

PHAEOPHYSCIA ENDOPHOENICEA (ASCOMYCOTA, PHYSCIACEAE) IN POLISH LOWLANDS

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Abstract. *Phaeophyscia endophoenicea* (Harm.) Moberg is a relatively rare lichen in Poland, known so far mostly from the southern part of the country. This work gives its localities in the north of Poland, the most important data on its ecology and total distribution, and a description of basic diagnostic features differentiating *P. endophoenicea* from other similar species.

Key words: lichens, *Phaeophyscia endophoenicea*, new records, distribution, ecology, Poland

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INTRODUCTION

The genus *Phaeophyscia* R. Moberg, separated from the genus *Physcia* s.l. by Moberg (1977), comprises taxa characterized by foliose, brownish thalli loosely adhering to the substrata, not containing atranorin and producing ellipsoid pycnospores. In Poland this taxon is represented by 12 species, both common and very rare elements of the domestic lichen biota (Fałtynowicz 2003). A rare representative of that genus in Poland, so far known almost exclusively from foothills and mountainous areas of southern Poland, is *Phaeophyscia endophoenicea* (Harm.) Moberg. The only mention of the occurrence of that lichen in northern Polish lowlands was made by Grummann (1963), who reported it from the Pojezierze Mazurskie lakeland without specifying the precise location. In 2008–2009, four localities of *P. endophoenicea* were found in the Pojezierze Olsztyńskie lakeland (western part of Pojezierze Mazurskie lakeland), confirming the historical report.

MATERIAL AND METHODS

Field investigations were made in 2008–2009 as part of research on the diversity and habitat of the lichen biota of the Pojezierze Olsztyńskie lakeland. A comparative study of *Phaeophyscia endophoenicea* used herbarium materials of the W. Szafer Institute of Botany in Kraków

(KRAM-L). The distribution of *P. endophoenicea* localities in Poland (Fig. 1) was elaborated based on literature data, and is presented on an ATPOL grid (Zajac 1978) as modified by Cieśliński and Fałtynowicz (1993). The division into mesoregions follows regionalization by Kondracki (1998).

RESULTS

Phaeophyscia endophoenicea (Harm.) Moberg
Symb. Bot. Upsal. 22: 38. 1977.

Thallus grey brown to brown, dull to weakly shiny, without pruina, irregular to sometimes orbicular, up to 3 cm in diam., closely adnate except for the margin of lobes. Lobes up to 2 mm broad, with rounded, slightly broader margins. Soralia mainly terminal and labiate, occasionally laminal, often yellowish to reddish due to the exposed medulla. Lower side black with abundant black rhizinae. Medulla yellow to orange red through the presence of skyrin in the lower part (Moberg 2002). Apothecia rarely observed (Nowak 1993; Moberg 2002). Skyrin in the lower medulla (K+ purple).

AFFINITIES. *Phaeophyscia endophoenicea* is a very characteristic species, easily recognizable by its red-orange medulla and large labiate soralia, which distinguish it from the most similar common

P. orbicularis (Neck.) Moberg. *P. endophoenicea* is also separated by absence of apothecia and pycnidia. Sometimes *P. orbicularis* creates forms with a yellowish thallus or with yellowish or orange soralia and spots on the upper cortex, resulting from the presence of skyrin (K+ purple-violet). Such a form of *P. orbicularis* has been described as f. *hueana* (Harm.) J. Nowak (Nowak 1993). In that species, however, skyrin does not occur in the medulla, which remains colorless, while in *P. endophoenicea* the red-orange pigment occurs in soralia as well as in the lower part of the medulla. These species also differ in their ecological requirements. *P. orbicularis* prefers sunnier, exposed habitats. Apart from tree bark, it also often overgrows masonry or rock, especially if calcareous (Moberg 1977, 2002; Nowak 1993). For the ecology of *P. endophoenicea* see below.

Another species slightly similar to *Phaeophyscia endophoenicea* is *P. pusilloides* (A. Zahlbr.) Essl. Hardly ever noted in southern Poland, it is characterized by soralia initially almost labiate and then capitate, raised on the ends of upcurved lobes. *P. pusilloides* also has narrower lobes of the thallus and a white medulla (seldom with red-orange spots) (Nowak 1993).

HABITATS AND DISTRIBUTION IN POLAND. In Poland, *Phaeophyscia endophoenicea* is known as an epiphyte growing usually on mossy bark, and only exceptionally on twigs of broadleaved trees (*Acer*, *Carpinus*, *Corylus*, *Fagus*, *Fraxinus*, *Malus*, *Populus*, *Pyrus*, *Salix*, *Sambucus*, *Sorbus*, *Ulmus*). Also infrequently noted on moss-overgrown rocks. This lichen usually develops in well insolated sites but in relatively moist conditions, often on trees growing in loose groups or on forest margins, less frequently on roadside trees as well as trees growing in old parks or alone (Nowak 1993; Kiszka 2002b, 2004; Fałtynowicz 2003; Kościelniak 2004; Czarnota & Kukwa 2007; Szczepańska 2007, 2008; Czarnota & Wojnarowicz 2008). In the south of the country *P. endophoenicea* usually colonizes trunks of *Fagus* in thin beech forest (Nowak 1967; Olech 1972). In the localities newly discovered in the north of Poland it overgrew bark of *Carpinus* and *Corylus* in well

preserved patches of oak-linden-hornbeam forest (*Tilio-Carpinetum typicum*, *T.-C. stachyetosum*). *P. endophoenicea* was usually recorded on forest margins at moderately insolated sites in the vicinity of lakes or watercourses.

The localities of *Phaeophyscia endophoenicea* known so far were recorded largely from the south of the country, wherein they were noted in the Beskid Śląski Mts (Kiszka 1967), Kotlina Żywiecka basin (Kiszka 1970), Beskid Żywiecki Mts (Nowak 1998), Babia Góra Mt (Nowak 1967, 1998), Beskid Makowski Mts (Nowak 1968, 1998), Beskid Wyspowsy Mts (Jagiełło 1983; Nowak 1998), Gorce Mts (Czarnota 2000; Czarnota & Wojnarowicz 2008), Pieniny Mts (Kiszka 2004), Beskid Sądecki Mts (Olech 1972, 1973; Śliwa 1998a), Beskid Niski Mts (Nowak 1995), Pogórze Przemyskie foothills (Kiszka 2002b), Góry Sanocko-Turczańskie Mts (Low Bieszczady Mts) (Kościelniak 2004) and Western Bieszczady Mts (High Bieszczady Mts; Kiszka 1997, 2002a; Kiszka & Kościelniak 2004). It was noted to occur from the foothills up to the upper edge of the lower montane belt (Nowak 1993; Fałtynowicz 2003). The altitude range of its occurrence in Poland reaches as far as 1200 m a.s.l. in the Beskid Żywiecki Mts (Nowak 1998). Single reports indicated its presence in the northern part of the Wyżyna Małopolska upland (Wzgórza Radomszczańskie hills; Czyżewska 1978, 1981) and in the Sudety Mts (Śnieżnik massif; Szczepańska 2007, 2008). Apart from the historical and very general report by Grumann¹ (1963), the newly discovered localities are the only records of this lichen in the northern lowlands of Poland.

WORLD DISTRIBUTION. *Phaeophyscia endophoenicea* is known mainly from Europe, where it occurs at dispersed localities, most of all in the

¹ The lichen collection of V. Grumann, stored at present in the herbarium of the Botanical Museum Berlin-Dahlem (B), consists mainly of specimens from Germany and contains no specimens from Poland. The information about the occurrence of *P. endophoenicea* in the Pojezierze Mazurskie lakeland may have originated from unpublished data of G. Lettau. Unfortunately, his large collection from former East Prussia probably was destroyed in Kaliningrad during World War II (H. Sipmann, pers. com.).

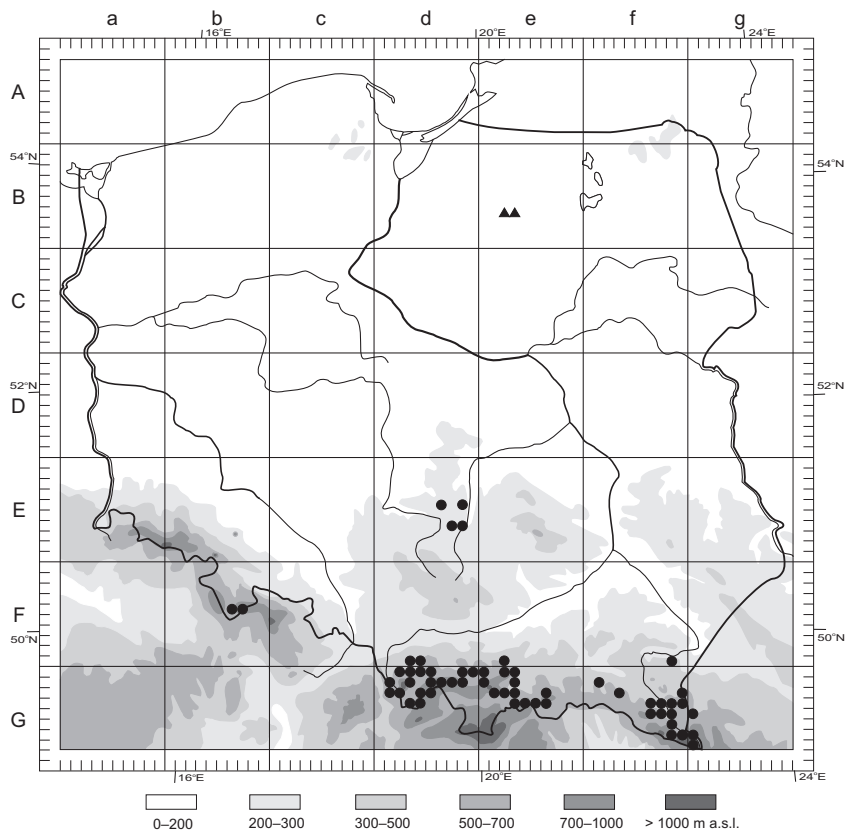


Fig. 1. Distribution of *Phaeophyscia endophoenicea* in Poland, in the ATPOL grid square system: ● – known localities, ▲ – new localities.

temperate zone (Moberg 1977, 2002; Nowak 1993; Litterski 1999). It was also noted both from lowlands and mountain areas in most of the countries neighboring Poland: Germany (Litterski 1999; Scholz 2000), Czech Republic (Liška *et al.* 2008), Slovakia (Pišút *et al.* 1993), Ukraine (Coppins *et al.* 2005) and Lithuania (Motiejūnaitė 1999a). Outside Europe *P. endophoenicea* is known from Asia (John & Breuss 2004; Seaward *et al.* 2004).

DISCUSSION

The new records of *P. endophoenicea* in Poland are significant because they fill a species distribution gap in the Central European lowlands. Perhaps the lack of records from the northern part of the country is due to having been overlooked in the field. In some regions of Poland

(e.g., Eastern Carpathians), *P. endophoenicea* is a frequent and non-threatened lichen, noted also in anthropogenic habitats (Kiszka & Kościelniak 2004). Based on a study in Bieszczadzki National Park, Kiszka (2002a) suggested that it should be affiliated to the mesoaplichens. Nationally, however, *P. endophoenicea* is classed as endangered (EN; Cieśliński *et al.* 2006). It is also on several local Red Lists covering the Puszcza Pilicka Primeval Forest (EN; Czyżewska 2003), Gorce (EN; Czarnota 2003) and the Beskid Sądecki Mts (VU; Śliwa 1998b). *Phaeophyscia endophoenicea* is also on the Red Lists of a number of other European countries such as Lithuania (CR; Motiejūnaitė 1999b), Great Britain (LC; Woods & Coppins 2003), Slovakia (EN; Pišút 1993), the Czech Republic (EN; Liška *et al.* 2008) and Estonia (DD; Randlane *et al.* 2008).

It is worth noting that in lowland areas of Poland and other European countries *P. endophaenicea* is recorded from biotopes with relatively well preserved vegetation cover, constituting local refuges of biodiversity (Motiejūnaitė 2002). It is also a frequent constituent of disappearing epiphytic associations of the *Lobarion* alliance, both on lowlands (Motiejūnaitė 1999a) and in mountainous areas (Kondratyuk *et al.* 1998; Kiszka & Kościelniak 2000). Thus it may be ascribed a role as environmental indicator.

At one of the newly discovered localities there were *P. endophaenicea* thalli with numerous apothecia, rarely observed in the national material. In some countries within the species range, apothecia have not been noted so far (cf. Smith *et al.* 2009). Although the factors that induce sexual reproduction and the formation of fruiting structures in lichenized fungi are unknown (Honegger & Zippler 2007), the presence of apothecia may indicate conditions favoring that. More new localities of *P. endophaenicea* are likely to be discovered Poland's lowlands, especially in the vast forest complexes of its northeast.

SPECIMENS EXAMINED. POLAND. POJEZIE-RZE OLSZTYŃSKIE LAKELAND: Be-62 – Las Warمیński Nature Reserve, forest section no. 462d, 53°37'44.3"N/20°29'41.7"E, on *Carpinus betulus* and *Corylus avellana*, 12 Sept. 2008, *leg. D. Kubiak* (OLTC L-3363 & L-3364); *ibid.* on *Corylus avellana*, 26 Dec. 2009, *leg. D. Kubiak* (OLTC L-3402); Las Warمیński Nature Reserve, forest section no. 496b, 53°36'59.4"N/20°29'58.3"E, on *Corylus avellana*, 12 Sept. 2008, *leg. D. Kubiak* (OLTC L-3365); Warمیński Nature Reserve, forest section no. 298/333, on *Carpinus betulus*, 16 Sept. 2009, *leg. D. Kubiak* (OLTC L-3393). Be-63 – Las Warمیński Nature Reserve, forest section no. 177h, 53°39'47.5"N/20°31'15.5"E, on *Corylus avellana*, 14 Sept. 2008, *leg. D. Kubiak* (OLTC L-3394).

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