymnia physodes</i> (L.) Nyl.	LC	s	E
72	<i>Hypogymnia tubulosa</i> (Schaer.) Hav.	LC	s	E
73	<i>Hypogymnia vittata</i> (Ach.) Parrique	VU	s	E
74	<i>Hypotrachyna afrorevoluta</i> (Krog & Swinscow) Krog &	NE*	s	E
75	<i>Lecania cyrtella</i> (Ach.) Th. Fr.	LC	s	E
76	<i>Lecania hyalina</i> (Fr.) R. Sant.	NT	s	E
77	<i>Lecanora albella</i> (Pers.) Ach.	NT	s	E
78	<i>Lecanora albescens</i> (Hoffm.) Branth & Rostr.	NE*	s	nE
79	<i>Lecanora allophana</i> f. <i>allophana</i> Nyl.	NT	s	E
80	<i>Lecanora allophana</i> f. <i>sorediata</i> Vain.	NE*	s	E
81	<i>Lecanora argentata</i> (Ach.) Malme	LC	s	E
82	<i>Lecanora barkmaniana</i> Aptroot & Herk	LC	s	E
83	<i>Lecanora carpinea</i> (L.) Vain.	LC	s	E
84	<i>Lecanora chlorotera</i> Nyl.	LC	s	E
85	<i>Lecanora circumborealis</i> Brodo & Vitik.	LC	s	E
86	<i>Lecanora expersa</i> Nyl.	LC	s	E
87	<i>Lecanora hagenii</i> (Ach.) Ach.	NE*	s	E
88	<i>Lecanora intumescens</i> (Rebent.) Rabenh.	NT	s	E
89	<i>Lecanora leptyroides</i> (Nyl.) Degel.	NT	s	E
90	<i>Lecanora persimilis</i> (Th. Fr.) Nyl.	LC	s	E
91	<i>Lecanora praesistens</i> Nyl.	NT	s	E
92	<i>Lecanora pulicaris</i> (Pers.) Ach.	LC	s	E

93	<i>Lecanora strobilina</i> (Spreng.) Kieff.	NE*	s	E
94	<i>Lecanora subcarpineae</i> Szatala	NT	s	E
95	<i>Lecanora symmicta</i> (Ach.) Ach.	LC	s	E
96	<i>Lecanora umbrina</i> (Ach.) A. Massal.	NE*	s	E
97	<i>Lecidea</i> cf. <i>albohyalina</i> (Nyl.) Th.Fr.	NE*	s	E
98	<i>Lecidea nylanderii</i> (Anzi) Th. Fr.	LC	s	E
99	<i>Lecidella elaeochroma</i> var. <i>elaeochroma</i> (Ach.) M. Choisy	LC	s	E
100	<i>Lecidella flavosorediata</i> (Vezda) Hertel & Leuckert	LC	s	E
101	<i>Lepraria coriensis</i> (Hue) Sipman	NE*	s	nE
102	<i>Lepraria eburnea</i> J. R. Laundon	LC	s	E
103	<i>Lepraria elobata</i> Tønsberg	LC	s	E
104	<i>Lepraria lobificans</i> Nyl.	LC	s	E
105	<i>Lepraria membranacea</i> (Dicks.) Vain.	NE*	s	nE
106	<i>Lepraria rigidula</i> (B. de Lesd.) Tønsberg	LC	s	E
107	<i>Lepraria vouauxii</i> (Hue) R. C. Harris	LC	s	E
108	<i>Leptogium lichenoides</i> (L.) Zahlbr.	LC	l	nE
109	<i>Leptogium saturninum</i> (Dicks.) Nyl.	NT	s	E
110	<i>Leptogium teretiusculum</i> (Wallr.) Arnold	EN	l	E
111	<i>Lobaria amplissima</i> (Scop.) Forssell	EN	l	E
112	<i>Lobaria pulmonaria</i> (L.) Hoffm.	VU	l	E
113	<i>Loxospora elatina</i> (Ach.) A. Massal.	LC	s	E
114	<i>Melanelixia glabra</i> (Schaer.) O. Blanco & al.	NT	s	E
115	<i>Melanelixia glabrata</i> (Lamy) Sandler & Arup	LC	s	E
116	<i>Melanelixia subargentifera</i> (Nyl.) O. Blanco & al.	LC	s	E
117	<i>Melanelixia subaurifera</i> (Nyl.) O. Blanco & al.	LC	s	E
118	<i>Melanohalea elegantula</i> (Zahlbr.) O. Blanco & al.	NT	s	E
119	<i>Melanohalea exasperata</i> (De Not.) O. Blanco & al.	NT	s	E
120	<i>Melanohalea exasperatula</i> (Nyl.) O. Blanco & al.	LC	l	E
121	<i>Menegazzia terebrata</i> (Hoffm.) A. Massal.	VU	s	E
122	<i>Micarea prasina</i> s.lat.	LC	s	E
123	<i>Mycobilimbia epixanthoides</i> (Nyl.) Hafellner & Türk	LC	s	E
124	<i>Mycobilimbia tetramera</i> (De Not.) Hafellner & Türk	NE*	s	E
125	<i>Mycoblastus affinis</i> (Schaer.) T. Schauer	VU	l	E
126	<i>Nephroma bellum</i> (Spreng.) Tuck.	NT	s	E
127	<i>Nephroma parile</i> (Ach.) Ach.	NT	s	E
128	<i>Nephroma resupinatum</i> (L.) Ach.	VU	s	E
129	<i>Nephromopsis laureri</i> (Kremp.) Kurok.	VU	s	E
130	<i>Normandina pulchella</i> (Borrer) Nyl.	LC	s	E
131	<i>Ochrolechia alboflavescens</i> (Wulfen) Zahlbr.	LC	s	E
132	<i>Ochrolechia androgyna</i> (Hoffm.) Arnold	LC	s	E
133	<i>Ochrolechia arborea</i> (Kreyer) Almb.	NT	s	E
134	<i>Ochrolechia pallescens</i> (L.) A. Massal.	EN	l	E
135	<i>Ochrolechia szatalaensis</i> Versegghy	VU	l	E
136	<i>Ochrolechia</i> cf. <i>turneri</i> (Sm.) Hasselrot	NE*	s	E
137	<i>Opegrapha rufescens</i> Pers.	LC	s	E
138	<i>Opegrapha varia</i> Pers.	NE*	s	E
139	<i>Oxneria huculia</i> S.Y. Kondr	NE*	s	E
140	<i>Pachyphiale fagicola</i> (Hepp) Zwackh	VU	s	E
141	<i>Pannaria conoplea</i> (Ach.) Bory	EN	s	E
142	<i>Parmelia ernstiae</i> Feuerer & A. Thell	NE*	s	E
143	<i>Parmelia saxatilis</i> (L.) Ach.	NE*	s	E
144	<i>Parmelia serrana</i> A. Crespo, M.C. Molina & D. Hawksw.	NE*	s	E
145	<i>Parmelia submontana</i> Hale	LC	s	E
146	<i>Parmelia sulcata</i> Taylor	LC	s	E
147	<i>Parmeliella triptophylla</i> (Ach.) Müll. Arg.	NT	l	E
148	<i>Parmelina carporrhizans</i> (Taylor) Poelt & Vezda	NE*	s	E

149	<i>Parmelina pastillifera</i> (Harm.) Hale	NT	I	E
150	<i>Parmelina quercina</i> (Willd.) Hale	NE*	s	E
151	<i>Parmelina tiliacea</i> (Hoffm.) Hale	LC	s	E
152	<i>Parmotrema arnoldii</i> (Du Rietz) Hale	VU	s	E
153	<i>Peltigera canina</i> (L.) Willd.	LC	I	nE
154	<i>Peltigera collina</i> (Ach.) Schrad.	NT	s	E
155	<i>Peltigera didactyla</i> (With.) J. R. Laundon	LC	s	nE
156	<i>Peltigera elisabethae</i> Gyeln.	LC	s	nE
157	<i>Peltigera horizontalis</i> (Huds.) Baumg.	NT	s	nE
158	<i>Peltigera membranacea</i> (Ach.) Nyl.	NT	I	nE
159	<i>Peltigera polydactylon</i> (Neck.) Hoffm.	LC	I	nE
160	<i>Peltigera praetextata</i> (Sommerf.) Zopf	LC	I	nE
161	<i>Pertusaria albescens</i> (Huds.) M. Choisy & Werner	LC	s	E
162	<i>Pertusaria amara</i> (Ach.) Nyl.	LC	s	E
163	<i>Pertusaria coccodes</i> (Ach.) Nyl.	VU	s	E
164	<i>Pertusaria coronata</i> (Ach.) Th. Fr.	VU	s	E
165	<i>Pertusaria hemisphaerica</i> (Flörke) Erichsen	EN	s	E
166	<i>Pertusaria leioplaca</i> DC.	LC	I	E
167	<i>Pertusaria multipuncta</i> (Turner) Nyl.	EN	I	E
168	<i>Pertusaria pupillaris</i> (Nyl.) Th. Fr.	NT	s	nE
169	<i>Phaeophyscia ciliata</i> (Hoffm.) Moberg	NT	s	E
170	<i>Phaeophyscia endophoenicea</i> (Harm.) Moberg	LC	s	E
171	<i>Phaeophyscia hirsuta</i> (Mereschk.) Essl.	NT	s	E
172	<i>Phaeophyscia orbicularis</i> (Neck.) Moberg	LC	s	E
173	<i>Phlyctis argena</i> (Spreng.) Flot.	LC	s	E
174	<i>Physcia adscendens</i> (Fr.) H. Olivier	LC	s	E
175	<i>Physcia aipolia</i> (Humb.) Fűrnr.	LC	s	E
176	<i>Physcia caesia</i> (Hoffm.) Fűrnr.	NE*	s	nE
177	<i>Physcia dubia</i> (Hoffm.) Lettau	NE*	s	nE
178	<i>Physcia stellaris</i> (L.) Nyl.	LC	s	E
179	<i>Physcia tenella</i> (Scop.) DC.	LC	s	E
180	<i>Physconia distorta</i> (With.) J. R. Laundon	LC	s	E
181	<i>Physconia enteroxantha</i> (Nyl.) Poelt	NT	s	E
182	<i>Physconia grisea</i> (Lam.) Poelt	NT	s	E
183	<i>Physconia perisidiosa</i> (Erichsen) Moberg	NT	s	E
184	<i>Placynthiella icmalea</i> (Ach.) Coppins & P. James	LC	s	nE
185	<i>Placynthiella uliginosa</i> (Schrad.) Coppins & P. Jam	LC	s	nE
186	<i>Platismatia glauca</i> (L.) W. L. Culb. & C. F. Culb.	LC	s	E
187	<i>Porina aenea</i> (Wallr.) Zahlbr.	LC	s	E
188	<i>Pseudevernia furfuracea</i> (L.) Zopf	LC	s	E
189	<i>Punctelia subrudecta</i> (Nyl.) Krog	NE*	s	E
190	<i>Ramalina calicaris</i> (L.) Fr.	NE*	s	E
191	<i>Ramalina farinacea</i> (L.) Ach.	LC	s	E
192	<i>Ramalina fastigiata</i> (Pers.) Ach.	VU	s	E
193	<i>Ramalina fraxinea</i> (L.) Ach.	NT	s	E
194	<i>Ramalina obtusata</i> (Arnold) Bitter	VU	s	E
195	<i>Ramalina panizzei</i> De Not.	EN	s	E
196	<i>Ramalina pollinaria</i> (Westr.) Ach.	NT	s	E
197	<i>Ramalina roesleri</i> (Schaer.) Hue	EN	s	E
198	<i>Ramalina thrausta</i> (Ach.) Nyl.	EN	s	E
199	<i>Rinodina archaea</i> (Ach.) Arnold	LC	s	nE
200	<i>Rinodina capensis</i> Hampe	NT	s	E
201	<i>Rinodina conradii</i> Körb.	VU	s	E
202	<i>Rinodina</i> cf. <i>degeliana</i> Coppins	NE*	s	E
203	<i>Rinodina exigua</i> (Ach.) Gray	NT	s	E
204	<i>Rinodina griseosoralifera</i> Coppins	NT	s	E

205	<i>Rinodina septentrionalis</i> Malme	LC	s	E
206	<i>Rinodina sophodes</i> (Ach.) A. Massal.	NT	s	E
207	<i>Sclerophora pallida</i> (Pers.) Y. J. Yao & Spooner	VU	s	E
208	<i>Scoliciosporum chlorococcum</i> (Stenh.) Vezda	LC	s	E
209	<i>Scoliciosporum sarothamni</i> (Vain.) Vezda	LC	s	E
210	<i>Scoliciosporum umbrinum</i> (Ach.) Arnold	LC	s	nE
211	<i>Strigula stigmatella</i> (Ach.) R. C. Harris	LC	s	E
212	<i>Thelenella modesta</i> (Nyl.) Nyl.	CR	s	E
213	<i>Trapelia corticola</i> Coppins & P. James	VU	s	E
214	<i>Trapeliopsis flexuosa</i> (Fr.) Coppins & P. James	LC	s	nE
215	<i>Trapeliopsis</i> cf. <i>gelatinosa</i> (Flörke) Coppins & P. Jame	NE*	s	nE
216	<i>Tuckermanopsis chlorophylla</i> (Willd.) Hale	LC	s	E
217	<i>Usnea barbata</i> (L.) F. H. Wigg.	NE*	s	E
218	<i>Usnea cavernosa</i> Tuck.	NT	l	E
219	<i>Usnea dasypoga</i> (Ach.) Nyl.	NT	s	E
220	<i>Usnea florida</i> (L.) F. H. Wigg.	EN	s	E
221	<i>Usnea glabrescens</i> var. <i>fulvareagens</i> Räsänen	VU	s	E
222	<i>Usnea intermedia</i> (A. Massal.) Jatta	VU	s	E
223	<i>Usnea lapponica</i> Vain.	LC	s	E
224	<i>Usnea subfloridana</i> Stirt.	LC	s	E
225	<i>Usnea substerilis</i> Motyka	LC	s	E
226	<i>Violella fucata</i> (Stirt.) T. Sprib.	LC	s	E
227	<i>Vulpicida pinastri</i> (Scop.) J.-E. Mattsson & M. J.	LC	s	E
228	<i>Xanthoria candelaria</i> (L.) Th. Fr.	LC	s	E
229	<i>Xanthoria fulva</i> (Hoffm.) Poelt & Petut.	NT	s	E
230	<i>Xanthoria parietina</i> (L.) Th. Fr.	LC	s	E
231	<i>Xanthoria polycarpa</i> (Hoffm.) Rieber	LC	s	E
232	<i>Xanthoria ulophyllodes</i> Räsänen	NT	s	E

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Table C. Initial predictor set considered as fixed effects for the GLMM analyses.

Predictor	Description	Transformation
Tree characteristics		
DBH	Tree diameter at breast height (1.3 m above ground)	
Tree height	Vertical height of the tree	
Crown volume	Volume of the crown	
Phenological age	Three-level factor: 1 young, 2 mature, 3 ancient	
Sampled area per tree	Sum of the area of the 13 plots	
Environmental variables		
Altitude	Altitude above sea level	
Precipitation	Mean annual precipitation, derived from a 100 m grid interpolated with the algorithm following Zimmermann and Roberts (2001) from the 1950-2000 means of the WorldClim data (Hijmans et al. 2005)	
Distance to river	Minimum Euclidian distance to nearest river	Natural logarithm
Radiation	Annual global potential shortwave radiation (algorithm following Kumar et al. 1997)	
Isolation measures		
Minimum distance	Projected Euclidian distance (derived from orthophotos) to the nearest sycamore maple tree with DBH ≥ 36 cm	
No.trees50m	Number of neighbouring trees within a radius of 200 m	Square root
Pot.habitat50m	Potential habitat amount within a radius of 50 m: $\sum DBH_i^{0.6}$ of trees with DBH ≥ 36 cm within a radius of 50 m (sensu Moilanen and Nieminen 2002; they used $\sum Area_i^{0.3}$; we used 0.6 instead of 0.3 as the exponent because DBH is linear)	Square root
No.trees200m	Number of neighbouring trees within a radius of 200 m	Square root
Si1	Connectivity index sensu Hanski (1999) with modifications according to Löbel et al. (2009) with α set to 1 and γ to 0.3 (Moilanen and Nieminen 2002) for trees with DBH ≥ 36 cm within a radius of 50 m of the focal tree.	
Si2	Connectivity index sensu Hanski (1999) with modifications according to Löbel et al. (2009) with α set to 1 and γ to 0.3 (Moilanen and Nieminen 2002) trees within a radius of 200 m and DBH set to 1.	

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Table D. Correlation table (Spearman's rho) for the initial predictor set considered for the GLMM analyses. In bold: $|\text{Spearman's rho}| > 0.7$. Height: tree height, DBH: diameter at breast height, CrVol: crown volume, Area: sampled area, PhAge: phenological age (ordinal scale), Alt: altitude, DistRiv: distance to nearest river, Rad: radiation, Prec: precipitation, MinDist: distance to nearest tree, NoTr50: number of trees within a radius of 50 m (square root transformed), NoTr200: number of trees within a radius of 200 m (square root transformed), PotHab50: potential habitat amount within a radius of 50 m, Si1: modified connectivity index sensu Hanski (1999) for trees within a radius of 50 m, Si2: modified connectivity index sensu Hanski (1999) for trees within a radius of 200 m.

	Height	DBH	CrVol	Area	PhAge	Alt	DistRiv	Rad	Prec	MinDist	NoTr50	NoTr200	PotHab50	Si1
Height														
DBH	0.33													
CrVol	0.74	0.55												
Area	0.38	0.85	0.62											
PhAge	0.35	0.66	0.33	0.60										
Alt	0.04	0.31	0.40	0.41	0.10									
DistRiv	-0.12	-0.05	-0.20	-0.08	0.08	-0.28								
Rad	0.09	0.02	0.17	0.09	-0.08	0.22	-0.16							
Prec	0.02	0.13	0.28	0.23	-0.06	0.76	-0.32	0.29						
MinDist	-0.10	0.31	0.06	0.35	0.11	0.24	-0.09	-0.03	0.18					
NoTr50	0.19	-0.27	0.00	-0.30	-0.07	-0.18	0.11	0.04	-0.20	-0.74				
NoTr200	0.21	-0.19	0.11	-0.24	-0.01	-0.12	0.18	0.11	-0.23	-0.47	0.69			
PotHab50	0.24	-0.21	0.05	-0.24	-0.02	-0.16	0.10	0.06	-0.20	-0.74	0.99	0.69		
Si1	0.19	-0.23	-0.02	-0.28	-0.02	-0.21	0.07	0.04	-0.22	-0.93	0.87	0.58	0.88	
Si2	0.14	-0.33	-0.05	-0.37	-0.12	-0.22	0.10	0.07	-0.20	-0.93	0.89	0.66	0.88	0.96

References

Hanski, I. 1999. Habitat connectivity, habitat continuity, and metapopulation in dynamic landscapes.

Table E. Results of the GLMM analyses determining effects on the per tree richness of epiphytic bryophytes and lichens. Random terms of the models are given. For fixed effects (tree characteristics, environmental variables and isolation measures) standardized coefficient estimates, relative variable importance (RVI), unconditional standard error (SE), z-value, *p*-value and 95% confidence intervals (CI) after conditional model averaging are shown. Ad.trees: additional trees; ol: observational level; M: number of models in the candidate model set ($\Delta \text{AICc} < 2$) considered for averaging estimates; K: number of predictors in the candidate model set; DBH: diameter at breast height; Phen.age: phenological age (1 = young trees, 2 = mature trees, 3 = ancient trees; we used the first level of the factor as the baseline for effects of phenological age); Pot.habitat50m: potential habitat amount within radius of 50 m; No.trees200m: number of trees within radius of 200 m. # $p < 0.1$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Bryophytes										
Species group	Random term	M	K	Fixed effect	RVI	Estimate	SE	z-value	<i>p</i>	2.5% CI 97.5% CI
All species	(1 Site/Ad.trees)	4	5							
				Crown volume	0.81	0.096	0.048	1.984	0.047 *	0.001 0.191
				Altitude	0.72	0.116	0.067	1.712	0.087 #	-0.017 0.250
				Phen.age2	1.00	0.199	0.062	3.164	0.002 **	0.076 0.321
				Phen.age3		0.280	0.088	3.146	0.002 **	0.105 0.454
				Radiation	1.00	-0.103	0.045	2.253	0.024 *	-0.192 -0.013
				Distance to river	0.17	-0.052	0.054	0.943	0.346	-0.159 0.056
Red-listed	(1 Site/Ad.trees)	12	5							
				DBH	0.37	0.245	0.178	1.353	0.176	-0.110 0.599
				Distance to river	0.82	0.430	0.213	1.993	0.046 *	0.007 0.853
				No.trees200m	0.29	-0.241	0.200	1.186	0.236	-0.639 0.157
				Pot.habitat50m	0.28	-0.233	0.202	1.141	0.254	-0.634 0.167
				Crown volume	0.15	0.134	0.193	0.684	0.494	-0.250 0.519
Not red-listed	(1 Site/Ad.trees)	7	6							
				Crown volume	0.74	0.090	0.049	1.815	0.069 #	-0.007 0.187
				Phen.age2	1.00	0.218	0.064	3.360	0.001 ***	0.091 0.345
				Phen.age3		0.306	0.091	3.326	0.001 ***	0.126 0.486
				Radiation	1.00	-0.113	0.046	2.414	0.016 *	-0.205 -0.021
				Altitude	0.41	0.094	0.068	1.368	0.171	-0.041 0.230
				Distance to river	0.23	-0.061	0.055	1.097	0.273	-0.170 0.048
				No.trees200m	0.09	-0.044	0.065	0.669	0.504	-0.174 0.085
Small diaspores	(1 Site/Ad.trees)	5	4							
				Crown volume	1.00	0.145	0.061	2.356	0.019 *	0.024 0.265
				No.trees200m	0.60	-0.119	0.073	1.602	0.109	-0.265 0.027
				DBH	0.30	0.062	0.063	0.964	0.335	-0.064 0.188
				Radiation	0.12	-0.032	0.055	0.580	0.562	-0.142 0.077
Large diaspores	(1 Site/Ad.trees)	4	5							
				Phen.age2	1.00	0.454	0.108	4.127	0.000 ***	0.238 0.669
				Phen.age3		0.622	0.137	4.473	0.000 ***	0.350 0.895
				Radiation	1.00	-0.197	0.072	2.711	0.007 **	-0.339 -0.055
				Altitude	0.24	0.124	0.106	1.145	0.252	-0.088 0.335
				Distance to river	0.21	-0.090	0.085	1.048	0.295	-0.260 0.079
				Crown volume	0.16	0.057	0.076	0.737	0.461	-0.094 0.208
Non-epiphytes	(1 Site/Ad.trees) + (1 ol)	7	5							
				Altitude	0.46	0.276	0.180	1.515	0.130	-0.081 0.634
				Phen.age2	1.00	0.520	0.168	3.059	0.002 **	0.187 0.854
				Phen.age3		0.809	0.221	3.605	0.000 ***	0.369 1.248
				Radiation	0.77	-0.232	0.120	1.910	0.056 #	-0.470 0.006
				Distance to river	0.20	-0.124	0.139	0.876	0.381	-0.400 0.153
				Pot.habitat50m	0.10	-0.143	0.147	0.959	0.338	-0.436 0.150
Epiphytes	(1 Site/Ad.trees)	6	5							
				Altitude	0.86	-0.154	0.072	2.114	0.035 *	-0.298 -0.011
				DBH	0.20	0.073	0.055	1.303	0.193	-0.037 0.184
				Crown volume	0.19	0.073	0.057	1.269	0.205	-0.040 0.186
				No.trees200m	0.11	-0.048	0.063	0.749	0.454	-0.173 0.077
				Distance to river	0.10	0.038	0.062	0.610	0.542	-0.085 0.162
- Red-listed	(1 Site/Ad.trees)	8	6							
				Distance to river	0.83	0.448	0.201	2.199	0.028 *	0.049 0.848
				No.trees200m	0.18	-0.254	0.177	1.416	0.157	-0.606 0.098
				Pot.habitat50m	0.13	-0.212	0.173	1.203	0.229	-0.556 0.133
				DBH	0.22	0.219	0.174	1.245	0.213	-0.126 0.565
				Crown volume	0.09	0.145	0.188	0.760	0.447	-0.229 0.520
				Altitude	0.08	0.128	0.227	0.555	0.579	-0.324 0.580
- Not red-listed	(1 Site/Ad.trees)	4	4							
				Altitude	1.00	-0.185	0.065	2.794	0.005 **	-0.314 -0.055
				Crown volume	0.24	0.067	0.059	1.125	0.261	-0.050 0.184

			DBH	0.21	0.058	0.058	0.991	0.322	-0.057	0.174
			No.trees200m	0.16	-0.044	0.060	0.713	0.476	-0.164	0.076
- Small diaspores	(1 Site/Ad.trees)	4	3							
			Altitude	0.27	-0.119	0.090	1.312	0.189	-0.298	0.059
			Distance to river	0.20	0.076	0.079	0.953	0.340	-0.080	0.232
			Crown volume	0.15	0.043	0.072	0.589	0.556	-0.101	0.187
- Large diaspores	(1 Site/Ad.trees)	11	7							
			DBH	0.37	0.151	0.090	1.657	0.098 #	-0.028	0.329
			Altitude	1.00	-0.226	0.095	2.335	0.020 *	-0.415	-0.036
			Phen.age2	0.35	0.268	0.131	2.011	0.044 *	0.007	0.529
			Phen.age3		0.317	0.172	1.821	0.069 #	-0.024	0.659
			Crown volume	0.09	0.120	0.091	1.302	0.193	-0.061	0.300
			No.trees200m	0.21	-0.090	0.092	0.963	0.336	-0.272	0.093
			Radiation	0.14	0.086	0.089	0.945	0.344	-0.092	0.263
			Distance to river	0.14	-0.085	0.092	0.909	0.363	-0.269	0.098
Lichens										
Species group	Random term	M	K	Fixed effect	RVI	Estimate	SE	z-value	p	2.5% CI
All species	(1 Site/Ad.trees)	11	6							
				No.trees200m	1.00	0.141	0.039	3.539	0.000 ***	0.063
				DBH	0.41	-0.054	0.037	1.449	0.147	-0.127
				Altitude	0.52	0.089	0.043	2.020	0.043 *	0.003
				Crown volume	0.31	-0.043	0.038	1.123	0.262	-0.118
				Distance to river	0.20	-0.039	0.040	0.962	0.336	-0.120
				Radiation	0.06	-0.026	0.033	0.769	0.442	-0.091
Red-listed	(1 Site/Ad.trees)	5	6							
				DBH	1.00	-0.760	0.213	3.517	0.000 ***	-1.183
				Phen.age2	1.00	0.377	0.222	1.673	0.094 #	-0.065
				Phen.age3		1.054	0.346	3.005	0.003 **	0.366
				No.trees200m	1.00	0.438	0.174	2.487	0.013 *	0.093
				Pot.habitat50m	0.40	-0.281	0.194	1.425	0.154	-0.666
				Altitude	0.26	-0.120	0.138	0.859	0.391	-0.395
				Radiation	0.13	-0.100	0.138	0.719	0.472	-0.374
Not red-listed	(1 Site/Ad.trees)	8	7							
				Altitude	0.78	0.104	0.037	2.758	0.006 **	0.030
				No.trees200m	1.00	0.113	0.039	2.891	0.004 **	0.036
				DBH	0.17	-0.049	0.035	1.384	0.166	-0.119
				Crown volume	0.15	-0.046	0.035	1.287	0.198	-0.116
				Pot.habitat50m	0.09	0.041	0.047	0.854	0.393	-0.053
				Distance to river	0.17	-0.036	0.040	0.872	0.383	-0.116
				Radiation	0.08	-0.020	0.034	0.575	0.566	-0.086
Small diaspores	(1 Site/Ad.trees)	5	5							
				DBH	0.65	-0.074	0.041	1.776	0.076 #	-0.155
				Distance to river	0.79	-0.076	0.041	1.850	0.064 #	-0.158
				No.trees200m	1.00	0.108	0.045	2.363	0.018 *	0.018
				Crown volume	0.36	-0.058	0.044	1.321	0.187	-0.145
Large diaspores	(1 Site/Ad.trees)	2	5							
				Altitude	1.00	0.394	0.088	4.414	0.000 ***	0.219
				Distance to river	1.00	0.234	0.095	2.411	0.016 *	0.044
				Phen.age2	1.00	0.370	0.144	2.538	0.011 *	0.084
				Phen.age3		0.540	0.198	2.693	0.007 **	0.147
				No.trees200m	1.00	0.271	0.088	3.038	0.002 **	0.096
				DBH	0.35	-0.132	0.118	1.103	0.270	-0.366
Non-epiphytes	(1 Site/Ad.trees)	12	7							
				DBH	0.74	0.334	0.137	2.398	0.017 *	0.061
				Altitude	0.95	0.383	0.150	2.522	0.012 *	0.085
				Distance to river	0.71	0.287	0.143	1.977	0.048 *	0.002
				Phen.age2	0.33	0.462	0.203	2.247	0.025 *	0.059
				Phen.age3		0.604	0.268	2.222	0.026 *	0.071
				Radiation	0.23	-0.152	0.120	1.254	0.210	-0.390
				Crown volume	0.16	-0.170	0.140	1.195	0.232	-0.448
				No.trees200m	0.13	0.169	0.156	1.069	0.285	-0.141
Epiphytes	(1 Site/Ad.trees)	4	4							
				DBH	1.00	-0.086	0.038	2.254	0.024 *	-0.161
				Altitude	0.49	0.081	0.035	2.260	0.024 *	0.011
				No.trees200m	1.00	0.137	0.040	3.413	0.001 ***	0.058
				Distance to river	0.39	-0.046	0.039	1.170	0.242	-0.124
- Red-listed	(1 Site/Ad.trees)	5	6							
				DBH	1.00	-0.760	0.213	3.517	0.000 ***	-1.183
				Phen.age2	1.00	0.377	0.222	1.673	0.094 #	-0.065
				Phen.age3		1.054	0.346	3.005	0.003 **	0.366

			No.trees200m	1.00	0.438	0.174	2.487	0.013 *	0.093	0.783
			Pot.habitat50m	0.40	-0.281	0.194	1.425	0.154	-0.666	0.105
			Altitude	0.26	-0.120	0.138	0.859	0.391	-0.395	0.154
			Radiation	0.13	-0.100	0.138	0.719	0.472	-0.374	0.173
- Not red-listed	(1 Site/Ad.trees)	8	5							
			DBH	0.81	-0.076	0.039	1.951	0.051 #	-0.153	0.000
			Altitude	0.55	0.099	0.037	2.661	0.008 **	0.026	0.172
			No.trees200m	0.91	0.113	0.044	2.527	0.012 *	0.025	0.201
			Distance to river	0.34	-0.052	0.041	1.264	0.206	-0.133	0.029
			Pot.habitat50m	0.18	0.065	0.052	1.235	0.217	-0.038	0.169
- Small diaspores	(1 Site/Ad.trees)	2	3							
			DBH	1.00	-0.090	0.038	2.298	0.022 *	-0.166	-0.013
			Distance to river	0.65	-0.077	0.041	1.870	0.062 #	-0.158	0.004
			No.trees200m	1.00	0.112	0.045	2.430	0.015 *	0.022	0.202
- Large diaspores	(1 Site/Ad.trees)	6	5							
			Altitude	1.00	0.314	0.102	3.026	0.002 **	0.111	0.518
			Distance to river	0.51	0.169	0.108	1.540	0.123	-0.046	0.384
			No.trees200m	1.00	0.346	0.102	3.354	0.001 ***	0.144	0.548
			DBH	0.31	-0.245	0.140	1.727	0.084 #	-0.524	0.033
			Phen.age2	0.52	0.296	0.172	1.704	0.088 #	-0.044	0.636
			Phen.age3		0.479	0.268	1.769	0.077 #	-0.052	1.009

Table F. Results of the GLMM analyses determining effects on the occurrence of the three focal species. Random term of the model and for fixed effects standardized coefficient estimates, relative variable importance (RVI), unconditional standard error (SE), z-value, p-value and 95 % confidence intervals (CI) after conditional model averaging are shown for the effects of tree characteristics, environmental variables and isolation measures on the occurrence of *Tayloria rudolphiana*, *Lobaria pulmonaria* and *Orthotrichum rogeri*. Ad.trees additional trees; ol observational level; M number of models in the candidate model set ($\Delta AICc < 2$) considered for averaging estimates; K number of predictors in the candidate model set; DBH diameter at breast height; Phen.age phenological age, 2 mature trees, 3 ancient trees (baseline = young trees); Pot.habitat50m potential habitat amount within radius of 50 m, No.trees200m number of trees within radius of 200 m; # $p < 0.1$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Species	Random term	M	K	Fixed effect	RVI	Estimate	SE	z-value	p	2.5% CI	97.5% CI
<i>T. rudolphiana</i>	(1 Site)	5	7								
				Altitude	1.00	2.901	1.356	2.109	0.035 *	0.205	5.596
				Phen.age2	0.64	19.216	4436.5	0.004	0.997	-8806.5	8844.9
				Phen.age3		20.805	4436.5	0.005	0.996	-8804.9	8846.5
				Pot.habitat50m	1.00	2.406	1.135	2.091	0.037 *	0.151	4.661
				Radiation	1.00	-2.134	1.205	1.745	0.081 #	-4.531	0.263
				DBH	0.55	2.185	1.234	1.750	0.080 #	-0.262	4.632
				Crown volume	0.15	0.986	0.927	1.048	0.295	-0.857	2.829
				Distance to river	0.12	-1.212	1.268	0.942	0.346	-3.733	1.309
<i>O. rogeri</i>	(1 Site/Ad.trees)	9	7								
				Distance to river	0.69	1.509	0.843	1.765	0.078 #	-0.167	3.185
				Phen.age2	1.00	-2.719	1.009	2.659	0.008 **	-4.722	-0.715
				Phen.age3		-2.791	1.482	1.861	0.063 #	-5.730	0.149
				Crown volume	0.33	1.160	0.807	1.417	0.156	-0.444	2.765
				DBH	0.21	1.226	0.957	1.263	0.207	-0.677	3.130
				Radiation	0.37	0.920	0.705	1.287	0.198	-0.482	2.322
<i>L. pulmonaria</i>	(1 Site/Ad.trees)	4	5								
				DBH	1.00	-3.545	1.269	2.754	0.006 **	-6.068	-1.022
				Crown volume	1.00	2.467	1.069	2.273	0.023 *	0.340	4.594
				Phen.age2	1.00	21.404	530.8	0.040	0.968	-1034.3	1077.1
				Phen.age3		21.721	530.8	0.040	0.968	-1034.0	1077.5
				Distance to river	0.21	0.853	0.874	0.962	0.336	-0.884	2.591
				No.trees200m	0.20	0.921	1.025	0.885	0.376	-1.117	2.959
				Radiation	0.17	-0.612	0.826	0.730	0.465	-2.254	1.031