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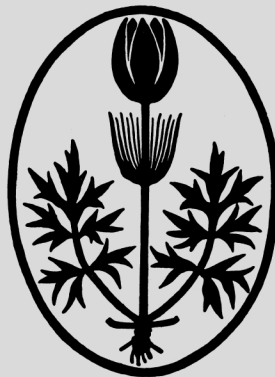
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Terricolous Lichens in the Glacier Forefield of the Rötkees (Eastern Alps, South Tyrol, Italy)

By

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With 2 Figures

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Key words: Lichenized *Ascomycetes*, *Lichenes*. – Biodiversity, ecology, flora, floristics. – Alps, alpine belt, glacier forefield, glacier retreat.

Summary

BILOVITZ P. O., NASCIBENE J., TUTZER V., WALLNER A. & MAYRHOFER H. 2014. Terricolous lichens in the glacier forefield of the Rötkees (Eastern Alps, South Tyrol, Italy). – *Phyton* (Horn, Austria) 54(2): 245–250, with 2 figures.

The investigation of lichens on soil, plant debris and terricolous mosses in the glacier forefield of the Rötkees yielded 31 lichen taxa (29 species and 2 varieties) and one lichenicolous fungus. *Micarea incrassata* HEDL. (*Lecanorales*) is new to Italy. Three sampling sites were established at increasing distance from the glacier, in order to compare species diversity, abundance and composition.

Zusammenfassung

BILOVITZ P. O., NASCIBENE J., TUTZER V., WALLNER A. & MAYRHOFER H. 2014. Terricolous lichens in the glacier forefield of the Rötkees (Eastern Alps, South Tyrol, Italy). [Terricole Flechten im Gletschervorfeld des Rötkees (Ostalpen, Südtirol, Italien)]. – *Phyton* (Horn, Austria) 54(2): 245–250, mit 2 Abbildungen.

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Die Erhebung der Flechten auf Erde, Pflanzenresten und terricolen Moosen im Gletschervorfeld des Rötkees ergab 31 Flechtentaxa (29 Arten und 2 Varietäten) und einen lichenicolen Pilz. *Micarea incrassata* HEDL. (*Lecanorales*) ist ein Neufund für Italien. Es wurden drei Aufnahmeflächen mit zunehmender Entfernung vom Gletscher festgelegt, um Diversität, Abundanz und Zusammensetzung der Arten zu vergleichen.

1. Introduction

Terricolous lichens are suitable indicators of various environmental disturbances of alpine regions, because of their direct contact with the soil, their competition with other ground vegetation and their sensitivity to anthropogenic influences (ST. CLAIR & al. 2007, RAI & al. 2012).

In the framework of a project on the impact of changing local conditions on lichen occurrence in glacier retreat regions, we investigated the terricolous lichen biota of five glacier forefields in the Eastern Alps (see also BILOVITZ & al. 2014), including that of the Rötkees (Fig. 1).

The Rötkees (Vedretta Rossa) is a glacier situated in the Röttal, which is an alpine side valley of the Ahrntal (Valle Aurina) in South Tyrol, Italy, on the border with Austria. Climate is continental and the bedrock of the glacier forefield mainly consists of lime-containing mica schists (RUTZ 1968, DAL PIAZ & al. 2011). The floristic data of the survey in the Rötkees area are presented in this paper.

2. Material and Methods

Sampling location: Italy, South Tyrol, High Tauern, Venediger Group, Rieserferner-Ahrn Nature Park, SE of Kasern, Röttal, 47°01'–02'N/12°10'–11'E, 2340–2490 m, glacier forefield of the Rötkees, 13. & 14.VIII.2013, leg. P. BILOVITZ, J. NASCIBENE, V. TUTZER, A. WALLNER & H. MAYRHOFER.

Three sampling sites were established at increasing distance from the glacier, corresponding to a gradient of moraine age: site 1 = c. 300 m, site 2 = c. 600 m, site 3 = c. 1500 m. In each site, lichens were surveyed within five 1 x 1 m randomly placed plots, both on soil (ter) and on plant debris or decaying terricolous mosses (deb). Spots with larger stones were avoided. Phanerogams were present in all three sites, but, with increasing distance from the glacier, diversity rose and vegetation cover became denser. Each plot was divided into 10 x 10 cm quadrats, in order to obtain data on species frequency (max. frequency/plot = 100). For each species, specimens were collected for a more accurate identification in the laboratory.

The specimens have been identified mainly with the aid of WIRTH & al. 2013, using routine light microscopy techniques. Some of the identifications required verification by using standardized thin-layer chromatography (TLC), following the protocols of WHITE & JAMES 1985 and ORANGE & al. 2001. The specimens are preserved in the herbarium of the Institute of Plant Sciences, University of Graz (GZU). The nomenclature mainly follows WIRTH & al. 2013, or other modern treatments.

3. Results and Discussion

Table 1. List of lichenized taxa with their substrata and the frequency of each species in the three sampling sites (indeterminable material not included).

Taxon	Substratum	Frequency		
		Site 1	Site 2	Site 3
<i>Allocetraria madreporiformis</i> (ACH.) KÄRNEFELT & A. THELL	ter	0	0	1
<i>Bacidia bagliettoana</i> (A. MASSAL. & DE NOT.) JATTA	deb	0	0	4 ²
<i>Bilimbia microcarpa</i> (Th. Fr.) Th. Fr.	deb	0	0	4 ²
<i>Caloplaca ammiospila</i> (WAHLENB.) H. OLIVIER	deb	1	0	0
<i>Caloplaca stillicidiorum</i> s. l.	deb	0	0	4
<i>Cetraria ericetorum</i> OPIZ	ter	0	0	2
<i>Cetraria islandica</i> (L.) ACH.	ter	0	0	44
<i>Cetraria muricata</i> (ACH.) ECKFELDT	ter	0	0	34
<i>Cladonia amaurocraea</i> (FLÖRKE) SCHAER.	ter	0	0	1
<i>Cladonia arbuscula</i> (WALLR.) FLOT. subsp. <i>squarrosa</i> (WALLR.) RUOSS	ter	0	0	1
<i>Cladonia cariosa</i> s. l. ¹	ter	0	62	20
<i>Cladonia macroceras</i> (DELISE) HAV.	ter	0	0	3
<i>Cladonia pyxidata</i> s. l.	ter	90	98	88
<i>Cladonia symphycarpia</i> (FLÖRKE) FR.	ter	0	35	9
<i>Lecidea berengeriana</i> (A. MASSAL.) Th. Fr.	ter	0	2 ²	7 ²
<i>Lecidea hypnorum</i> LIB.	deb	0	0	2
<i>Lecidella wulfenii</i> (HEPP) KÖRB.	deb	0	0	8 ²
<i>Micarea incrassata</i> HEDL.	ter	0	0	1
<i>Peltigera lepidophora</i> (NYL. ex VAIN.) BITTER	ter	0	0	11
<i>Peltigera rufescens</i> (WEISS) HUMB.	ter	0	16	13
<i>Protopannaria pezizoides</i> (WEBER) P. M. JØRG. & S. EKMAN	ter	25	10	2
<i>Protothelarella sphinctrinoidella</i> (NYL.) H. MAYRHOFER & POELT	ter, deb	15	0	0
<i>Psoroma tenue</i> HENSSEN var. <i>boreale</i> HENSSEN	ter	29	21	8
<i>Rinodina mniaraea</i> (ACH.) KÖRB. var. <i>mniaraea</i>	deb	0	0	2
<i>Rinodina mniaraea</i> var. <i>mniaraeiza</i> (NYL.) H. MAGN.	deb	0	0	18
<i>Solorina bispora</i> NYL.	ter	0	0	11
<i>Sporodictyon terrestre</i> (Th. Fr.) S. SAVIĆ & TIBELL	ter	6	0	4
<i>Stereocaulon alpinum</i> LAURER	ter	230	120	295
<i>Stereocaulon nanodes</i> TUCK.	ter	15	0	0
<i>Thamnolia vermicularis</i> (SW.) SCHAER. var. <i>vermicularis</i>	ter	0	0	21 ²
<i>Thamnolia vermicularis</i> var. <i>subuliformis</i> (EHRH.) SCHAER.	ter	0	0	42 ²

²) doubtful frequency data of morphologically similar crustose lichen species with black apothecia and the two morphologically identical varieties of *T. vermicularis*.

¹) with an affinity to Clade D according to PINO-BODAS & al. 2012.

Thirty-one lichen taxa (29 species and 2 varieties) and the lichenicolous fungus *Rhagadostoma brevisporum* (NAV.-ROS. & HLADÚN) NAV.-ROS. on *Peltigera lepidophora* were found in the three sampling sites. The crustose lichen *Micarea incrassata* (*Lecanorales*) growing on soil is new to Italy.



Fig. 1. Rötkees and sampling site 1. – Phot. P. O. BILOVITZ, 13.VIII.2013.

The diversity of terricolous lichens near the front of the glacier was very low. The first lichens occurred at a distance of about 300 m from the front (site 1), and only 8 species were found in this sampling site. The fruticose lichen *Stereocaulon alpinum* was not only the most noticeable, but also the most frequent species (Fig. 2), followed by *Cladonia pyxidata* s. l. The rest were crusts (*Caloplaca ammiospila*, *Protopannaria pezizoides*, *Protothelenella sphinctrinoidella*, *Psoroma tenue* var. *boreale* and *Sporodictyon terrestre*), with the exception of *Stereocaulon nanodes*, which normally occurs on rocks.

At a distance of about 600 m to the glacier (site 2), we found a similar species assemblage that also included *Cladonia cariosa* s. l., *Cladonia symphy carpia*, *Lecidea berengeriana* and *Peltigera rufescens*.

The number of species rose significantly at a distance of about 1500 m from the glacier (site 3), where we found 26 lichens. The increase of species richness in this sampling site was mainly due to the contribution of both crustose lichens growing on plant debris and/or decaying terricolous mosses (*Bacidia bagliettoana*, *Bilimbia microcarpa*, *Caloplaca stillicidiorum* s. l., *Lecidea hypnorum*, *Lecidella wulfenii*, and *Rinodina mniaraea* var. *mniaraea* / var. *mniaraeiza*) and fruticose lichens (*Allocetraria madreporiformis*, *Cetraria ericetorum*, *C. islandica*, *C. muricata*, *Cladonia amaurocraea*, *C. arbuscula* subsp. *squarrosa*, *C. macroceras* and *Thamnolia vermicularis* var. *vermicularis* / var. *subuliformis*). The increase of foliose and crustose lichen



Fig. 2. 1 x 1 m plot of sampling site 1. Small patches of *Stereocaulon alpinum*, the most frequent lichen species near the glacier. – Phot. P. O. BILOVITZ.

species directly growing on soil remained low (*Solorina bispora*, *Peltigera lepidophora*, and *Micarea incrassata*).

In comparison with the glacier forefield of the Gaisbergferner in Tyrol, with 39 species (BILOVITZ & al. 2014), the total diversity of the Rötkees glacier forefield was lower. One third of the species occurred in both forefields.

The gradient of species richness, composition and biological traits seems to reflect the gradient of moraine age, lichen communities being more diverse as much as the substrate is more stable. However, ecological analyses on our dataset can be conducted in more depth when data will be available for all five glacier forefields covered by our project.

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