

NEW RECORDS OF THE LICHEN SPECIES *PYCNOTHELIA PAPILLARIA*  
IN POLAND IN THE CONTEXT OF THREATS TO SPECIES

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**ABSTRACT.** Three new localities of the lichens species *Pycnothelia papillaria* were discovered during recent field trips to Bory Dolnośląskie, Wzniesienia Gubińskie and Pojezierze Poznańskie. To the date only scattered information about this species is available from Poland. New localities, historical context and analyses of its threats, especially of possible impact of invasive bryophytes, are presented in this paper.

**KEY WORDS:** lowland, western Poland, epigaeic lichens, *Campylopus introflexus*

## INTRODUCTION

In Europe, the distribution of *Pycnothelia papillaria* Dufour ranges from Boreal and Central Europe to the southern parts of the continent (TOBOLEWSKI 1988, PURVIS et AL. 1992, WIRTH 1995, NIMIS and MARTELOS 2008). TOBOLEWSKI (1988) determined the distribution of this species in Poland. Many later records of *Pycnothelia papillaria* confirm earlier observations, but numerous, new localities have been identified mainly in southern and south-eastern part of the country (NOWAK 1968, KISZKA and PIÓRECKI 1994, FAŁTYNOWICZ 2003 and literature cited therein, BIELCZYK et AL. 2004, CZARNOĆA et AL. 2005).

*Pycnothelia papillaria* is growing in dry and sunny habitats. It prefers sandy, sandy-clay or sandy-gravel soil (NOWAK and TOBOLEWSKI 1975, TOBOLEWSKI 1988, FAŁTYNOWICZ 2003). This species can be found mostly on heathlands, psammophilous grasslands, paths and at the edge, in gaps or inside coniferous forests (TOBOLEWSKI 1988, PURVIS et AL. 1992). In Poland the species is legally protected (ROZPORZĄDZENIE... 2004) and is classified as endangered species (CIEŚLIŃSKI et AL. 2006).

According to some authors *P. papillaria* is threatened by undergoing succession (KOŚCIELNIAK and KISZKA 2006), climate warming (VAN HERK et AL. 2002) and susceptibility to acidic precipitation (HAUCK 2008). Considering the information given above, additional new data on this species is more than welcome.

## RESULTS AND DISCUSSION

*Pycnothelia papillaria* has been found in only a few localities in the central part of the western Poland,

mostly in coniferous forests (comp. MALLACH 1933, 1939, TOBOLEWSKA 1955, TOBOLEWSKA and WRONÓWNA 1955, DEUGOSZ 1961, TOBOLEWSKI 1962, 1963, 1988, JANICKA 1963, MIELOSZYK 1964, ŻUKIEL 1967, KOZŁOWSKA 1975, POLAK 1978, LIPNICKI 1991, FAŁTYNOWICZ 2003, GROCHOWSKI 2005). Some new records of *P. papillaria* were made during investigations carried out in Bory Dolnośląskie, Wzniesienia Gubińskie, and Pojezierze Poznańskie in 2006-2008 (Fig. 1). Specimens were found in the Bory Dolnośląskie in the heathland from *Pohlio-Callunion* alliance. The well-developed population of *Pycnothelia papillaria* has been noted below the top of inland dunes in the "Mierkowskie Wydmy" reserve (Forest Promotional Complex "Bory Lubuskie"). It was recorded together with *Stereocaulon condensatum* Hoffm., in patches of *Polytrichum piliferi-Stereocaulum condensati*. In the reserve, species was also observed by LIPNICKI (2007), who recorded *P. papillaria* in *Cladonia-Pinetum* forest and on road shoulders. Mats of this community developed in the top part of an open inland dune in the first stage of primeval succession. The physiognomy of the community was mainly created by lichens. Among the accompanying bryophytes, *Polytrichum piliferum* Hedw. and *Cephaloziella divaricata* (Sm.) Schiffn. were observed. Sporadically small tussocks of *Corynephorus canescens* (Hedw.) Brid. also occurred in the psammophilous grassland. The weakly developed thallus of *P. papillaria* on the sandy soil at the edge of *Leucobryo-Pinetum* in Równina Nowotomyska was found together with *Cladonia cervicornis* ssp. *verticillata* (Hoffm.) Ahti and *Cladonia mitis* Sandst.

Scarcity of records both in the past and at present makes it difficult to determine the dynamic tendency of this species. Valuable information can be achieved

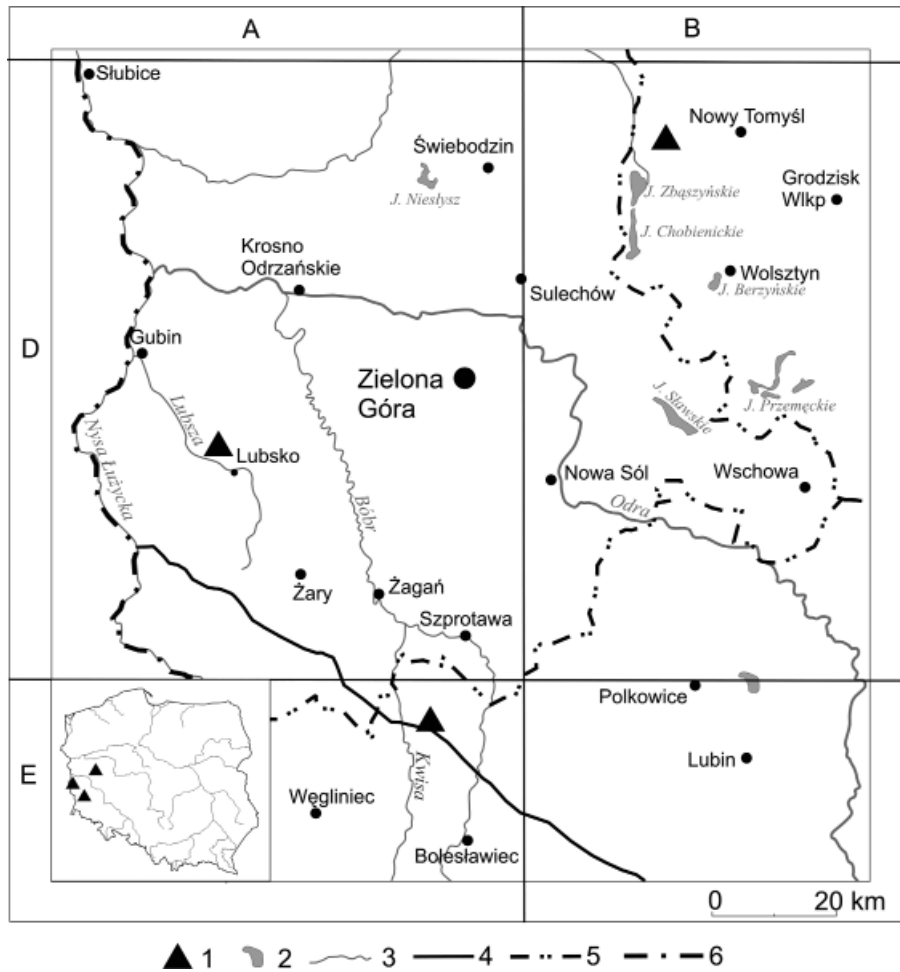


FIG. 1. Localization of new sites of *Pycnothelia papillaria* in western Poland: 1 – new localities, 2 – lakes, 3 – rivers, 4 – motorway, 5 – border of province, 6 – border of Poland

by comparative studies of lichenobiota of some regions. CIEŚLIŃSKI (1991) describing current status of preservation of epigeic and epilithic lichens in the Świętokrzyski National Park, did not find *P. papillaria* again. Similar observations were made by TOBOROWICZ (1983) and ŁUBEK (2007). CIEŚLIŃSKI (2003) analyzing changes of lichen biota during the period of last 130 years in the north-eastern Poland, observed a significant decrease of localities of *P. papillaria*. Similar results from central Poland were also obtained (CIEŚLIŃSKI and CZYŻEWSKA 2006, LIPNICKI 2006) as well as in the Bieszczadzki National Park by KOŚCIELNIAK and KISZKA (2006) who compared lichenobiota in the last 40 years. Despite earlier records, *Pycnothelia papillaria* was not also observed after 1992 in Śląsk Opolski (LEŚNIAŃSKI 2004). LIPNICKI (2006) pointed difficulties in finding explanation of stock depletion of this species in the Bory Tucholskie. Nevertheless it should be pointed out that some authors (GROCHOWSKI 2005) recorded *P. papillaria* in the sites where species had not been observed before.

According to the studies carried out in the Netherlands (VAN HERK ET AL. 2002) impact of climate change can be suggested as one of the major causes of disappearance of this arctic-boreal species. KOŚCIELNIAK and KISZKA (2006) explained retreating of *P. papillaria* by changes of its habitats as result of outgoing succession.

Similar observations were made by SPARTUSS (2007) who pointed the decrease of favourable habitats for this species, their acidification and eutrophication. Susceptibility to acidic precipitation connected with the lack of fumarprotocetraric acid in the thallus which probably increases the pollution tolerance of some species (HAUCK 2008) could be responsible for retreat of this species.

The observations in the Wzniesienia Gubińskie give additional explanation to this phenomenon. In this region, massive occurrence of neophytic bryophyte *Campylopus introflexus* was observed near stands of *P. papillaria*. Population of this moss was in good condition and covered large parts of dunes in the reserve, outcompeting other species, among them *P. papillaria*. Expansion of *C. introflexus* noted in last decades in many European countries, also in Poland (e.g., RUSIŃSKA and URBAŃSKI 1993, HASSEL and SÖDERSTÖM 2005, ROSADZIŃSKI 2007, FUDALI ET AL. 2009) can be a real threat to *P. papillaria* and other lichens in the future.

Lack of historical data connected with monitoring of *P. papillaria* can not give the explicit explanation of disappearance of this species. The influence of *C. introflexus* can be taken into account as an additional factor impacting the vitality of this epigeic lichen in present time.

SPECIMEN EXAMINED. 1. POLAND. Dolny Śląsk, Bory Dolnośląskie, Nadleśnictwo Bolesławiec (Obręb Kliczków), on soil in *Pohlio-Callunion* związek, alt. ca 200 m a.s.l., ATPOL grid square AE-08, 26.09.2006, leg/det. W. Fałtynowicz; 2. POLAND. Dolne Łużyce, Wzniesienia Gubińskie, Nadleśnictwo Lubusko (Forest Promotional Complex "Bory Lubuskie"): "Mierkowskie Wydmy" reserve, on soil in *Polytricho piliferi-Stereocaulium condensati* community, alt. ca 73 m a.s.l., 52°82.05'N, 14°86.47'E, ATPOL grid square AD-64, 04.10.2008, leg. S. Rosadziński, det. D. Zarabska; 3. POLAND. Wielkopolska, Równina Nowotomska, Nadleśnictwo Grodzisk Wlkp., Jastrzębsko Stare, ca 3.7 km NW from village, on soil in the edge of *Leucobryo-Pinetum* forest, alt. 75 m a.s.l., 52°18.30'N, 16°00.35'E, ATPOL grid square BD-12, 06.11.2008, leg/det. D. Zarabska.

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