

A study of *Acarospora nitrophila*, a rare and misunderstood lichen species, and the sister species *A. praeruptorum* (Acarosporales, Lecanoromycetes)

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Abstract: Revised descriptions with new images and records of the European species *Acarospora nitrophila* and *A. praeruptorum* are published. *Acarospora moraviae* is treated as synonym of *A. nitrophila*. *Acarospora matraensis*, incorrectly reported as *A. nitrophila*, is described from Hungary.

Key words: *Acarospora suzae*, DNA barcodes, Iceland, integrative taxonomy, Korea, medullary anatomy

INTRODUCTION

Acarospora nitrophila H. Magn. is the most misunderstood species of Acarosporaceae in Europe. It was originally described in Magnusson (1924). Magnusson (1929) added to his species concept of *A. nitrophila* three forms (*subrufa* H. Magn., *obscurata* H. Magn., and *pruinosa* H. Magn.) and one variety (*irrigata* H. Magn.). In the taxonomy of Clauzade et al. (1981) the forms and varieties were ignored. Clauzade and Roux considered that *A. nitrophila* had a subspecies *nitrophila* with four varieties [var. *praeruptorum* (H. Magn.) Clauzade & C. Roux, var. *chalcophila* (H. Magn.) Clauzade & C. Roux, var. *inaequalis* (H. Magn.) Clauzade & C. Roux, and var. *suzae* (H. Magn.) Clauzade & C. Roux]. The variety *suzae* had three forms [f. *suzae* (H. Magn.) Clauzade & C. Roux, f. *moraviae* (H. Magn.) Clauzade & C. Roux, f. *irregularis* (H. Magn.) Clauzade & C. Roux]. *Acarospora nitrophila* had a second subspecies *normanii* (H. Magn.) Clauzade & C. Roux with two varieties [var. *normanii* (H. Magn.) Clauzade & C. Roux and var. *tyroliensis* (H. Magn.) Clauzade & C. Roux]. Roux (2007) revised the taxonomy, recognizing only *Acarospora nitrophila* subsp. *nitrophila* (syn. *A. irregularis*) and *Acarospora nitrophila* subsp. *praeruptorum*. Knudsen et al. (2014) recognized *A. irregularis* as a separate species from *A. nitrophila* and member of the *Acarospora badiofusca* group. Knudsen et al. (2017) recognized no forms or varieties of *A. nitrophila* and *A. praeruptorum*. Roux et al.

(2019) agreed with the concept proposed by Knudsen et al. (2017). Roux (2019) considered *A. inaequalis*, known from a single specimen, as a synonym of *A. nitrophila*. In this paper we consider the Czech *A. moraviae* H. Magn., also known from a single specimen, as a synonym of *A. nitrophila* and not variety of *A. suzae* as proposed in Roux et al. (2019).

To remedy this issue, we refine our description of *A. nitrophila* in Knudsen & Kocourková (2017) and publish new images of the species. We also publish a description and image of *A. praeruptorum*. For reference to our discussion of *A. moraviae* we include a new picture of *A. suzae* (see also picture in Knudsen & Kocourková (2017)). We describe a new species, *A. matraensis* from Hungary, which Vězda mis-determined as *A. nitrophila*.

MATERIAL AND METHODS

Specimens of *Acarospora nitrophila*, *A. praeruptorum*, *A. suzae* and several specimens mis-identified as *A. nitrophila* were studied from LB, PRM, STU, hb. Kocourková & Knudsen (hb. K&K), hb. Malíček, hb. Schiefelbein and hb. Schumm. The morphology of specimens was examined with dissecting microscopes. The anatomy of hand sections was measured in water at 1000× with compound microscopes. The amyloid reaction of the hymenial gel and subhymenium was tested with fresh undiluted IKI (Merck's Lugol, Sigma-Aldrich 1.09261); see

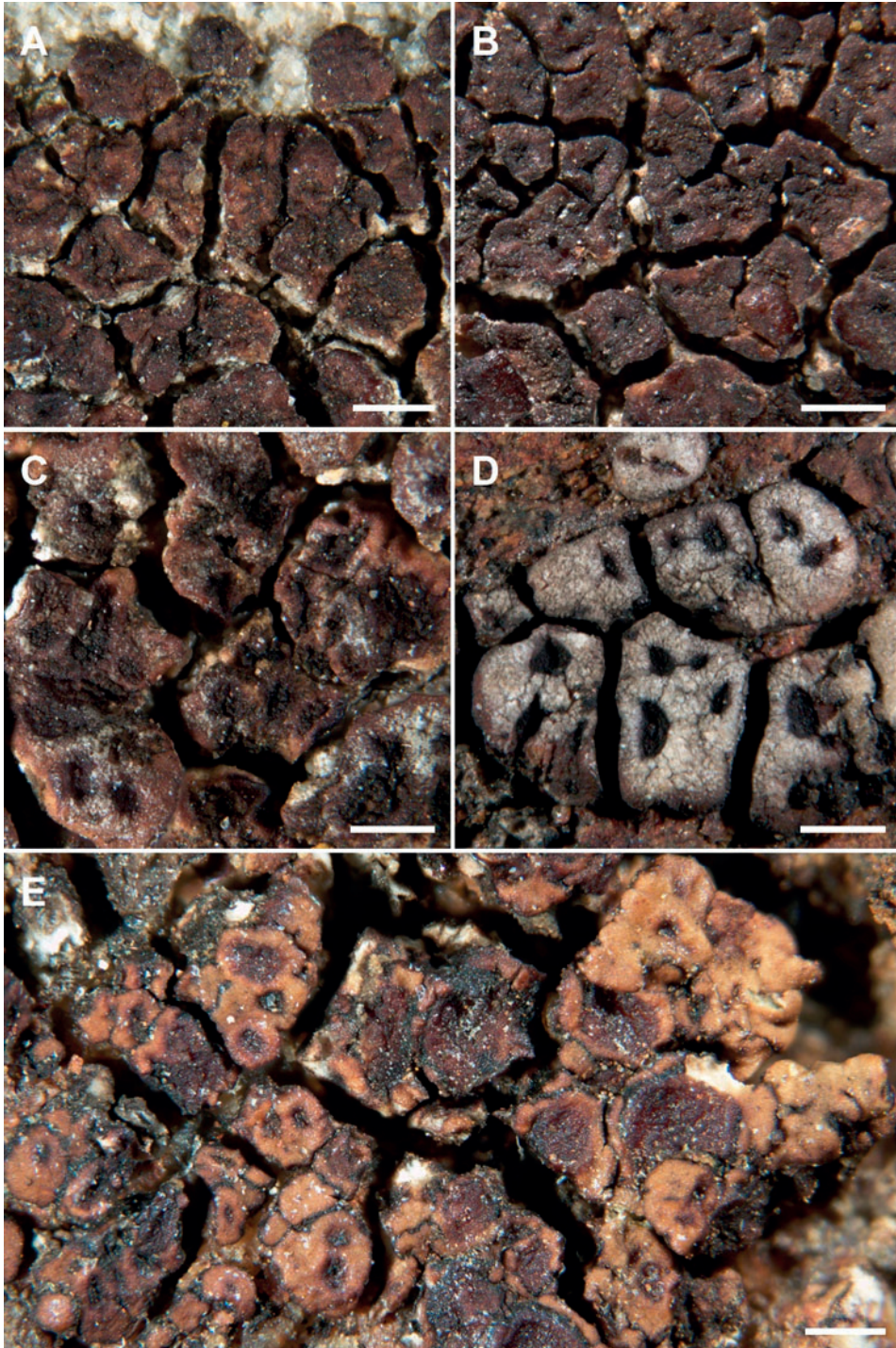


Fig. 1. *Acarospora nitrophila*, Wirth 7345. A – Marginal part of the thallus. B – Flat areoles with punctiform apothecia. C – Partly pruinose areoles with several immersed apothecia per squamule. D – *A. nitrophila*, Hilitzer, PRM 759732. Pruinose bullate areoles with immersed apothecia. E – *A. nitrophila*, Räsänen 673. Shiny light brown thallus with pseudolecanorine and immersed apothecia. Scales A–E = 500 μ m.

protocol for reproducible results in Knudsen and Kocourková (2018) and Knudsen et al. (2024). The ascus stain was studied in IKI (Hafellner 1993). Medullary anatomy was studied in Phloxine. Spot tests and thin-layer chromatography in solvent C were used to identify secondary metabolites or their absence (Orange et al. 2001). For sequencing methods for the three DNA barcodes published in this paper see Knudsen et al. (2025). Macrophotographs were taken with the digital camera Olympus DP74 mounted on an Olympus SZX 16 stereomicroscope using PROMICRA Quick PHOTO INDUSTRIAL 4 software and stacked using Olympus Deep Focus 3.5 module for increasing the depth of field. Microphotographs were taken with a digital camera Olympus DP74 mounted on an Olympus BX51 light microscope fitted with Nomarski interference contrast using PROMICRA INDUSTRIAL 4 software. The figure plates were processed with the module Figure Maker F7 fitted to the same software.

RESULTS AND DISCUSSION

ACAROSPORA NITROPHILA H. Magn., Göteborg. Vetensk.-och Vitter.-Handl., Ser. IV 28 (no. 2): 74 (1924). Figs 1, 2

Mycobank # 375645

Type: Sweden, Lule Lappmark, Gällivare Parish, Njammats, 1871, P. J. Hellbom s.n., UPS! Lectotype designated in Knudsen & Kocourková (2017).

=*ACAROSPORA MORAVIAE* H. Magn., Göteborgs Kungl. Vetensk. Samhälles Handl., Ser. B, Math. Naturvensk. Skr. 6(17): 21 (1956), type; Czech Republic, Třebíč pr., pag. Heraltice, 600 m, on gneiss, 1926, J. Suza (UPS! holotype), syn. nov.

Description. Hypothallus endosubstratal, IKI-, algae not observed. Thallus dispersed or contiguous areoles developing a mycelial base or becoming squamules with a stipe, 0.3–0.5(–1.4) mm wide (rarely to 1.5–2.0 mm wide and often with several small apothecia), 0.3–0.6 mm thick, plane and flat usually in early development, often irregular in shape, sometimes becoming convex. Upper surface light or dark brown or red brown, epruinose or rarely pruinose and then usually only part of thallus. Lower surface sometimes white in young

areoles or squamules, but usually pale brown to blackish brown, sometimes blackened by substrate interactions. Epicortex lacking or less than 10 µm thick. Cortex 20–30(–40) µm thick, upper layer dark brown and narrow, often one cell thick, lower layer hyaline, with cortical cells round or variable in shape, 3–6 µm wide, vertically arranged or not. Algal layer 80–120 µm thick, not dense, relatively even, algal cells 8–20 µm wide, uninterrupted by hyphal bundles but with occasionally narrow strands of hyphae visible between the algal cells. Medulla usually up to 400 µm thick, sometimes obscure with substrate crystals or discoloration from substrate interactions, hyphae thin-walled, branching, densely intricate to vertical, 2–4(–5) µm wide, sometimes with cells rounded, intermixed with disarticulated round cells to irregular bloated angular cells as wide as 7 µm, continuous with mycelial base or stipe, with hyphae at base of areoles or squamules usually not disarticulated, and continuous with the hypothallus.

Apothecia solitary, or up to 10 in areole or squamule in process of replicating by division, usually distinctly small 0.1–0.4 mm wide, rarely wider than 0.5 mm, immersed, semi-immersed with outline of a margin, or in an elevated thalline margin, or pseudolecanorine, disc dull brown, rarely pruinose even when upper surface of areoles or squamules are pruinose. Parathecium indistinct to 15–30 µm wide, sometimes barely expanding near surface of disc, not forming the margin but visible sometimes as narrow ring around the disc, hyphae narrow. Hymenium (90–)100–130(–150) µm tall, epihymenium ca. 10 µm tall, paraphyses unbranched or partly branched in upper part, most paraphyses at mid-level (1.0–)1.5 µm wide, rarely 2 µm wide, the apices barely expanded usually in a gel cap 2–3 µm wide, hymenial gel IKI+ immediately red or blue slowly turning red, hemiamyloid. Asci cylindrical to narrowly clavate, 80–120 × 10–20 µm, ascospores 100–200 per ascus, 4–5 × (1.5–)2 µm, rarely a few smaller, ellipsoid (n=40). Subhymenium 20–30 µm tall, IKI+ blue. Hypothecium indistinct to 20 µm tall, hyphae narrow. Pycnidia rare, 110–125 × 100–120 µm, according to Magnusson (1929) 135 × 65 µm, conidiogenous cells 10–12 µm long, conidia simple, 1.5–2.2 × 0.7 µm. Not producing any secondary metab-

olites. DNA Barcodes: Malíček et al. 7908, ITS: MW715699, mtSSU: MW715735 nLSU: PQ198664; Malíček 5828, ITS: ON447576, mtSSU: ON367849, nLSU: ON391425. ITS: 100% (535/535), 0% gaps; SSU: 97%, 1 gap (5/590 substitutions); LSU: 99% (736/740), 0% gaps (2/740 substitutions).

Distribution and Ecology. Based on Magnusson's report of 23 specimens of *Acarospora nitrophila*, the species is widespread in Europe (Magnusson 1929). Magnusson (1929) reported it from Austria (2), the Czech Republic (Moravia 4 and Bohemia 1 for 5), France (2), Finland (1), Germany (1), Hungary (3), Italy (1), Norway (1), Romania (1), Sweden (2), and Switzerland (5). Five of Magnusson's specimens we considered misidentified and not *nitrophila*: Czech Republic (1), Hungary (1), Finland (1), Italy (1), and Switzerland (1) leaving 18 reports, not all of which we have seen (Knudsen & Kocourková 2017). We have verified only 12 specimens collected after the 1936 collection by Räsänen in Finland. There are four specimens from the Czech Republic (1988, 2013, 2015), four specimens from Germany (1978, 1998, 2001, 2003), one from Italy (2002) and four specimens from Sweden (1945, 1961, 1978, 1986) (see cited specimens). Golubkova (1988) reported *A. nitrophila* from the former USSR and these collections need verification. Roux et coll. (2025) recently determined two old specimens from France as *A. nitrophila* s. str. and considers it rare but probably poorly known.

Acarospora nitrophila occurs in the Czech Republic, Finland, Germany, Italy, Norway, Sweden (verified by authors and Nascimbene et al. 2012) and in Austria, France, Hungary, Romania, and Switzerland (Magnusson 1929; Roux et al. 2025) on siliceous rock, diabase, gneiss, granites, and Keuper sandstone. It can be dispersed or contiguous, solitary or growing among other lichens. It may prefer humid sites in the sun, like the specimens collected in the Vltava River valley in the Czech Republic by A. Hilitzer or J. Malíček. Magnusson (1929) reported that *A. nitrophila* sometimes grew in moist sites and named these specimens variety *irrigata* H. Magn.

Magnusson (1929) listed in his key the main diagnostic character of *Acarospora nitrophila* is the medulla, which he described as “apparent-

ly cellulose”. This is often not easy to observe because it can have substrate crystals and particles or colors absorbed from substrate interactions as well as a variable amount of disarticulated round or bloated angular cells mixed with intricate hyphae. The best character is the small apothecia mostly 0.1–0.4(–0.5) µm wide, immersed or with thalline margins. The best diagnostic combination is the small apothecia, a cortex usually 20–40 µm thick, a narrow parathecium to 15–30 µm wide around the apothecial disc, usually high hymenium 110–130 µm, and IKI+ hemiamyloid hymenial gel. *Acarosporaceae* usually have a medulla of vertical or intricate hyphae with no disarticulated or irregular cells. In *A. nitrophila*, some disarticulated hyphae are always present as well as some round cells and usually some bloated cells which Magnusson describes as “stretched”. The medulla is best studied in Phloxine and can be used to verify an identification made from the diagnostic combination above.

The contiguous form of *A. nitrophila* (Fig. 1, A–C) is caused by areoles or squamules that have replicated by division over a long period of years. This form usually has immersed apothecia and partially formed apothecia with margins, and usually up to ten per areole or squamule. Pseudolecanorine apothecia usually are more common on smaller areoles or squamules at perimeters of the contiguous thalli.

We treat *Acarospora moraviae* as a synonym of *A. nitrophila*. It is known only from the holotype collected in 1926 in Czech Republic by J. Suza (UPS!). It is an unimpressive collection typical of the contiguous form of *A. nitrophila*. Magnusson (1956) considered *A. moraviae* as similar to *A. nitrophila* and *A. suzae* (Fig. 3) but different from both based on ascospore size. Magnusson (1956) described *A. moraviae* based on an incorrect observation of ascospores 2.0–2.5 × 1.5 µm but the holotype has ascospore size 4 × 1.5–2 µm, a range congruent either with *A. nitrophila* or *A. suzae* (Magnusson 1956; Roux et al. 2019).

Roux et al. (2019) considered *A. moraviae* as a synonym of *A. suzae*. *Acarospora moraviae* differs from *A. suzae* especially in having IKI+ hemiamyloid vs. euamyloid hymenial gel and in having mostly smaller apothecia to 0.5 mm

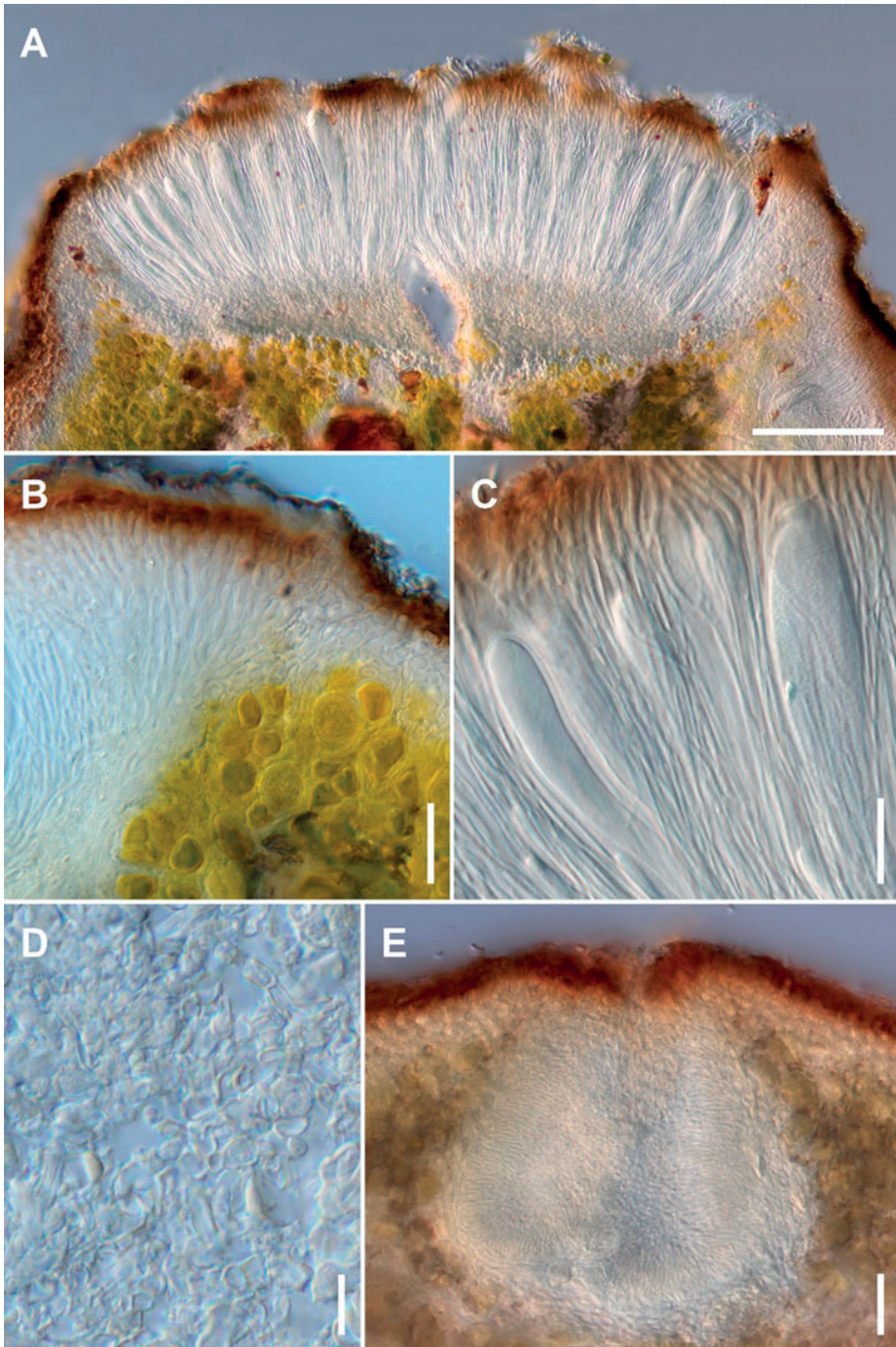


Fig. 2. *Acarospora nitrophila*. A – Vertical section through apothecium with narrow parathecium and high hymenium, Malíček 7908. B – Thin epicortex developed above parathecium, Malíček 5817. C – Hymenium with asci and paraphyses unbranched or partly branched in upper part, Malíček 7908. D – Medulla of cells variable in shape and size mixed with hyphae, Räsänen 673. E – Pycnidium, Wirth 7345. Scales A = 100 μm , B, C, E = 20 μm , D = 10 μm .

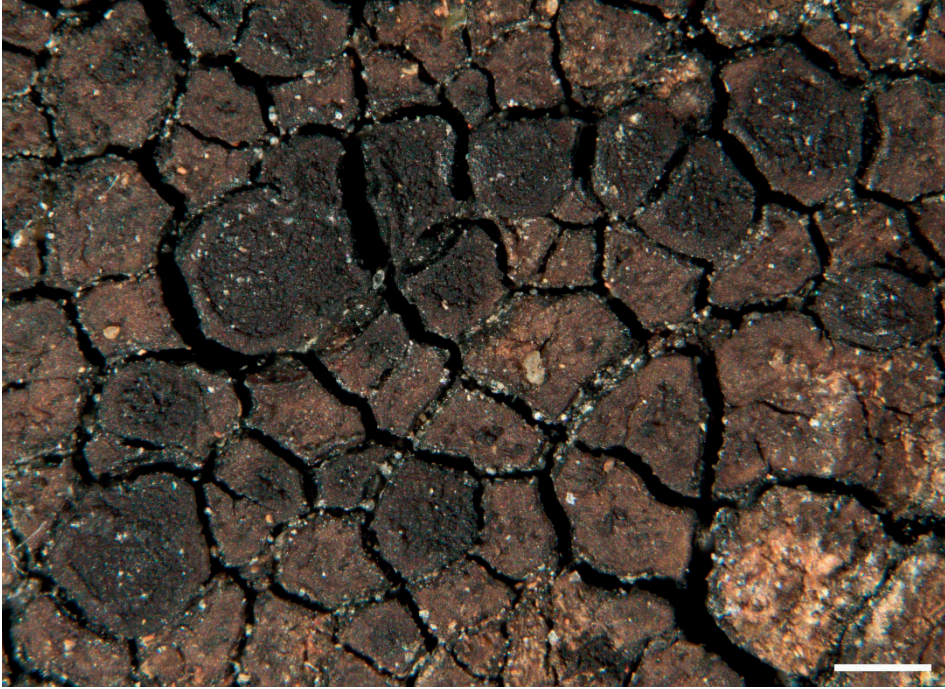


Fig. 3. *Acarospora suzae*, A. VĚZDA: LICHENES SELECTI EXSICCATI 260, PRM 604399. Habit of the thallus with apothecia. Scale = 500 μm .

wide vs. larger apothecia up to 1.2 mm wide. We treat this form as within the normal morphological range of *A. nitrophila*.

Despite published efforts, *A. nitrophila* continues to be misunderstood by lichenologists. For example, Schumm (2024) published a collection of pictures of Acarosporaceae in which he continued the confusion surrounding *A. nitrophila* derived from the taxonomy of Clauzade et al. (1981), citing as synonyms of *A. nitrophila* the following taxa: *A. normanii*, *A. praeruptorum*, and several related varieties as well as making *A. muddii* H. Magn. a new synonym. The images by Schumm (2024) amplified the confusion. Schumm (2024) has three different collections labelled *A. nitrophila*, none of which are *A. nitrophila*. The first *A. nitrophila* (Schumm 17985; Germany) has a verrucose thallus like *A. muddii* that Magnusson (1929) identified from Germany but has abundant elevated apothecia instead of scarce punctiform apothecia. The anatomical pictures show a prosoplectenchymatous medulla rather than the medullary anatomy of *A. nitrophila* described in

this paper. The second specimen of *A. nitrophila* from Hungary offered by Schumm (2024), was identified by A. Kiszely & A. Vězda (Ex A. Vězda: LICHENES SELECTI EXSICCATI 1339, PRM!) It is not *A. nitrophila* and is described new at the end of this paper as *A. matraensis* K. Knudsen & Kocourk. We were able to borrow Schumm's third specimen of *A. nitrophila* (Schumm 21239; Austria). We recovered its ITS and LSU sequences which confirmed that the specimen is a morphotype of *A. fuscata* (Schrad.) Arnold. Despite Schumm's (2024) statement that the specimen was spot test negative, it had a KC+ red cortex, producing gyrophoric acid, congruent with the molecular data.

Schumm (2024) also had an image of a collection determined by Vězda as *Acarospora moraviae* (Ex A. VĚZDA: LICHENES SELECTI EXSICCATI. 2344, Czech Republic, PRM!), which we consider a synonym of *A. nitrophila*. But it is an older specimen of *A. suzae* which have areoles with well-developed mycelial bases on an uneven rock surface and has IKI+ dark blue

euamyloid hymenial gel while *A. moraviae* has IKI+ hemiamyloid hymenial gel and flat areoles. The thallus is similar to *A. suzae* var. *tyroliensis* H. Magn. which we consider in the normal morphological range of the species (Magnusson 1929). We saw only abundant asci with unreleased ascospores in three sections. But the immature ascospores and Magnusson's uncertainty about *A. moraviae* probably led to the determination of the specimen by Vězda as *A. moraviae* (Magnusson 1929, 1956).

A previous sequence of *Acarospora nitrophila* published from Iceland is *A. fusca* H. Magn. in Crewe et al. (2006). *Acarospora fusca* was also reported from Greenland (Magnusson 1935). Sequences of *Acarospora* cf. *nitrophila* in Westberg et al. (2015) is *A. normani*. Recently *A. nitrophila* was reported from Korea (Park et al. 2023). The description has a cortex too low, 15–20 vs. 20–30(–60) μm , and a medulla of only intricate hyphae 2.0–2.5 μm wide instead of the variable hyphae with often disarticulated round or irregular cells. Park et al. (2023) did not cite European specimens of *A. nitrophila* that were examined. There were no photographs of the Korean taxon supplied. They supplied three ITS and mtSSU barcodes. When blasted in NHI GenBank we did not recover our sequences of *A. nitrophila* at all in BLAST results. This is a taxon probably new for science and is not related to *A. nitrophila*.

Specimens examined: Czech Republic. Central Bohemia: Libčice, sunny outcrops in the Vltava River valley, 22 Oct. 1926, A. Hititser s.n. (PRM 759732, Kuták's duplicate, det. by Magnusson as form *obscurata*), Distr. Příbram: Vltava River valley, Drevníky, "Županovice, Županovické skály" rocks, W of village, S-facing slopes, 49.28521°N 14.28527°E, 270–280 m, on sunny volcanic rock, 21 July 2013, J. Malíček 5817 (hb. Malíček); Vltava River valley, Čelina, Cholín: SW-facing rocks on SW slope of Dubový vrch hill, 49.7122°N 14.3197°E, 415 m, on volcanic rock, leg. J. Malíček & P. Martinec 21 July 2013, J. Malíček 5828 (hb. Malíček). Praha: Butovice, Prokopské údolí Nature Reserve, Hemrovy skály rocks, S-facing diabase slopes, 50.0430°N 14.3544°E, 270–290 m, on diabase rock, 24 March 2015, J. Malíček 7908 et al. (hb. Malíček); Praha, Pražská plošina plateau, Malá Ohrada, Albrechtův hill above Prokopský brook, 50.0436°N 14.3464°E,

289 m, on SE-facing slope with diabase outcrops, 20 Apr. 1988, J. Kocourková 8510 (hb. K&K). Finland. Kurkijoki: Insula Heinsimä, Majakkmäki, on diabase, 21 June 1936, V. Räsänen, Lichenes Fenniae Exsiccati 673 (hb. K&K). Germany. Bayern: Allgäu, Hindelang, Hinterstein, am Bärgrößel-Bach bei der Talstation der Material-seilbahn südi, Bärgrößelalm, 1200 m, among *Rhizocarpon badiotrum* and *R. geographium*, 6 Sept. 2003, V. Wirth & P. Dornes (STU). Meckenberg-Vorpommern: Uecker-Randow, gravel pit S of Boldtsdorf, map No. 2448/3, on granite boulder in the pit, 14 Apr. 2001, U. Schiefelbein 716 (hb. Schiefelbein). Württemberg: Asperg bei Ludwigsburg, Festung Hohenasperg, Weinbergmauren, 1978, V. Wirth (STU). Italy. Trento Prov.: Stelvio National Park, Val de Saent, on acidic metamorphic granite, 46.47031956°N 10.73215738°E, 2750 m, 2002, J. Nascimbene 13 (BL). Norway. Nordland: Vega Parish, Vega Island, Vegmo, Dalen, exposed stone fence, 1978, G. Degelius V-2008 (UPS). Sweden. Bohuslän: Ödsmål Parish, Hälledalen, on irrigated non-calcareous rocks, on irrigated non-calcareous rocks, 1918, A.H. Magnusson 1961 (UPS, var. *irrigata*); Solberga Parish, Rörtången, on non-calcareous stone fence, 1935, A.H. Magnusson 14863 (UPS); Lule Lappmark, Gällivare Parish, Stora Luleä, on non-calcareous rock, 1963, G. Gilenstam 499 (UPS); Torne Lappmark, Jukkasjärvi Parish, 550 m, on non-calcareous rock, 1945, G. Degelius (UPS); Uppland, Österövsta Parish, Ledskärsångarna, on non-calcareous rock, 1986, T. Foucard (UPS).

ACAROSPORA PRAERUPTORUM H. Magn., Svensk bot. Tidskr. 18: 330 (1924). Fig. 4

Mycobank 375680

Type: Sweden, Bohuslän, Stenkyrka, Hiäsen, 28, Sept. 1923, A. H. Magnusson (UPS, holotype, n.v.), Malme, Lichenes suecici exsiccati No 946 (HI isotype).

= *Acarospora praeruptorum* var. *koerberi* H. Magn., [as 'körber'], K. Svenska Vetensk-Akad. Handl., Ser. III 7 (no. 4): 191 (1929), type: Silesia, Körber s.n. (UPS, n.v., holotype), syn. nov.

Description. Hypothallus endosubstratal I-, algae not observed. Thallus of squamules with stout stipes, (0.5–)1.0–2.0 mm wide, 0.4–0.6 mm



Fig. 4. *Acarospora praeruptorum*, Suza, PRM 578549. A – Squamulose imbricate thallus, forming an irregular topography with immersed apothecia. B – Detail of immersed apothecia with thick margin and rough disc. Scales A, B = 500 μm .

thick, often imbricate, forming an irregular topography, replicating by division, beginning as small bullate squamules with stipe and white lower surface. Upper surface dark to light brown, smooth or rugulose, sometimes with fissures, epruinose, rarely with some pruina. Lower surface white especially when young or brown. Epicortex absent or thin. Cortex usually 40–70 μm thick, rarely thinner in small poorly developed specimens, cells 2–6 μm wide, often in vertical pattern. Algal layer 100–200 μm thick, with even or uneven upper surface, and not interrupted by hyphal bundles but with occasional narrow strands of hyphae visible between the algal cells, usually 10–20 μm wide. Medulla continuous with the stipe, usually obscure, vertical to intricate hyphae 3–5 μm wide, up to 500 μm thick, disarticulated hyphae rare, hyphae at base of stipes continuous with hypothallus. Apothecia punctiform to 1.5 mm wide, immersed, or elevated in thalline margin, often absent. Parathecium 20–30 μm wide, hyphae narrow. Hymenium (85–)100–135 μm thick, epihymenium brown ca. 20 μm tall, paraphyses mostly 2 μm wide with apices in brown gel caps 3–5 μm wide, hymenial gel IKI+ red, hemiamyloid. Asci 90–110 \times 10–25 μm , ascospores 3–5 \times 1.5–2 μm . Subhymenium 40–80 μm tall, IKI+ blue. Hypothecium 10–20 μm wide. Pycnidia not observed. Not producing secondary metabolites. DNA Barcode: J. Malíček 14819: ITS OP162404, mtSSU: OP177789, nLSU: OP216719.

Distribution and ecology. Despite being the location of holotype, *Acarospora praeruptorum* is considered to be at least infrequent in Sweden (Magnusson 1929). It also occurs in Austria, France, Hungary, Switzerland, and Romania (Magnusson 1929). It is frequent in the Czech Republic (Malíček et al. 2024) and probably Germany. It prefers sunny locations and occurs commonly on diabase in the Czech Republic. It has also been collected on acidic volcanic rock, conglomerate rock, clay slate, and calciferous porphyry.

Discussion. *Acarospora praeruptorum* was a species often misdetermined as *A. nitrophila*. In a phylogeny we recovered the sequences of *A. nitrophila* as a sister species to *A. praeruptorum* and *A. saxonica* H. Magn. (Knudsen et al. 2025). *Acarospora praeruptorum* differs from *A. nitrophila* in having squamules 1–2 mm wide

and wider apothecia 1–2 mm wide. We do not accept *Acarospora aequatula* H. Magn. and *A. degenerans* H. Magn. as varieties of *A. praeruptorum* without a revision of types and identified material (Magnusson 1929). We agree with Magnusson that var. *koerberi* H. Magn. is the best example of *A. praeruptorum* (Fig. 4). It is common phenotype in the Czech Republic, and we treat it as a synonym. The holotype consists of small specimens collected from an underhang with a narrow cortex (ca. 20 μm thick), probably growing in too much shade. Many specimens seen are sterile or have few apothecia. *Acarospora praeruptorum* is most similar to *A. irregularis* in usually having a robust squamulose thalli but differs in having only scattered narrow hyphal strands not interrupting the algal layer and forming algal palisades vs. an interrupted algal layer, and IKI+ hemiamyloid hymenial gel vs. euamyloid gel (Knudsen et al. 2014).

Specimens recently examined. Czech Republic, Central Bohemia, Příbram, Sedlčany region, Nalžovice, Drbákov-Albertory skály National Nature Reserve, thermophilus oak forest with rocky outcrops, on W-facing slopes of Na Vyhliďce Hill, 49.7241°N / 14.3686°E, 380–390 m, on acidic volcanic rock, 15 April 2020, J. Malíček 13690 (hb. Malíček); Northern Bohemia, Kokořínsko-Máchův kraj Protected Landscape Area, Provodín, Provodínské kameny Nature Monument, Lysá skála rock, 50.6302°N/14.6084°E, 80–420 m, on acidic basalt rock, 24 March 2015, J. Malíček 14819 (hb. Malíček); Moravia, Brno, Adamova, 400 m, Suza (PRM, det. Magnusson as syntype of *A. nitrophila* form *pruinosa*); Třebíč District, Náměšť n. Oslavou, Zňátky, 400 m, 1927, J. Suza (PRM, paratype of var. *koerberi*, Magnusson 1929), in valley fluvii Rokytňá, supra opp. Moravský Krumlov, 300 m, on sunny conglomerate rock, Aug. 1969, V. Wirth & A. Vězda (STU). France, Elsass, Vogesen, Rossberg bei Thann, 1070 m, on a steep slope, on calciferous porphyry, 2 Sept. 1971, V. Wirth 3331 (STU). Germany, Baden, Südschwarzwald, Utzenfeld (Kr. Lörrach) 600 m, “Kleine Utzenfeld” on very exposed, dry, warm clay slate, V. Wirth 2668 (STU), Württemberg, Haigerloch, Trillfingen, Maur cemetery, 510 m, 2 May 1981, V. Wirth 7553 (STU).

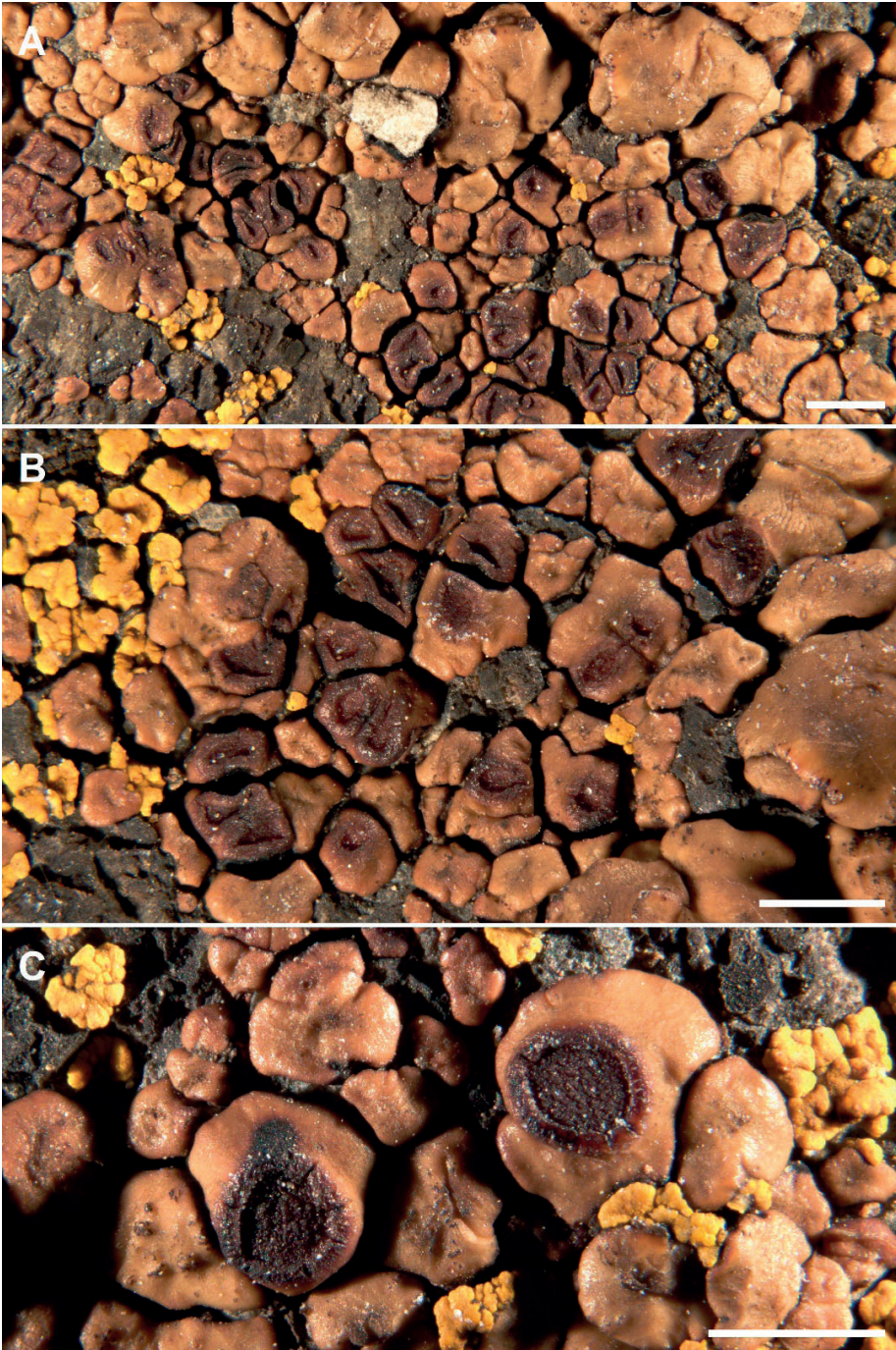


Fig. 5. *Acarospora matraensis*, A.Vězda: Lichenes selecti exsiccati 1339, PRM 795264. A – Habit of the thallus with young apothecia. B – Thallus with young apothecia and marginal lobes. C – Details of apothecia. Scales A–C = 1 mm.

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sp. nov. Fig. 5

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Type: Hungary, Mátra Mountains, in valley of Kővicses River, below ruins of castle Cserteri, 250 m, on andesite in full sun, 16 May 1975, A. Kiszzeley & A. Vězda, A. Vězda: Lichenes selecti exsiccati 1339 (identified as *Acarospora nitrophila*) PRM 795264! holotype).

Diagnosis. Similar to *Acarospora nitrophila* in having a high hymenium and having IKI+ blue to red hemiamyloid gel but differing in producing gyrophoric acid, in having a parathecium 50–80 μm wide forming a black margin vs. a parathecium indistinct to distinct 15–30 μm wide and not forming a margin, in sometimes having elevated lecideine apothecia similar to *A. badiofusca*, in having a prosoplectenchymatous medulla vs. a medulla of hyphae intermixed with disarticulated often bloated to irregular cells. Vězda probably determined this specimen based on a similarity in appearance with *A. irregularis* but it differs from *A. matraensis* in having an interrupted algal layer. Obviously, the collectors did not do spot tests.

Etymology. Named for Mátra Mountains where the type was collected.

Description. Hypothallus endosubstratal, no algae observed. Thallus of areoles broadly attached to subsquamulose with mycelial base or squamulose with broad stripe, 0.5–1.5 mm wide, 0.2–0.5 mm thick, convex, dispersed to contiguous. Upper surface epruinose, smooth to uneven, a light yellowish-brown. Lower surface yellowish-brown to black from substrate interactions. Epicortex thin and continuous. Cortex 50–75(–80) μm thick, pale upper layer yellowish, lower layer wide, cells 3–5 μm wide. Medulla 100–300 μm thick, hyphae 1–5 μm wide, thin-walled, continuous with mycelial base or stipe and hypothallus. Apothecia expanding to reduce areole to a thalline margin or becoming elevated. Parathecium 50–80 μm wide forming a black ring around immersed apothecia, or black margin around elevated apothecia, hyphae 1 μm wide, outer surface thinly blackened. Hymenium 100–150 μm high, highest in elevated apothecia, epihymenium ca. 20 μm tall, golden brown, paraphyses 1–2 μm thick, apices unexpanded and not capitate in

gel caps, hymenial gel IKI+ blue turning red in squash, hemiamyloid. Asci usually cylindrical, 80–130 \times 10–15 μm wide ascospores 2–3 \times 1.0–1.5 μm (n=50+). Algal layer 50–75 μm thick, even, uninterrupted algal cells 5–8 μm . Subhymenium ca. 30 μm thick, IKI+ dark blue. Hypothecium 10–20 μm thick, hyphae 1 μm thick. Pycnidia not seen. Chemistry: producing gyrophoric acid in the cortex.

Ecology and distribution. On andesite rock in the sun at 250 m. Currently known only from the type locality. The studied type specimen was too old for obtaining DNA sequences.

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