The sorediate species of *Xylographa* in Austria (Baeomycetales, lichenized Ascomycetes)

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Abstract: Heininger, C. & Spribille, T. 2009. The sorediate species of *Xylographa* in Austria (Baeomycetales, lichenized Ascomycetes). – Herzogia **22**: 129–134.

Based on a review of material in Austrian herbaria, we revise the sorediate species of the lignicolous lichen genus *Xylographa* in Austria. Two species are present. *Xylographa soralifera*, reported here as new for Austria, is widespread but infrequent in the provinces of Carinthia, Salzburg, Styria and Tyrol. *Xylographa vitiligo* is more common and found from lowlands to near the treeline throughout the mountainous part of Austria.

Zusammenfassung: Heininger, C. & Spribille, T. 2009. Die sorediösen Arten der Flechtengattung *Xylographa* in Österreich. – Herzogia **22**: 129–134.

Eine Revision der sorediösen Vertreter der Flechtengattung *Xylographa* in Österreich wird vorgestellt basierend auf Material aus österreichischen Herbarien. Zwei Arten kommen vor. *Xylographa soralifera*, ein Erstnachweis für Österreich, ist verbreitet aber nicht häufig in den Bundesländern Kärnten, Salzburg, Steiermark und Tirol. *Xylographa vitiligo* ist die häufigere Art und kommt vom Tiefland bis zur alpinen Waldgrenze im gesamten Ostalpenraum vor.

Key words: Coarse woody debris, conservation, lignicoles, saproxylic, taxonomy.

Introduction

Xylographa is perhaps the genus of lichenized fungi most closely associated with wood. The last comprehensive treatment of the genus for central Europe was that of Redinger (1938), and most regional treatments draw from his concepts and those of Laundon (1963). Four species are generally accepted as occurring in central Europe: three esorediate species, *Xylographa parallela* (Ach.:Fr.) Behlen & Desberger, *X. minutula* Körb., *X. trunciseda* (Th.Fr.) Minks and one sorediate taxon, *Xylographa vitiligo* (Ach.) J.R.Laundon (Wirth 1995, Hafellner & Türk 2001, etc.). In addition, *Xylographa opegraphella* Nyl. is known to occur on marine driftwood on the northern shores of the Baltic Sea (Brodo 1992), and may eventually be found on its southern shores as well. Recently, Holien & Tønsberg (2008) recognized a second sorediate *Xylographa* species occurring in northern Europe and western North America, *Xylographa soralifera* Holien & Tønsberg, and cited a single specimen from the Italian Alps. This was the first new *Xylographa* to be described from Europe in 87 years, the last being *X. rubescens* Räsänen from Finland (Vainio 1921), the taxonomic merit of which is not universally recognized.

It was apparent already before Holien & Tønsberg (2008) went to press that *Xylographa* in the eastern Alps required critical re-evaluation. Subsequently, we began a review of all material of *Xylographa* in Austrian herbaria with the aim of bringing past concepts up to date and testing species concepts. In the present contribution we will report on our assessment of sorediate *Xylographa*, which has traditionally all been assigned to a single taxon, *X. vitiligo*.

Materials and Methods

We studied a total of 146 specimens from the Austrian herbaria GZU, IB, KL, LI, SZU, W and WU, and conducted thin layer chromatography (TLC) wherever the material was sufficient. Additional material from neighbouring countries, including Italy, Serbia, Slovakia and Slovenia, was examined only insofar as it was represented in Austrian herbaria. TLC followed the standardized methods outlined by Culberson (1972) with modifications following Culberson & Johnson (1982). Microscopy was only carried out on selected fertile specimens and employed a Zeiss Axioskop microscope. Photos were taken with a Zeiss AxioCam MRc5 digital camera mounted on a Leica Wild M3Z stereo dissecting scope and digitally optimized using CombineZM freeware.

Results and Discussion

Sorediate *Xylographa* in Austria consists of two chemically and morphologically distinct species which can be referred to the recently described *X. soralifera* and the previously recognized *X. vitiligo*, respectively. They can be distinguished using the following key:

1 Stictic acid present; esorediate parts of thallus often poorly developed, immersed; soralia concave to flat, often with salt-and-pepper-like pigmentation of the outer soralia ..... ***X. vitiligo***

1* Fumarprotocetraric acid present; esorediate parts of thallus usually well developed and surficial; soralia strongly convex, whitish to greenish, outer soralia usually not darkly pigmented ..... ***X. soralifera***

The Species

Xylographa soralifera Holien & Tønsberg, Graphis Scripta 20: 58 (2008). Type: USA, Washington State, BG, holotype (Holien & Tønsberg 2008).

Description: A full description is provided by Holien & Tønsberg (2008).

Xylographa soralifera is reported here as new to Austria; we also report a second specimen from Italy, from the same general vicinity as the specimen reported by Holien & Tønsberg (2008). *X. soralifera* is far less common than the other sorediate *Xylographa* species in Austria, *X. vitiligo*, having been collected only 15 times in total as compared to the dozens of collections seen for *X. vitiligo*. It tends to occur at lower elevations (mostly <1700 m) but whether it is more generally confined to logs, as opposed to snags, is unclear; this is an ecological difference that is fairly constant in northwest North America (T.S., pers. obs.). In western North America the species can also occur on bark of conifers (Holien & Tønsberg 2008).

Although superficially similar and long confused with each other, the two species tend to differ markedly in habit when well developed (Fig. 1). *X. soralifera* has convex soralia and a largely surficial thallus, as opposed to the flat to concave soralia of *X. vitiligo*. In *X. soralifera*, the soralia usually lack darkish pigmentation but are often slightly greenish, especially if damaged; in *X. vitiligo*, by contrast, the soralia often possess a 'salt-and-pepper' pigmentation of the outer soralia. Chemistry is the most reliable way of separating the two taxa, with *X. soralifera* possessing fumarprotocetraric and *X. vitiligo* stictic acid. Both substances give K+ brownish yellow and P+ orange-red reactions. Although the P reaction of fumarprotocetraric acid tends to be more intensely reddish, TLC is the most reliable means of identification. *X. soralifera* is often found fertile – about two thirds of Austrian specimens bore apothecia – whereas apothecia are found in less than 10 % of specimens of *X. vitiligo*. This pattern parallels observations of fecundity of the two species in western North America by the second author.

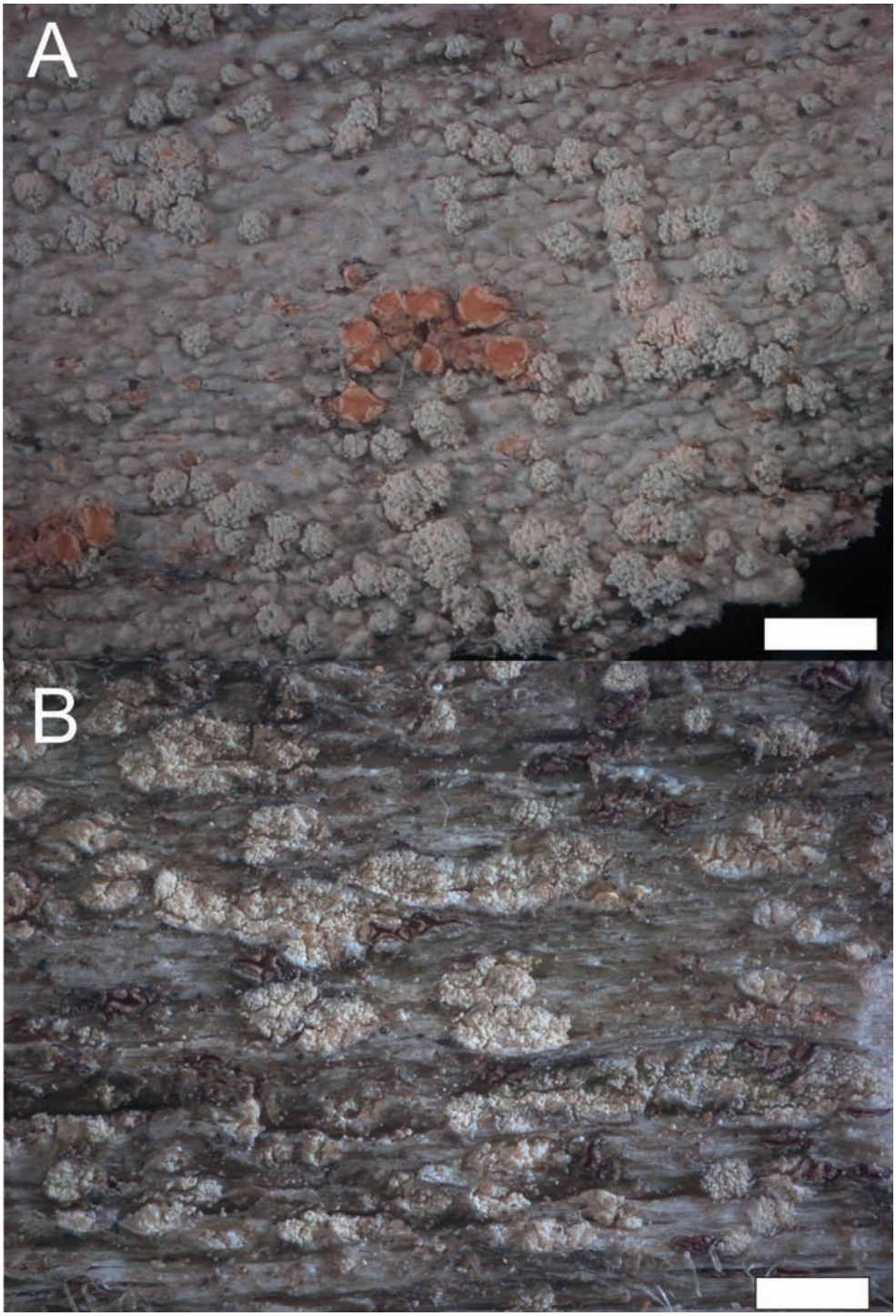

Fig. 1: Habit of sorediate species of *Xylographa* in Austria. **A** – *Xylographa soralifera*, fertile specimen (Breuss 5788, LI); **B** – *Xylographa vitiligo*, fertile specimen (Hafellner 56763, GZU). Scale bar = 1 mm.

Xylographa soralifera can be most readily confused with crustose sorediate lichens which contain fumarprotocetraric acid as a main secondary lichen substance. These include, in Austria, *Pertusaria pupillaris* (Nyl.) Th.Fr., which tends to have cavate, erumpent soralia and the additional presence of protocetraric acid (Schreiner & Hafellner 1992), and to a lesser extent *Ramboldia cinnabarina* (Sommerf.) Kalb, Lumbsch & Elix [syn. *Pyrrhospora cinnabarina* (Sommerf.) M. Choisy], which differs in the additional presence of atranorin. The sorediate morph of *Lecanora conizaeoides* Nyl. ex Crombie also contains fumarprotocetraric acid as the main substance but has more irregularly erumpent soralia and rarely occurs on wood. *X. soralifera* is colonized by several species of lichenicolous fungi in northwestern North America (e.g., *Bellemerella ritae*; Pérez-Ortega & Spribille 2007), but these were not found in the Austrian material.

Exsiccatae: ITALY. [**Trentino-Alto Adige**]. Lich. Rar. Lang. Exs. 385 (WU!).

Specimens examined: AUSTRIA. Kärnten. Gurktaler Alpen, Hochrindl W über Deutsch Griffen, 1530–1600 m, sehr lockerer, beweideter Lärchen-Zirbenwald, 13.VI.1993, J. Poelt s.n. (GZU); Nationalpark Nockberge, N von Radenthein, Hänge E gegenüber der Erlacher Hütte, MTB 9148/2, ca. 1630 m, lockerer Lärchen-Zirbenwald, auf morschen Strünken, 29.VIII.1994, J. Hafellner 33455 (GZU); Steirisches Randgebirge, Koralpe E von Wolfsberg, NW-exponierte Hänge kurz E von der Hipfel Hütte, 46°48'30"N/14°57'E, MTB 9155/4, ca. 1600 m, subalpiner Fichtenwald, auf morschen Baumstümpfen, 14.VI.1998, J. Hafellner 45487 (GZU); Hohe Tauern, Reißeckgruppe, Tal des Gößbaches, MTB 9046, 1200–1600 m, auf Holz von *Picea abies*, 30.VIII.1994, R. Türk 20050 (LI); Gailtaler Alpen, Aufstieg von Weißbriach zur Hochwarter Höhe, ca. 1200 m, N-expon. Hang mit *Picea* und *Vaccinium myrtillus*, 18.VII.1994, O. Breuss 10148, 10149 (LI); Naggler Nock, südl. Techendorf am Weißensee, nähe Bergstation, MTB 9245/4, 21.VI.1982, S. Wagner s.n. (LI). **Salzburg.** Hohe Tauern, Glockner Gruppe, "Hutterwald" SSW von Niedernsill, 47°15'29"N/12°38'27"E, 1590–1600 m, auf Holz von *Picea abies*, 28.IX.2000, R. Türk 29494 (LI); Gasteiner Tal, Pongau, NE von Badgastein, äußerer Teil des Kötschachtale Umgebung vom Hoteldorf "Grüner Baum", MTB 8844/4, 1090 m, Fichtenwald, 05.III.1994, H. Wittmann (LI); Hochkönigmassiv, Dientener Sattel, MTB 8644, auf Holz von Zaun, 26.VIII.1978, R. Türk 2347 (LI); **Steiermark.** Frauenalpe bei Murau, in Wäldern, 24.V.1906, B. Fest (GZU); Niedere Tauern, Ende des Triebentales SO von Trieben, 1200–1300 m, waldige Hänge unweit der Griesmoarhube, VIII. 1973, J. Poelt 12414 (GZU); Niedere Tauern, Wölzer Tauern, Plannerkessel, 1600–1700 m, subalpiner Fichtenwald, 25.VII.1985, J. Hafellner 13722 (GZU); **Tirol.** Auf morschen Stöcken am Aufstiege zu Schgagelhütte von St. Ulrich, , 8/[1]898, A. Zahlbruckner (W); Osttirol, Hohe Tauern, Virgental, Weg von Zedlach zum „Zedlacher Paradies" N oberhalb Zedlach, Fichten-Lärchenwald mit vielen Altbäumen, 1400–1650 m, 01.IX.1988, J. Poelt (GZU); Virgental, Weg von Virgen zum Wetterkreuz, 1600–1700 m, 26.VIII.1988, O. Breuss 5788 (LI).

Xylographa vitiligo (Ach.) J.R.Laundon, Lichenologist 2: 147 (1963). Type: H-ACH (seen and lectotypified by Holien & Tønsberg 2008).

Description: A full description is provided by Ryan (2004) and synonymy by Holien & Tønsberg (2008).

Xylographa vitiligo is the more common of the two sorediate *Xylographa* species in Austria, and is widespread throughout the eastern Alps (Fig. 2B). There is also one record from the Mühlviertel, in the Austrian/Czech/German border area (Breuß & Türk 8655, LI). It is apparently still not known from the Czech Republic itself, but almost certainly occurs there. Kanz et al. (2005) report only one old record from the Bavarian Forest/Šumava region, though it is not clear from which country, Germany or the Czech Republic, it originated.

X. vitiligo has been confused with a variety of sterile sorediate crusts on wood. Most often it has been lumped together with *X. soralifera*, from which it differs in soralia morphology and chemistry (see that species). Besides that species, it is perhaps most commonly confused with the commonly sterile *Lecidea pullata* (Norman) Th.Fr. (*Biatora amaurospoda* Anzi of Hafellner & Türk 2001, but see Jørgensen et al. 2002), which differs in the presence of sphaerophorin and is thus UV+ white, and *Buellia griseovirens* (Turner & Borrer ex Sm.)

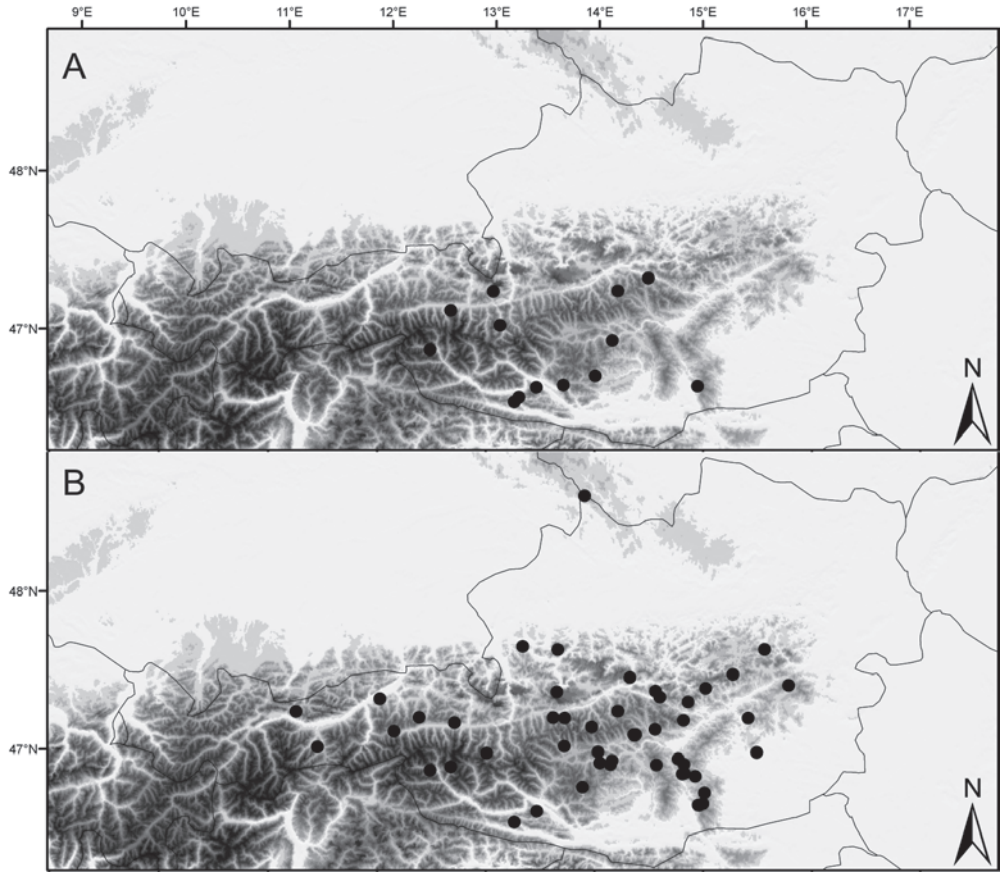

Fig. 2: Distribution of sorediate *Xylographa* species in Austria. **A** – *X. soralifera*; **B** – *X. vitiligo*.

Almb., from which it differs in the lack of faint yellowish pigmentation in the soralia and in its chemistry (stictic acid vs. atranorin and norstictic acid in *B. griseovirens*; rare forms have only atranorin). *Buellia arborea* Coppins & Tønsberg also bears a superficial resemblance to *X. vitiligo* but is K+ yellow, not orangish, in spot tests and has atranorin and placodiolic acid as detected by TLC. Species of the *X. vitiligo* group have also sometimes been confused with *Lecanora expersa* Nyl., a sorediate lignicolous species occurring especially in Upper Austria (SANTESSON et al. 2004 erroneously listed it as 'lichenicolous' instead of lignicolous in the Fennoscandian lichen checklist; Z. Palice, pers. comm.). However, *L. expersa* lacks fumarprotocetraric and stictic acids and instead is characterized by atranorin and an unknown fatty acid similar to roccellic acid.

Exsiccatae: AUSTRIA. Steiermark. Obermayer, Dupla Graecensia Lichenum 33 (GZU!), 43 (GZU!); **Tirol:** Rehm, Ascomyceten 123 (GZU!, W!).

Selected additional specimens examined (64 seen in total): **AUSTRIA. Kärnten.** Turracherhöhe-Süd, Wagner 9049/3 (KL); **Niederösterreich.** Kalkalpen, Gem. St. Ägyd bei Neuwalde, Breuss & Türk 8655 (LI); **Oberösterreich.** Mühlviertel, Böhmerwald, 600 m WSW vom Plöckenstein, Türk & Wittmann 4869 (LI); **Tirol.** Osttirol, Nationalpark Hohe Tauern, Glockner-Gruppe, Hafellner 47006 (GZU); **Salzburg.** Schladminger Tauern, Lungau, Mayrhofer, Poelt & Türk s.n. (GZU).

Acknowledgements

We would like to thank the curators of the cited herbaria for loans of specimens, Walter Obermayer (Graz) and Henrik von Wehrden (Halle a.d. Saale) for assistance with the graphics, and Viktoria Wagner (Halle a.d. Saale) for shepherding the manuscript through the proof stage.

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Manuscript accepted: 6 July 2009.

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