

1 ***Parmelia submontana* Nád. ex Hale –new records in Poland**

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3

Dedicated to Professor Lucyna Śliwa

4

5 **Summary**

6 *Parmelia submontana* is quite a rare epiphytic lichen in both Poland and central Europe. In
7 Poland, it grows mainly in the mountains and in the northern part of the country. We found
8 eight new localities of *P. submontana*, in northern and southwestern Poland. We report it here
9 as a new species for Wigry National Park. Distribution of the species in Poland is presented on
10 the map.

11

12 **Keywords:** epiphytes, geographical distribution, rare lichen

13

14 **INTRODUCTION**

15 *Parmelia submontana* Nád. ex Hale is one of nine species of the *Parmelia* genus found in
16 Poland (Ossowska, 2021; Fałtynowicz et al., 2024). It is one of the rarest and of greatest interest
17 species in the genus in the country, as evidenced by various publications dedicated to this taxon
18 (e.g. Fałtynowicz, 1993; Kubiak, 2000; Motiejūnaitė et al., 2003). Lichenologists all over
19 Europe have also paid special attention to this lichen due to its rarity (e.g., Degelius, 1935;
20 Schindler, 1975; Arvidsson, 1989; Christensen, 1997; Gauslaa, 1999; Thell et al., 2017). In
21 Poland, *P. submontana* is under strict legal protection (Regulation..., 2014) and is listed as a
22 species of Vulnerable (VU category) on the "Red List..." (Cieśliński et al., 2006).

23 Wigry National Park, where half of the described in this paper *P. submontana* localities were
24 found, has been extensively explored by lichenologists (Bystrek & Matwiejuk, 1994, 1999,
25 Bystrek & Przepiórkowska, 1994, Fałtynowicz, 1994, Fałtynowicz & Krzysztofiak, 2010 and

26 Matwiejuk, 2010). Despite this, new lichen species continue to be discovered in the area. The
27 region is considered one of the most intriguing lichenological regions in the Central European
28 lowland. Recent research conducted after 2010 has led to a significant increase in the number
29 of species identified in the area; more than 300 lichen species have been documented in the
30 park (see, Fałtynowicz & Halama, 2013, Fałtynowicz et al., 2017, 2018).

31 The aim of this study was to contribute to the current understanding of the distribution of
32 the rare lichen species *Parmelia submontana* in Poland.

33

34 **METHODS**

35 New localities were found in the years 2003-2018 during the implementation of various
36 research and monitoring projects.

37 The distribution map of the sites studied was based on the ATPOL grid (Cieśliński &
38 Fałtynowicz, 1993). Information on the worldwide and Polish distribution of the *Parmelia*
39 *submontana* was collected from literature. Herbarium specimens were collected only from the
40 Wigry National Park and the Góry Stołowe Mts and deposited in the WRSL.

41 **RESULTS AND DISCUSSION**

42 **Distribution of *P. submontana* in the world**

43 *P. submontana* is classified as a sub-Atlantic species but is most abundant in the mountains of
44 the Mediterranean zone (cf. Degelius, 1935, Nimis, 2016). According to Hale (1987), it is
45 representative of the southern Mediterranean European mountain element. Regardless of these
46 classifications, the range of *P. submontana* is wide. It is found throughout Europe, from the
47 Urals and Caucasus in Russia (Urbanavichus & Andreev, 2010) to Portugal (Jones, 2002), and
48 from the Scandinavian Peninsula (Santesson, 1993) to North Africa (Schindler, 1975). In

49 northern and central Europe, it has few and dispersed localities, although Thell et al. (2017)
50 state that this species has clearly spread in Scandinavia in recent years.

51 Outside Poland, it has been found in single sites in Królewiec Region (Russia) (Zalewska et al.,
52 2004), Lithuania (Motiejūnaitė, 2017), Latvia (Motiejūnaitė et al., 2016), Estonia (Randlane et
53 al., 2014), Ukraine (Kondratyuk et al., 1996), Slovakia (e.g. Lisicka, 2005), Czech Republic
54 (Liška et al., 2008), and Hungary (Papp et al., 2020). It has slightly more sites in Germany
55 (Scholz, 2000), Austria (Hafellner & Türk, 2016), southern France (Roux, 2012), and Italy,
56 especially in the Apennines (Nimis, 2016), but also in Sardinia (Vězda, 1988). *P. submontana*
57 is also known from Romania (Vicol, 2016), Greece (Arcadia, 2020), Spain (Aragón & Rico,
58 1997, Blázquez, 2022), Turkey (Karagünlü & Tufan-Çetin, 2020), Portugal (Paz-Bermúdez,
59 2009), the UK (Smith et al., 2009), Belgium, and Luxembourg (Serusiaux et al., 2004),
60 Denmark (Christensen, 1997), as well as Sweden and Norway (Thell et al., 2017). The
61 southernmost localities of this species have been found in Tenerife in the Canary Islands
62 (Hawksworth et al., 2008), Tunisia (Seaward, 1996), and the Atlas Mountains of northern
63 Morocco (Schindler, 1975; Ravera, 2001; Molina, 2011).

64 ***Parmelia submontana* Nád. ex Hale**

65 The specimens of *P. submontana* found were typically formed at most localities. Only at
66 locality 2 in Wigry National Park and at the locality in Zaboryszki were the lobes short (ca. 2
67 cm) and partially covered with algae. This may indicate a weakened condition of the thalluses.
68 At none of the new sites were apothecia found.

69

70 **New localities and distribution of *P. submontana* in Poland**

71 *P. submontana* was discovered in four separate locations within Wigry National Park, spanning
72 two ATPOL squares, as indicated in Figure 1. The locations and details are as follows:

73 1/ 54,06326 N; 23,02877 E; found on a branch in the crown of *Populus tremula* at a height of
74 approximately 18 meters; 26.09.2016;

75 2/ 54.1034 N; 23.03135 E; found on a trunk of *Quercus robur* at a height of approximately 10
76 meters; 01.09.2016;

77 3/ 54.10911 N; 23.057528 E; found on a branch in the crown of *Populus tremula* at a height of
78 approximately 16 meters; 01.09.2018;

79 4/ 53.99412 N; 23.17372 E; forest section 330/331/348/349, found on a trunk of *Quercus robur*
80 at a height of 2 meters, 26.09.2016.

81 In three locations, *P. submontana* grew high up in strongly illuminated tree crowns, and
82 only at a height of 2 meters low on the trunk, but also in an exposed area, as the tree is located
83 at a forest road intersection. The species populations were scarce, but all specimens had typical
84 developed thalli.

85 Apart from Wigry National Park, we found new localities of *P. submontana* in four other
86 places in the country (Fig. 1):

87 1/ 54.23878 N; 23.09901 E; Zaboryszki village near Szypliszki, on the trunk of *Salix fragilis* at
88 a height of approximately 1,5 meters growing over the drainage ditch near the forester's
89 lodge, several thallus; 07.1999;

90 2/ 53.7786 N; 16.4941 E; Storkowo village near Szczecinek, near the the Geoecological Station
91 of the Adam Mickiewicz University; very rich population on the trunk of *Carpinus betulus*
92 at a height of 1–2 m in the oak-hornbeam forest, next to the Młyński Potok River (a small
93 tributary of the Parsęta River); 07.2003;

94 3/ 50.3776 N; 16.2893 E; Góry Bystrzyckie Mts, Taszów village, by the village road; very rich
95 population on the trunk of *Acer platanoides* at 1–2 m; 08.2017;

96 4/ 50,6556 N; 16,4408 E; Góry Stołowe Mts, near Studzienna village, red hiking trail, on the
97 trunk of *Acer platanoides* ; 09.2007 at 1–2 m.

98 Ossowska (2021) reports 68 sites of *P. submontana* in Poland, located in 33 squares of the
99 ATPOL grid. In addition, other authors (Zalewska et al., 2004, Fałtynowicz, 2016, Ossowska
100 et al., 2020, Szymczyk, 2021 et al.) report this species from ten more sites, and new data from
101 six ATPOL squares are presented in this article. Most of the sites are located in the north of
102 Poland, within the belt of moraines from the last glaciation. Many sites have been found in
103 mountainous regions, while only a few are scattered in the highlands of the central part of the
104 country (refer to Fig. 1). *P. submontana* grows most often on the following trees: *Acer* (24% of
105 all sites), *Quercus* (15.5%), *Carpinus* (14%), *Populus* (8.5%), and *Tilia* (8.5%). It has
106 occasionally been found on *Abies*, *Alnus*, *Betula*, *Fagus*, *Fraxinus*, *Malus*, *Padus*, *Picea*,
107 *Robinia*, *Salix*, *Sorbus*, and on bedrock. It thrives in various habitat conditions, but in most
108 cases, it prefers good access to light and places with significant air humidity, often growing
109 near watercourses or lakes. It has been observed on roadside trees or high up in the tree crowns.

110 *P. submontana* is likely more common in Poland than previously believed, as it is often
111 mistaken for other lichen taxa due to its high similarity. Furthermore, its tendency to grow high
112 on tree trunks and in their crowns may contribute to its underestimation. On a national scale,
113 the species does not appear to be endangered; Kościelniak (2007) reported that *P. submontana*
114 is spreading intensively in southeastern Poland.

115

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296 relationships that could have appeared to influence the work reported in this paper.

297 Oświadczenie o wkładzie merytorycznym każdego autora:

298 Wiesław Fałtynowicz – stworzenie koncepcji pracy, zebranie okazów, napisanie tekstu głównego

299 Agnieszka Kowalewska – zebranie okazów, identyfikacja okazów

300 Hanna Fałtynowicz – zebranie okazów, identyfikacja okazów, tłumaczenie tekstu

301 Amelia Piegdoń – zebranie okazów, identyfikacja okazów,

302 Katarzyna Patejuk – zebranie okazów, identyfikacja okazów,

303 Piotr Górski – zebranie okazów, korekta tekstu

304 Marek Halama – zebranie okazów, zrobienie mapy romieszczenia

305 Monika Staniaszek-Kik – zebranie okazów, identyfikacja okazów,

306 Monika Dimos-Zych – zebranie okazów, identyfikacja okazów,

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Explanation for figure

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313 Fig. 1. Distribution of *Parmelia submontana* localities in Poland on the background of the
314 grid lines ATPOL.

315 Explanations: ● – localities according to Ossowska (2021); ■ – localities known after
316 2021; ▲ – new localities.

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