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The importance of old deciduous trees and wooden fences for lichen diversity – an example from the Teichalm area (Eastern Alps)

Peter Othmar Bilovitz

Peter Othmar Bilovitz, University of Graz, Institute of Plant Sciences, NAWI Graz, Holteigasse 6, 8010 Graz, Austria. pe.bilovitz@uni-graz.at

Abstract

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The investigation of the epiphytic lichen diversity on four neighbouring old, isolated deciduous trees and a wooden fence in the Teichalm area yielded 74 lichen taxa and 4 lichenicolous fungi. *Anaptychia ciliaris*, *Cyphelium notarisii*, *Ramalina fastigiata* and *R. fraxinea* are remarkable records. The usually sterile lichen *Thelomma ocellatum* was rich in fertile thalli. The known lichen diversity of the Teichalm-Sommeralm region increases from 87 to 122 taxa.

Keywords

Biodiversity; lichenized Ascomycetes; epiphytic lichens; Nature Park Almenland

Introduction

The area of the Teichalm is situated about 30 km north of Graz, the capital city of the Austrian province Styria. The Teichalm and the adjacent Sommeralm represent the largest “seasonal mountain pasture” in Austria and both are part of the Nature Park “Almenland”. The Teichalm-Sommeralm region is a 9 km long high valley, which runs from east to west at 1170 to c. 1500 m altitude. According to Lieb (1991), it is part of the Grazer Bergland. The area shows a great variety of rock types, siliceous as well as calcareous; Lieb (1990) gives a general survey of the geology and geomorphology of the Teichalm. According to Lazar (1990: 17), the climate can be characterized as winter-cold and summer-cool, with a distinct maximum of precipitation in summer due to frequent thunderstorms; the average precipitation amounts to 1100 to 1130 mm per year. Lieb & Zimmermann (1990) describe the history of land use, which lasts already over centuries. To this day the “seasonal mountain pasture” is the most important way of land use in the area followed by forestry. There are no natural, but only managed forests mainly with spruce and larch, whereas beech and sycamore occur only exceptionally, often as old, isolated trees in pastures. Zimmermann & Maurer (1990) report on the vegetation, Maurer et al. (1990) on the flora of the Teichalm-Sommeralm area. Drescher-Schneider (1990) gives an account of the forest development during the post-glacial period.

Apart from the contribution of Maurer et al. (1990), who present a list of 79 lichen species from the Teichalm-Sommeralm area (saxicolous lichens not treated), there are only single records mentioned in various publications (Poelt 1974: 33, Poelt 1977: 116–117, Poelt & Hafellner 1981: 144, Hafellner 1982: 303, Ebner et al. 1984: 128, Mayrhofer 1984: 385, Anonymus 1992: 26, Hafellner 1993: 177–178, 179, Ropin & Mayrhofer 1993: 806, 819, Hafellner 2001: 10, Blaha & Grube 2007: 52, Arup 2009: 121). Altogether, 87 lichen species have been published from the Teichalm-Sommeralm area to date. Contributions to the lichen flora of other areas in the Grazer Bergland are provided by Maurer et al. (1983), Hafellner & Muggia (2006) and Hafellner (2009).

Material and methods

The epiphytic lichen diversity of four neighbouring old, isolated deciduous trees (2 *Acer pseudoplatanus* and 2 *Fagus sylvatica*) and a wooden fence in the Teichalm area was investigated. The specimens have been identified mainly with the aid of Wirth (1995) and Ihlen & Wedin (2008), 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 et al. (2001). The specimens are preserved in the herbarium of the Institute of Plant Sciences, University of Graz (GZU). The nomenclature follows Nimis & Martellos (2003), Santesson et al. (2004), or other modern treatments. New records for the Teichalm-Sommeralm region are marked with an asterisk (*).

Sampling location

Austria, Styria, Grazer Bergland, Nature Park “Almenland”, Teichalm, hiking trail to the Buchkogel, c. 1.3 km SE of the restaurant “Angerwirt”, 47°20'N/15°29'E, c. 1225 m, pasture with wooden fences and isolated deciduous trees, 09.XI.2011, leg. P. Bilovitz.

List of substrata and their abbreviations

Ace pse	<i>Acer pseudoplatanus</i> (sycamore)
Fag syl	<i>Fagus sylvatica</i> (beech)
bra	on branches
cor	corticolous, on bark of trunks
lig	lignicolous, on wooden fences

List of taxa

Lichenized taxa

**Amandinea punctata* (Hoffm.) Coppins & Scheid.: cor Ace pse, lig

Anaptychia ciliaris (L.) Körb.: cor Ace pse, cor Fag syl

**Arthonia didyma* Körb.: cor Fag syl

- **Buellia disciformis* (Fr.) Mudd: bra/cor Ace pse
- **Buellia griseovirens* (Turner & Borrer ex Sm.) Almb.: cor Ace pse
- **Caloplaca cerina* (Ehrh. ex Hedw.) Th.Fr.: cor Ace pse
- **Caloplaca cerinella* (Nyl.) Flagey: cor Ace pse
- Caloplaca holocarpa* (Hoffm. ex Ach.) A.E.Wade: lig
- **Caloplaca monacensis* (Lederer) Lettau: cor Fag syl
- **Candelaria concolor* (Dicks.) Stein: cor Ace pse, cor Fag syl
- **Candelariella reflexa* (Nyl.) Lettau: cor Ace pse, cor Fag syl
- **Candelariella xanthostigma* (Ach.) Lettau: cor Fag syl
- **Cyphelium notarisii* (Tul.) Blomb. & Forssell: lig
- Cyphelium tigillare* (Ach.) Ach.: lig
- Evernia prunastri* (L.) Ach.: cor Fag syl, lig
- **Flavoparmelia caperata* (L.) Hale: cor Fag syl
- **Gallowayella fulva* (Hoffm.) S.Y.Kondr. & al.: cor Ace pse
- Hypogymnia farinacea* Zopf: bra Ace pse
- Hypogymnia physodes* (L.) Nyl.: lig
- Lecanora allophana* Nyl.: cor Ace pse, cor Fag syl
- Lecanora carpineae* (L.) Vain.: cor Ace pse
- **Lecanora chlarotera* Nyl.: cor Ace pse, cor Fag syl, lig
- **Lecanora circumborealis* Brodo & Vitik.: lig
- Lecanora hagenii* (Ach.) Ach.: cor Ace pse
- **Lecanora persimilis* (Th.Fr.) Nyl.: cor Ace pse, cor Fag syl
- Lecanora pulicaris* (Pers.) Ach.: lig
- Lecanora varia* (Hoffm.) Ach.: bra Ace pse, lig
- **Lecidella achristotera* (Nyl.) Hertel & Leuckert: cor Fag syl
- **Lecidella elaeochroma* (Ach.) M.Choisy: cor Ace pse

- **Lepraria finkii* (de Lesd.) R.C.Harris: cor Fag syl
- **Leptogium lichenoides* (L.) Zahlbr.: mus Ace pse
- **Leptogium saturninum* (Dicks.) Nyl.: cor Ace pse
- Massjukiella candelaria* (L.) S.Y.Kondr. & al.: cor Ace pse, lig
- Massjukiella polycarpa* (Hoffm.) S.Y.Kondr. & al.: lig
- Melanelixia glabra* (Schaer.) O.Blanco & al.: cor Ace pse, cor Fag syl
- Melanelixia subargentifera* (Nyl.) O.Blanco & al.: bra/cor Ace pse
- Melanelixia subaurifera* (Nyl.) O.Blanco & al.: cor Fag syl
- Melanohalea exasperata* (De Not.) O.Blanco & al.: bra Ace pse
- Melanohalea exasperatula* (Nyl.) O.Blanco & al.: bra/cor Ace pse, cor Fag syl, lig
- **Micarea denigrata* (Fr.) Hedl.: lig
- **Ochrolechia arborea* (Kreyer) Almb.: cor Ace pse, cor Fag syl
- Parmelia saxatilis* (L.) Ach.: cor Fag syl
- Parmelia sulcata* Taylor: cor Ace pse, cor Fag syl, lig
- Parmelina tiliacea* (Hoffm.) Hale: cor Ace pse, cor Fag syl
- Parmeliopsis ambigua* (Wulfen) Nyl.: lig
- Peltigera praetextata* (Flörke ex Sommerf.) Zopf: cor Ace pse
- Pertusaria albescens* (Huds.) M.Choisy & Werner: cor Ace pse, cor Fag syl
- **Pertusaria coccodes* (Ach.) Nyl.: cor Fag syl
- **Phaeophyscia nigricans* (Flörke) Moberg: cor Ace pse
- Phaeophyscia orbicularis* (Neck.) Moberg: bra/cor Ace pse
- Phlyctis argena* (Spreng.) Flot.: cor Fag syl
- Physcia adscendens* H.Olivier: bra/cor Ace pse, cor Fag syl
- Physcia dubia* (Hoffm.) Lettau: cor Ace pse
- Physcia stellaris* (L.) Nyl.: bra/cor Ace pse, lig
- **Physciella chloantha* (Ach.) Essl.: cor Ace pse

- **Physconia detera* (Nyl.) Poelt: cor Fag syl
- Physconia distorta* (With.) J.R.Laundon: cor Ace pse, cor Fag syl
- **Physconia enteroxantha* (Nyl.) Poelt: cor Ace pse, cor Fag syl
- **Physconia perisidiosa* (Erichsen) Moberg: cor Ace pse
- Pseudevernia furfuracea* (L.) Zopf: cor Ace pse, lig
- **Punctelia jeckeri* (Roum.) Kalb: cor Fag syl
- **Pycnora sorophora* (Vain.) Hafellner: lig
- Ramalina farinacea* (L.) Ach.: cor Ace pse, cor Fag syl
- Ramalina fastigiata* (Pers.) Ach.: cor Fag syl
- Ramalina fraxinea* (L.) Ach.: cor Ace pse, cor Fag syl
- **Rinodina exigua* (Ach.) Gray: cor Fag syl
- **Rinodina sophodes* (Ach.) A.Massal.: bra/cor Ace pse
- **Scoliciosporum umbrinum* (Ach.) Arnold var. *corticolum* (Anzi) Bagl. & Carestia: bra/cor Ace pse
- Thelomma ocellatum* (Körb.) Tibell: lig
- **Trapeliopsis flexuosa* (Fr.) Coppins & P.James: lig
- Usnea hirta* (L.) Weber ex F.H.Wigg.: lig
- Usnea intermedia* (A.Massal.) Jatta: cor Fag syl
- Usnea subfloridana* Stirt.: cor Fag syl
- Xanthoria parietina* (L.) Th.Fr.: bra/cor Ace pse, cor Fag syl, lig

Lichenicolous taxa

- **Arthonia galactinaria* sensu amplo: on *Lecanora carpinea*
- **Arthonia subfuscicola* (Linds.) Triebel: on *Lecanora carpinea*
- **Tremella phaeophysciae* Diederich & M.S.Christ.: on *Phaeophyscia orbicularis*, *Physciella chloantha*
- **Vouauxiella lichenicola* (Linds.) Petr. & Sydow: on *Lecanora chlarotera*

Results and discussion

The investigation of the epiphytic lichen diversity of four neighbouring old, isolated deciduous trees and a wooden fence in the Teichalm area yielded 74 lichen taxa and 4 lichenicolous fungi. 44 lichen taxa occur on *Acer pseudoplatanus*, 35 on *Fagus sylvatica* and 23 on the wooden fence. The number of known lichen species of the Teichalm-Sommeralm area therefore increases from 87 to 122. The forests in the area are managed and dominated by *Picea abies* and *Larix decidua*. Therefore old, isolated deciduous trees and wooden fences play an important role for the epiphytic lichen diversity in the Teichalm area, especially for species depending on euphotic sites. According to the ecological indicator values of Central European lichen species (Wirth 2010), the arithmetic mean of all species with regard to the light value (L) comes to around 7 (L 7 = half-light plant, mostly in full light, but also in the shade). The fruticose species *Anaptychia ciliaris*, *Ramalina fastigiata* and *R. fraxinea* are among the endangered lichens in Austria (Türk & Hafellner 1999); the same applies to the crustose species *Cyphelium notarisii*, which is much rarer in Austria than the morphologically identical *C. tigillare*. The usually sterile lichen *Thelomma ocellatum* was rich in fertile thalli. A similar high number of species on old, isolated individuals of *Acer pseudoplatanus* and *Fagus sylvatica* in a pasture is reported by Bilovitz (2007: 99), who recorded 69 epiphytic lichen species on seven phorophytes.

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