

SEVERAL NOTEWORTHY LICHENS FOUND IN THE FOOTHILLS OF THE ŠUMAVA MTS, SOUTH BOHEMIA, CZECH REPUBLIC

Několik pozoruhodných lišejníků z Šumavského předhůří

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Abstract: Two interesting sorediate crusts, *Arthonia endlicheri* and *Dirina* aff. *stenhammari*, were found on overhangs of gneiss outcrops in forested slopes near an artificial lake in the foothills of the Šumava Mts, South Bohemia. The latter species is related to, but not conspecific with, *Dirina stenhammari*; it has an identical chemistry and similar morphology, but its ITS sequence differ from various *Dirina stenhammari* populations (data not shown in this paper). *Dirina* aff. *stenhammari* was highly parasitised by the lichenicolous hyphomycete *Milospium graphideorum*, new to the Czech Republic. *Arthonia endlicheri* was not rarely collected in Central Europe until the middle of 20th century; we revised PRM herbarium material from the Czech Republic, Romania, Slovakia, and the Ukrainian Carpathians. Nowadays, it is considered extinct in some Central European countries; in the Czech Republic, it had previously not been seen for more than 50 years. Other noteworthy lichens recorded at the same locality are *Agonimia gelatinosa*, *A. vouauxii*, *Lecanactis latebrarum*, *Leptogium tenuissimum*, and *Porocyphus coccodes*.

Keywords: *Agonimia*, *Arthonia endlicheri*, *Dirina stenhammari*, *Leptogium tenuissimum*, *Porocyphus*

This paper stresses how little we still know about the Central European lichen flora and how surprising records can be made during an afternoon walk around where you live. This happened to the first two authors last year on one summer day when taking a walk around an artificial, c. 60 years old water reservoir, "Husinecká přehrada", in the Šumava Mts foothills. For the Czech Republic, the surroundings of this lake are rather poor in lichens; very few thermophilous species reach this upland (e.g. *Caloplaca demissa* and *C. irrubescens*) and upper mountainous elements are missing. The region is largely forested, but its woodlands are managed and old-growth forests are absent. The area is also rather dry, being in the shade of the Šumava Mts, the annual precipitation is only c. 600 mm (Tolasz 2007). This rather dry climate has a negative impact on lichens, particularly epiphytic species. Uncommon lichens may be found mainly in wet valley bottoms.

Walking around the lake, we focused on lichen communities of dry overhangs of gneiss rocks and outcrops in forested slopes. Such communities are mainly composed of expected sorediate lichens, such as *Caloplaca demissa* (rare), *Chrysothrix chlorina* (rare), *Lecanora orosthea*, *Lepraria vouauxii* and other *Lepraria* species, *Leprocaulon microscopicum*, *Psilolechia lucida*, and *Ramalina pollinaria*. Apart from these, we recorded several *Trentepohlia*-containing crusts: *Cystocoleus/Racodium* felt-crusts (rare and not collected), *Arthonia endlicheri*, *Lecanactis latebrarum* (often abundant), *Opegrapha gyrocarpa*, *O. lithyrga*, *Porina chlorotica*, and *Dirina* aff. *stenhammari* (undescribed species), the latter highly parasitized by a black hyphomycete *Milospium graphideorum*, which is a new recorded lichenicolous fungus for the Czech Republic.

During our short walk, we also recorded some uncommon lichens: *Agonimia gelatinosa*, *A. vouauxii*, and *Leptogium tenuissimum* were found in open grassland and *Porocyphus coccodes* occurred on a horizontal siliceous rock face, occasionally flooded by lake water.

Locality of collections: Czech Republic. *South Bohemia:* the Šumava Mts foothills, distr. Prachatice, Husinec, forested E-slope and open grassland near to the dam of the water reservoir "Husinecká přehrada", alt. c. 520 m, N49°1'60" E13°59'3"E (WGS-84).

Notes to selected species

Agonimia gelatinosa (Ach.) M. Brand & Diederich – voucher specimen: CBFS JV7174.

Superficially similar to *A. vouauxii* and forms of *A. allobata* (Stizenb.) P. James, without finger-like goniocysts, but 8-spored asci, size of ascospores and ecology (epigeic species) are characteristic; for more characters see Sérusiaux et al. (1999) or Orange & Purvis (2009). It is rarely recorded in the Czech Republic; in the 20th century, it was collected by Vězda (1961) as *Polyblastia nigrata* from Hrubý Jeseník Mts.

Agonimia vouauxii (B. de Lesd.) M. Brand & Diederich – voucher specimen: CBFS JV7175.

This inconspicuous lichen is easily misidentified for *Verrucaria bryoctona* (Th. Fr.) Orange in the field, because both species have spherical to slightly obpyriform glossy perithecia, half-immersed in a grey-green granular-verrucose thallus, and occurring in similar habitats. However, the ascospores in *Agonimia vouauxii* are characteristic; it is one of a few *Agonimia/Polyblastia* species with only 2-spored asci. Somewhat similar lichens with 2-spored asci are *Agonimia tristicula* (Nyl.) Zahlbr. with pyriform perithecia and squamulose thallus, *Polyblastia agraria* Th. Fr. with a very simplified, gelatinose thallus, *P. helvetica* Th. Fr. with very large ascospores and *Thelenella muscorum* (Fr.) Vain. with well-developed paraphysoids. Although the species is not rare in anthropogenic habitats (e.g. discharge hoppers or settling pits), only one record from Brno has been published from the Czech Republic (Vězda 1961).

- Other unpublished records from the Czech Republic (sub *Polyblastia vouauxii*): **Central Bohemia.** Příbram, Lešetice, SE foot of discharge hopper c. 0.7 km W of village, alt. 550 m, N49°38'48" E14°0'37", on soil at base of hopper, 1. 11. 2008, *J. Vondrák* (CBFS JV6850). **South Bohemia.** České Budějovice, Mydlovary, settling pit "MAPE", alt. 400 m, N49°5'58.153" E14°20'7.759", on decaying leaves over clay soil, 19. 9. 2007, *J. Vondrák* (CBFS JV5853); České Budějovice, Nové Hodějovice, dam of settling pit, c. 0.7 km ENE of village, alt. 430 m, N48°57'7.8" E14°30'44.216", on acidic soil, 10. 11. 2008, *J. Vondrák* (CBFS JV6713); *Ibid.*: 16. 11. 2008 (CBFS 6841); Týn nad Vltavou, Temelín, at railway between Temelín and nuclear power-plant "Temelín", alt. 490 m, N49°11'19" E14°21'57", on soil of railway embankment, 4. 4. 2009, *J. Vondrák* (CBFS JV7003). **West Bohemia.** Sokolov, Chodov, discharge hopper "Smolnická výsypka", alt. 450 m, N50°15'13" E12°44'10", on decaying leaves over clay soil, 25. 9. 2007, *J. Vondrák* (CBFS JV5874).

Arthonia endlicheri (Garov.) Oxner – voucher specimen: CBFS JV7173 (image on <http://botanika.prf.jcu.cz/lichenology>).

This is one of the commonly sterile sorediate crusts containing *Trentepohlia*. It has a cream-white or pinkish, rather thick crust containing lecanoric acid (C+ red). The thallus margin is often delimited by a black prothallus line and it may be inconspicuously lobate (as reflected the former name for this species, *A. lobata* (Flörke) A. Massal.). Collections normally have pycnidia, but apothecia are very rare (see revised material from Romania); crusts with pycnidia and/or apothecia are sparingly or not sorediate.

We have revised available samples of *A. endlicheri/A. lobata* in PRM. The species was rather frequently recorded in Central Europe until the middle of 20th century. We observed well-developed material from the Czech Republic, Slovakia, Romania (former territory of Hungary) and Ukrainian Carpathians. Nevertheless, the species is considered to be extinct in the Czech Republic (Liška et al. 2008), Germany (Wirth et al. 1996) and Poland (Cieśliński 2003). In the Ukrainian Carpathians, it was also missing for more than 50 years (Kondratyuk et al. 1998) and it is absent from the Slovakian red list (Pišút et al. 2001).

- Revised samples (all named *Arthonia/Pachnolepia lobata*): **Czech Republic.** Hrobčice u Liblína (distr. Rokycany), rocks above river Berounka, 1898, *E. Bayer* (PRM 694349); Náchod, locality Peklo, 1920, *V. Kuťák* (PRM 579155, 759449, Lich. Bohemiae 2148); Nové Město nad Metují, 1921, *V. Kuťák* (PRM); *Ibid.*: 1920, *V. Kuťák* (PRM 694347, Lich. Bohemiae 2086); Tábor, rocks above river Lužnice, 1926, coll. ? (PRM, herb. M. Servít). **Romania.** Herkulesbad (Băile Herculane), 1885, *Lojka* (PRM 579156, fertile!; PRM 579157); *Ibid.*: Thermas Herculis, *H. Lojka* (PRM 579154, Lich. Hung. Exs. 93, 1882). **Slovakia.** Vihorlat: Choňkovce, Borola, alt. 350 m, 1930, *J. Nádvorník* (PRM 17929). **Ukraine.** Carpathians: Nevické Podhradí (Nevyc'ke, NE of Uzhgorod), 1929, *J. Nádvorník* (PRM, sen num.); *Ibid.*: 1932 (PRM 759448).

Dirina aff. stenhammari (Fr. ex Stenh.) Poelt & Follm. – voucher specimen: CBFS JV7172 (image on <http://botanika.prf.jcu.cz/lichenology>).

Dirina stenhammari s.str. is a predominantly sterile crust with a *Trentepohlia* photobiont, containing erythrin, ± lecanoric acid and UV+ yellow and white unknown substances. It occasionally occurs on limestone overhanging rocks throughout the Czech Republic; previous records are mentioned in Vondrák & Palice (2004), Vondrák (2006) and Vondrák et al. (2007). The species has two ecological niches, occurring on limestone rocks throughout Europe and on siliceous/calcareous seashore cliffs. As our record does not fit in both ecologies, we decided to obtain molecular data (ITS nrDNA) from populations of *D. stenhammari* with various ecologies. We found that the species is heterogeneous; most coastal (on siliceous rocks) and inland (calciphilous) populations form a monophyletic group, but our specimen and a sample from Svalbard (although with identical chemistry and similar morphology) are distinguished from others, both probably representing two separate species (Vondrák & Redchenko, unpublished data).

In one herbarium sample of *Arthonia endlicheri* from the Ukrainian Carpathians [Nevické Podhradí (Nevyc'ke, NE of Uzhgorod), 1929, *J. Nádvorník* (PRM)], it is intermixed with a *Dirina aff. stenhammari* crust with the lichenicolous *Milospium graphideorum*; this crust is probably conspecific with our sample (identical morphology and ecology).

Leptogium tenuissimum (Dicks.) Körb. – voucher specimen: CBFS JV7176.

This tiny *Leptogium* is characterized by its deeply-divided, overlapping lobes forming blue-grey to brown cushions on soil; for more characters see Jørgensen (2007a) or Gilbert & Jørgensen (2009). No records have been published from the Czech Republic in the last 50 years (Vězda & Liška 1999).

- Other unpublished records from the Czech Republic: **Central Bohemia.** Kladno, Švermov, Čabárna, former colliery Zápotocký – the colliery tip, on the slag, 310 m a. s. l., N50°10'44.494" E14°8'34.568", on soil, *J. Vondrák & O. Peksa*, 19. 5. 2010 (CBFS JV7776); Příbram, discharge hopper c. 0.5 km S of cultural monument "Vojna", N49°38'1" E14°0'6", on soil on slope of hopper, 26. 5. 2008, *J. Vondrák* (CBFS JV6857). **Eastern Bohemia.** Hanušovice, Chrastice, protected area "Chrastický hadec" c. 1 km SE of village, alt. 540 m, N50°7'54" E16°56'40", on sandy soil in an open situation, 2. 10. 2008, *J. Vondrák* (CBFS JV6711); Hanušovice, Raškov, steep serpentinite SW slopes with rocky outcrops c. 1 km NW of village, alt. 500–600 m, N50°2'55" E16°54'25", in fissures in serpentinite rock, among bryophytes, 4. 10. 2008, *J. Vondrák* (CBFS JV6712). **South Bohemia.** Písek, Hradiště, rock on the left side of Otava river, 1 km W of village, N49°17'50" E14°06'50", in fissures of siliceous rock, 4. 9. 2002, *J. Vondrák* (CBFS JV594); Strakonice, Radošovice, gneiss rock, c. 700 m S of village, alt. 430 m, N49°13'26" E13°54'10", on barren soil on sunny slope, 27. 3. 2009, *J. Vondrák* (CBFS JV7010). **South Moravia.** Dalešice, Mohelno, in lower part of "Mohelenská hadcová step" petrophytic steppe on S slope, S of village, N49°06'30" E16°11'10", on soil in crevices of serpentinite rock, 19. 10. 2008, *J. Vondrák* (CBFS JV6811).

Milospium graphideorum (Nyl.) D. Hawksw. – voucher specimen: CBFS JV7171 (image on <http://botanika.prf.jcu.cz/lichenology>).

This hyphomycete forms black sporodochia on *Dirina* thalli, particularly populations in coastal habitats (Khodosovtsev et al. 2007). It is rather rare inland, and new to the Czech Republic.

Porocyphus coccodes (Flot.) Körb. – voucher specimen: CBFS JV7178

This cyanolichen containing unusual photobiont *Calothrix* has an areolate to granular thallus and forms blackish patches on well-lit stones or rocks at brook/river banks, ± periodically inundated; for variability and other features see Jørgensen (2007b). The only record published from the Czech Republic in the last 50 years is from the Jihlava river valley (Vězda 1998; without exact locality description).

- Other unpublished record from the Czech Republic: **East Bohemia.** Chrudim, Nasavrky, protected area Krkanka in valley of river Chrudimka, alt. c. 360 m, N49°51' E15°47'E, on siliceous stone in river (occasionally flooded), 24. 9. 2009, *J. Vondrák* (CBFS JV7283).

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Souhrn

Při odpolední procházce kolem Husinecké přehrady (Jižní Čechy, okr. Prachatice) jsme objevili dva zajímavé solediozní lišejníky na převislých stěnách drobných skalních výchozů v zalesněném svahu nad přehradou. Později jsme tyto sterilní lišejníky určili jako *Arthonia endlicheri* a *Dirina* aff. *stenhammari*. Zdejší *Dirina* je příbuzná s jinými evropskými populacemi *D. stenhammari*, obsahuje stejné lišejníkové kyseliny a má podobnou morfologii. Molekulární data ovšem ukazují, že náš vzorek není skutečná *D. stenhammari*, ale samostatný, nepopsaný druh. Problematikou fylogenetické různorodosti *D. stenhammari* se budeme dále zabývat. Stélky *Dirina* od Husinecké přehrady byly hojně parazitovány hyfomycetem tvořícím nápadná černá sporodochia, *Milospium graphideorum*, který dosud nebyl z ČR znám.

Arthonia endlicheri je většinou považována za maritimní druh vázaný na přímořské skály, ovšem naše revize herbářového materiálu z vnitrozemí (ČR, SR, Rumunsko – Transylvánie a Ukrajinské Karpaty) ukazují, že druh byl do poloviny dvacátého století ve střední Evropě pravidelně sbírán. *Arthonia endlicheri* je v současnosti překvapivě považována za vyhynulý druh v některých střeoevropských zemích (např. v Německu a Polsku). V Čechách je druh znovu nalezen po více než padesáti letech.

Dalšími významnými lišejníky zaznamenanými během procházky jsou *Agonimia gelatinosa*, *A. vouauxii*, *Lecanactis latebrarum*, *Leptogium tenuissimum* a *Porocyphus coccodes*. Všechny zmíněné druhy byly na našem území velmi málo sbírány a většina z nich nebyla v posledních padesáti letech od nás udávána.

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