

NEW RECORDS OF THE RARE METALLOPHILIC LICHEN *PORPIDIA MELINODES* FROM HORNFELS IN THE SUDETY MTS

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Porpidia melinodes (Körb.) Gowan & Ahti is a saxicolous lichen species described in 1993 as a vegetatively reproducing counterpart of *P. flavicunda* (Ach.) Gowan (Gowan & Ahti 1993). Both these species belong to the *Porpidia speirea* group, characterized by having thin excipular hyphae, no sharp contrast between the margin and medulla of the excipulum, and having the confluent chemosyndrome as the primary chemotype (Buschbom & Mueller 2004; Fryday 2005). Within this group, *P. flavicunda* and *P. melinodes* form a separate subgroup of taxa having an obligate orange thallus and a nonamyloid medulla (Fryday 2005).

Porpidia melinodes is one of the rarest elements of the lichen biota of Poland. Previously the only confirmed locality of this species was on a slope of Śnieżka Mt. in the Karkonosze/Krkonoše Mts (Jabłońska 2009, 2012), where it grew on mineral-rich hornfels. It was also reported from five localities on noncalcareous sandstone in Pilsko and on the Babia Góra massif (Carpathians; Nowak 1998). However, Jabłońska (2009, 2012) excluded these localities as unverified in her study of the genus *Porpidia* Körb. in Poland, because the corresponding herbarium material was not available.

In 2013, during field work in the zone of hornfels rock in the Góry Izerskie Mts, which are adjacent to the Karkonosze/Krkonoše Mts, I found a new abundant population of this species. The lichens grew there on insolated metamorphic rocks rich in minerals (hornfels) at ca 1040–1060 m a.s.l., in association with common lichen species

typical for siliceous rock, including *Acarospora fuscata* (Nyl.) Th. Fr., *Candelariella coralliza* (Nyl.) H. Magn., *Lecanora intricata* (Ach.) Ach., *L. polytropha* (Ehrh. ex Hoffm.) Rabenh., *Lecidea confluens* (Weber) Ach., *Protoparmelia badia* (Hoffm.) Hafellner, *Rhizocarpon geographicum* (L.) DC., *Umbilicaria polyphylla* (L.) Baumg. and another metallophilic species, *Lecidea silacea* (Hoffm.) Ach. (locality at Wysoki Kamień Mt.). Thalli of *Porpidia melinodes* were recorded on both exposed horizontal surfaces and vertical surfaces in basal parts of rock complexes, as well as on smaller boulders and stones.

Porpidia melinodes is characterized by having a rather thin, orange or partially orange-gray thallus with an uneven upper surface and a well-developed, dull gray to black prothallus (Fig. 1).



Fig. 1. *Porpidia melinodes* (Körb.) Gowan & Ahti at the Wysoki Kamień Mt. locality, Góry Izerskie Mts.

Apothecia are generally rare and were not observed in the examined material. The most characteristic trait of the species consists in numerous crater-like soralia delimited by a white rim, initially solitary and rounded, later grouped in larger aggregates. The soredia are granular and dull gray, becoming greenish white when eroded. The thallus and soralia do not react with the standard reagents K, C, Pd and I. In the collected material, secondary metabolites including confluent acid, 2'-O-metyloperlatolic acid (minor) and stictic acid (present in one sample) were detected by TLC.

Porpidia melinodes occurs mainly in arctic and boreal zones of Europe and North America, where it is widespread and common (Buschbom & Mueller 2005), but more southern localities are also known. The species has been reported from Greenland (Hansen 1999), Iceland (Kristinsson & Heidmarsson 2009), Svalbard (Elvebakk & Hertel 1997), Norway, Sweden and Finland (Santesson *et al.* 2004), Great Britain and Ireland (Fryday 2005), Spain (Llimona & Hladun 2001), Poland (Jabłońska 2009, 2012), the Czech Republic (Jabłońska *et al.* 2011) and Cyprus (Litterski & Mayrhofer 1998).

Some authors consider *P. melinodes* to be a metallophilic species preferring metal-rich siliceous rocks (Purvis & Halls 1995; Fryday *et al.* 2009). The hornfels zone in the Góry Izerskie Mts, and especially the Wysoki Kamień Mt. locality, has long been known as a place where metallophyte lichens occur. Among others, two obligate metallophilic species, *Rhizocarpon oederi* and *Lecidea silacea*, were reported from there (Körber 1855; Stein 1879). However, hornfels is not a typical metalliferous substrate with a high concentration of Fe ions, but only a type of rock which may be locally enriched in various minerals, among them iron compounds (Aleksandrowski *et al.* 2013). The other certain Polish record of *P. melinodes* also came from hornfels (see above), but at the closest locality in West Bohemia (Jabłońska *et al.* 2012) it grew on gneiss, and the five unconfirmed Carpathian records were from sandstone. Therefore the ecological spectrum of *Porpidia melinodes* seems to be wider and this lichen may possibly

prefer mineral-enriched rather than strictly metal-rich rock substrates.

SPECIMENS EXAMINED. [Ea-78 ATPOL grid square]: POLAND. GÓRY IZERSKIE Mts (Wysoki Grzbiet ridge): Zwalisko Mt., Wieczorny Zamek rocks, on hornfels, 19 July 2013, *M. Kossowska* (hb. Kossowska 1333); Wysoki Kamień Mt., rocks at summit, on hornfels, 18 July 2013, *M. Kossowska* (hb. Kossowska 1335).

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