

Article ID: 5515
DOI: 10.5586/am.5515

Publication History
Received: 2019-08-06
Accepted: 2019-11-24
Published: 2020-06-30

Handling Editor
Andrzej Szczepkowski; Warsaw
University of Life Sciences –
SGGW, Poland;
<https://orcid.org/0000-0002-9778-9567>

Authors' Contributions
BG: field research, specimen identification, preparation of the manuscript and graphics; AK: field research, specimen identification, photographic documentation, and correction of the manuscript

Funding
The studies were financed by the State Forests National Forest Holding – Directorate-General of the State Forests in 2018 as a project “Species diversity of macrofungi in Wielkopolska National Park – preliminary recognition and valorization.”

Competing Interests
AK is the Associate Editor of the journal; BG: no competing interests have been declared

Copyright Notice
© The Author(s) 2020. This is an open access article distributed under the terms of the [Creative Commons Attribution License](#), which permits redistribution, commercial and noncommercial, provided that the article is properly cited.

CHECKLIST

Contribution to the Knowledge of Mycobiota of the Wielkopolski National Park (W Poland)

Błażej Gierczyk ^{1*}, Anna Kujawa ²

¹ Faculty of Chemistry, Adam Mickiewicz University in Poznań, Poland

² Institute for Agricultural and Forest Environment, Polish Academy of Sciences, Poland

*To whom correspondence should be addressed. Email: hanuman@amu.edu.pl

Abstract

The Wielkopolski National Park is located in western Poland, near Poznań City. Its unique postglacial landforms are covered with various (semi)natural and anthropogenic ecosystems. The mycobiota of this Park has been studied for 90 years; however, current state knowledge is still insufficient. In 2018, a few-year-long project on the chorology, richness, and diversity of fungal biota of this area was started. In the first year, 312 taxa of macromycetes were found. Among them, 140 taxa were new for the biota of the Wielkopolski National Park. Five species (*Botryobasidium robustius*, *Hebeloma subtortum*, *Leccinum brunneogriseolum*, *Pachyella violaceonigra*, and *Sistotrema athelioides*) were new for Poland, and 26 taxa were new for the Wielkopolska region.

Keywords

Ascomycota; Basidiomycota; macrofungi; rare species; protected area

1. Introduction

The Wielkopolski National Park (Polish: Wielkopolski Park Narodowy; WPN) is a lowland nature protection area in western Poland, ca. 15 km SW from Poznań City. The area of the WPN is composed of one major fragment bordering with the Warta River and divided by two major roads: a national road, DK5, crossing the park between the villages of Szreniawa and Stęszew, and a provincial road, No. 430, between the villages of Luboń and Mosina, and a few exclaves near Wielkawieś and Długosławiec and within Puszczykowo villages. The WPN is surrounded by several large villages (e.g., Luboń, Mosina, Puszczykowo, and Stęszew) and many small ones; several small settlements are also located within the Park area (Figure 1). The WPN was established in 1957 and enlarged in 1996. The total area of the WPN is 7,619.8 ha, while its buffer zone is 7,383.2 ha. The WPN is located in the Wielkopolskie Lakeland (Polish: Pojezierze Wielkopolskie) macroregion, in the mesoregions of Grodzisk Heights (Polish: Wysoczyzna Grodziska), Śrem Basin (Polish: Kotlina Śremska), and Poznań Gap of the Warta (Polish: Poznański Przełom Warty) (Solon et al., 2018). The whole area of the WPN is a part of the Ostoja Wielkopolska Natura 2000 protected area. The terrain sculpture of the WPN was formed by a glacier during the Weichselian glaciation; the major part of the Park area is ground moraine height, furrowed by tunnel valleys (Bartkowski, 1972; Krygowski, 2007). The watercourse network of the WPN is scanty, limited to the Samica and Wirynka rivers, and a few nameless streams. Much richer is the system of standing water, composed of several ribbon lakes (Figure 2), small, more or less circular lakes located in the deepest parts of the tunnel valleys and some periodic reservoirs. The soils of the WPN are mostly of postglacial origin, formed of gravels, sands, and clays, mainly brown leached soils and podzolic soils (Borowiec, 1971, 1973). Richer soils are present in dips of the land (black soils, muck soils, or peat soils) (Borowiec, 1973). The WPN area is dominated by forest ecosystems. The most important trees occurring in the WPN are *Pinus sylvestris*, *Acer platanoides*, *A.*

pseudoplatanus, *Alnus glutinosa*, *Betula pendula*, *Carpinus betulus*, *Fagus sylvatica*, *Populus tremula*, *Quercus petraea*, *Q. robur*, *Q. rubra*, and *Tilia cordata* (Żukowski et al., 1995). On the maps of potential natural vegetation, the dominating forest type in the WPN is *Gallio-Carpinetum*, while the other types are *Salici-Populetum*, *Querco-Pinetum*, *Calamagostrio-Quercetum*, *Potentillo albae-Quercetum typicum*, *Fraxino-Alnetum*, *Leucobryo-Pinetum*, and *Ficario-Ulmetum chrysosplenietosum* (Matuszkiewicz, 2008). In fact, most of the WPN area is covered with substitutive forest communities with the domination of *Pinus sylvestris*, *Quercus* spp., and *Carpinus betulus*. Nonforest areas occurring in the Park are either (semi)natural (grasslands, meadows, fens, and reed beds) or anthropogenic communities (fields, pastures, road margins, gardens, and parks).

The first data on fungi from the surroundings of Poznań was provided by Pfuhl (Pfuhl, 1896, 1898) at the end of the nineteenth century. At least some

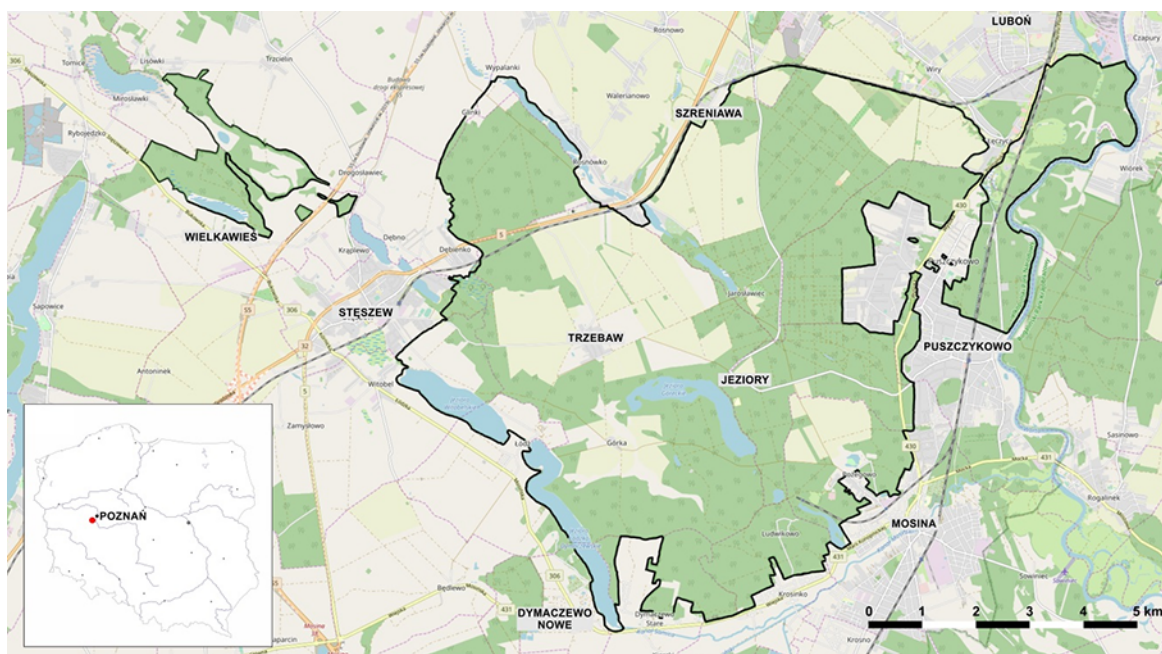


Figure 1 Borders of the Wielkopolska National Park and location of the study area in Poland Based on OpenStreetMap: <https://www.openstreetmap.org/>



Figure 2 Jarosławieckie Lake – a ribbon lake in between the villages of Jezioro and Trzebow in the WPN. Photography by Anna Kujawa.

of them concerned the area currently included in the WPN (e.g., forests in the vicinity Mosina, Wiry, or Szreniawa). Regular mycological studies in the WPN began in 1928 by N. Szyndlerówna and have been continued to the present day. Part of these results have been published in numerous monographs (Bałazy, 1988; Domański, 1965, 1991; Domański et al., 1967; Lisiewska, 1961; Nespiak, 1975, 1981, 1990; Skirgiełło, 1998, 2000), articles (Bałazy, 1982; Bujakiewicz, 1973; Bujakiewicz & Fiebich, 1992, 1993; Danielewicz & Maliński, 1999; Domański, 1955, 1960; Dzięczkowski, 1961; Fiedotjew, 1936; Jesse, 1947; Kujawa, Gierczyk, et al., 2012; Lisiewska, 1965, 2011; Lisiewska & Madeja, 2003; Młynarek, 1971; Pfuhl, 1896, 1898; Raszka, 1994; Skirgiełło, 1976, 1984; Skirgiełło & Wosińska, 1963; Szulczewski, 1931; Teodorowicz, 1932, 1933; Wojewoda, 1977, 1979), and conference proceedings (Bujakiewicz, 1992), while others remain unpublished in master's theses (Fiebich, 1989; Pawlak, 1977; Skowrońska, 1986; Susicka, 1994; Szyndlerówna, 1928; Wilczyńska, 1994) and expertises (Bujakiewicz & Fiebich, 1991; Bujakiewicz & Szambelańczyk, 1997). The total number of taxa mentioned from the WPN in 2017 in published and unpublished materials is 814, including species of uncertain status (Kujawa, 2017; Lisiewska, 2011). Among them, 622 were listed in published reports. In 2018, a new project on the fungal diversity in the WPN started. In the beginning, the number of taxa known from the WPN and mentioned in all available sources was verified; the hitherto known mycobiota of this Park composed of 786 taxa. Moreover, 50 species of uncertain status have been reported in published and unpublished materials. In this paper, an annotated list of localities of 140 taxa, new for the WPN, and found during the first year of the study is presented. The list of taxa previously reported from the WPN and confirmed in 2018 is also enclosed.

2. Material and Methods

Specimens were collected in 2018 from March to November, using the route method. All types of habitats in the WPN were checked during the field studies. Forest compartment numbers were given after the Forest Data Bank (<https://www.bdl.lasy.gov.pl/>). The specimens collected were identified using standard methods used in fungal taxonomy, i.e., analysis of micro- and macrocharacters using a binocular or optical microscope. Standard staining techniques using aqueous ammonia solution, 10% KOH in water, Congo red in ammonia, Melzer reagent, sulfovanilin, and aniline (cotton) blue in lactophenol were applied. Specimens were identified using the following general keys and atlases: *Funga Nordica* (Knudsen & Vesterholt, 2008, 2012), *Nordic Macromycetes* (Hansen & Knudsen, 1992, 1997, 2000), *Flora Agaricina Neerlandica* (Bas et al., 1988, 1990, 1995, 1999; Noordeloos et al., 2001, 2005), *Die Nichtblätterpilze, Gallertpilze und Bauchpilze* (Jülich, 1984), *Fungi of Switzerland* (Breitenbach & Kränzlin, 1984, 1986, 1991, 1995), and *Pilzkompendium* (Ludwig, 2000, 2001, 2007a, 2007b, 2012a, 2012b, 2017a, 2017b). The following monographs and taxonomic papers were used: *Agaricus* (Parra, 2008, 2013), *Conocybe* and *Pholiotina* (Hausknecht, 2009), *Crepidotus* (Consiglio & Setti, 2008), *Hebeloma* (Beker et al., 2016), *Hypocrea* (Jaklitsch, 2009, 2011), *Peziza* (Hohmeyer, 1986), *Scutellinia* (Schumacher, 1990), Boletales (Ladurner & Simonini, 2003; Lannoy & Estades, 1995), Strophariaceae (Noordeloos, 2011), polyporoid fungi (Bernicchia, 2005; Ryvarden et al., 2017), corticioid fungi (Bernicchia & Gorjón, 2010). Specimens of Ascomycota were also identified based on the keys, iconography, and descriptions provided in a DVD edition by Baral & Maron (2005). For the taxa mentioned in *Funga Nordica 2* (Knudsen & Vesterholt, 2012), the names given in this monograph have been used (except for a few taxa, as indicated on the species list), other names have been used as recommended in MycoBank Database (<http://www.mycobank.org/>). The data on the distribution in Poland were compiled based on the checklists of Polish micro- and macromycetes (Chmiel, 2006; Mułenko et al., 2008; Wojewoda, 2003a) and the database of Polish mycological literature (Kujawa, 2018). The threat categories were given based on the “Red list of the macrofungi in Poland” (Wojewoda & Ławrynowicz, 2006), the protected species – according to the Regulation of the

Minister of Environment (2014). Dry specimens were deposited in B. Gierczyk private fungarium and Turew Field Station of the Institute for Agricultural and Forest Environment of the Polish Academy of Sciences.

3. Results

Abbreviations:

- ! – species new to Poland, # – species new to Wielkopolska region;
- LP – Landscape Park, NP – National Park, NR – Nature Reserve;
- PU – Protection Unit (Polish: Obwód Ochronny): Jz – Jeziory; Gr – Górk; OG – Osowa Góra; Pu – Puszczykowo; Wi – Wiry; Wy – Wypalanki;
- NICL – species not included in Polish checklists; RL – species mentioned in red list with categories: Ex – extinct, E – endangered, V – vulnerable, R – rare;
- *Ac.ng* – *Acer negundo*; *Ac.pl* – *Acer platanoides*; *Ac.ps* – *A. pseudoplatanus*; *Al.g* – *Alnus glutinosa*; *Bt* – *Betula* spp.; *Bt.p* – *B. pendula*; *Co* – *Corylus avellana*; *Cp* – *Carpinus betulus*; *Fg* – *Fagus sylvatica*; *Fx* – *Fraxinus excelsior*; *La* – *Larix* sp.; *Pi* – *Pinus sylvestris*; *Po* – *Populus* spp.; *Q* – *Quercus* spp.; *Rb* – *Robinia pseudoacacia*; *Sa* – *Salix* spp.; *Ti* – *Tilia* spp.; *Um* – *Ulmus* spp.

3.1. Annotated Species List: Ascomycota

3.1.1. *Bisporella citrina* (Batsch) Korf & S. E. Carp.

Specimens Examined. 1. Puszczykowo, 1.5 km E (PuPU: 14¹); X/2018; *Pi* forest; numerous apothecia on twigs of a deciduous tree. 2. Puszczykowo, 2.5 km NWW (JzPU: 74); X/2018; oak-hornbeam forest (*Q*); numerous apothecia on wood of *Q*.

3.1.2. *Ciliolarina larinica* (Raitv.) Svrček

Specimen Examined. Puszczykowo, 2.5 km NWW (JzPU: 74); X/2018; mixed forest (*Pi*, *Q*, *Cp*, *Ti*, *Co*); numerous apothecia on *Pi* log.

Notes. In Poland also known from the vicinity of Wilkowo village (Gierczyk & Ślusarczyk, 2020) and Lasy Janowskie LP (Chmiel, 1997).

3.1.3. *Dialonectria episphaeria* (Tode) Cooke

Specimens Examined. 1. Ludwikowo, 700 m N (OGPU: 90; by Kociołek Lake); IX/2018; mixed forest (*Pi*, *Q*, *Fg*, *Bt*, *Ac.ps*); numerous perithecia on *Hypoxylon* sp. stromata on *Fg* log. 2. Puszczykowo, 1.5 km E (PuPU: 14); X/2018; *Pi* forest; numerous perithecia on *Hypoxylon* sp. stromata on *Fg* twigs. 3. Stare Puszczykowo (PuPU: 54); XI/2018; oak-hornbeam forest; numerous perithecia on *Hypoxylon fragiforme* stromata on twigs of a deciduous tree.

3.1.4. *Hyaloscypha daedaleae* Velen.; NICL

Specimens Examined. Puszczykowo, 1.5 km E (PuPU: 14); X/2018; *Pi* forest; a few apothecia on *Q* wood.

Notes. In Poland species also known from Gryżyński LP (Ślusarczyk, 2016) and the Kaczawskie Foothills (Gierczyk et al., 2018).

3.1.5. *Hydropisphaera peziza* (Tode) Dumort.

Specimens Examined. 1. Jarosławiec, 1.5 km NW (WiPU: 103); IX/2018; *Al.g* forest; numerous perithecia on *Al.g* log. 2. Stare Puszczykowo (PuPU: 49); XI/2018; oak-hornbeam forest; numerous perithecia on *Fg* log.

3.1.6. *Hypocrea strictipilosa* P. Chaverri & Samuels; NICL

Specimen Examined. Puszczykowo, 3 km W (JzPU: 75); X/2018; mixed forest (*Pi*, *Q*, *Cp*, *Ti*, *Co*); numerous stromata on wood of a deciduous tree.

Notes. In Poland known from Białowieża Primeval Forest (Gierczyk et al., 2015) and the vicinity of Mostki village (Gierczyk & Ślusarczyk, 2020).

¹ Forest compartment number (Polish: numer oddziału leśnego).

3.1.7. *Hypoxylon fragiforme* (Pers.) J. Kickx f.

Specimens Examined. 1. Puszczykowo, 1.5 km E (PuPU: 14); X/2018; *Pi* forest; numerous stromata on *Fg* twigs. 2. Stare Puszczykowo (PuPU: 54); XI/2018; oak-hornbeam forest; numerous perithecia on *Fg* log.

3.1.8. *Hypoxylon howeanum* Peck.

Specimen Examined. Wielkowieś, 0.5 km N (WyPU: 122K); X/2018; riparian forest; numerous perithecia on *Cp* (?) twigs.

3.1.9. *Lachnum sulphureum* (Fuckel) P. Karst. var. *sulphureum*

Specimens Examined. 1. Puszczykowo, 1.7 km E (PuPU: 18); X/2018; a humid place in a *Pi* forest; numerous apothecia on *Urtica dioica* stems. 2. Wielkowieś, 0.8 km NNW (WyPU: 123K); X/2018; a humid place in a *Pi* forest; numerous apothecia on *Urtica dioica* stems.

3.1.10. *Leptosphaeria acuta* (Fuckel) P. Karst.

Specimen Examined. Wielkowieś, 0.8 km NNW (WyPU: 123K); X/2018; riparian forest; numerous stromata on *Urtica dioica* stems.

3.1.11. *Melastiza cornubiensis* (Berk. & Broome) J. Moravec

Specimen Examined. Łęczycza, 2.2 km NEE (PuPU: 4); XI/2018; forest road; numerous apothecia on soil.

3.1.12. *Orbilia xanthostigma* (Fr.) Fr.

Specimen Examined. Wielkowieś, 0.8 km NNW (WyPU: 123K); X/2018; oak-hornbeam forest; on a log of a deciduous tree.

3.1.13. *Pachyella violaceonigra* (Rehm) Pfister; NICL (Figure 3)

Specimen Examined. Jarosławiec, 1.5 km NW (WiPU: 103); IX/2018; *Al.g* forest; a few ascomata on *Al.g* log.

Notes. Apothecia up to 3.5 cm in diameter, shallowly cup-shaped when young, then appanate to slightly pulvinate, discoid, appressed to substratum with somewhat undulate margin, fleshy and fragile. Hymenial layer dark to very dark chestnut brown with distinct vinaceous red or violaceous tint. The outer surface of the ascomata paler. Asci eight-spored, amyloid in the upper part, with crosiers. Spores ellipsoid, thin-walled, hyaline with two guttules, $20\text{--}30 \times 12\text{--}14 \mu\text{m}$, mature spores covered with fine warts and low and short coma-like ridges. Paraphyses cylindrical with inflated apex, septate, with dark bodies in upper part. Ectal excipulum of textura globulosa with hyphoid, gel-embedded outer layer. Medullary excipulum of textura intricata.

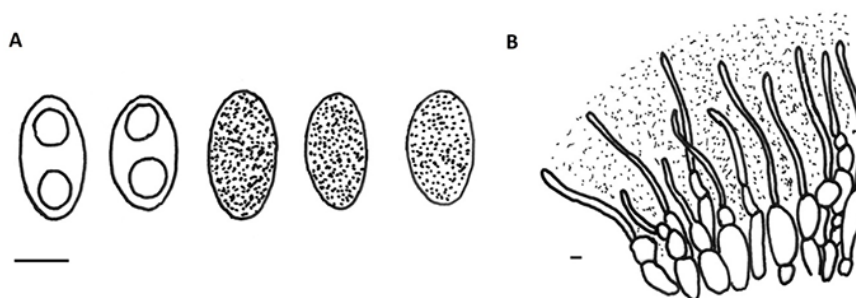


Figure 3 Microcharacters of *Pachyella violaceonigra* (Rehm) Pfister: (A) spores, (B) ectal excipulum with a gelatinous layer. Scale bars: 10 μm .

3.1.14. #*Peziza pseudovesiculosa* Donadini; NICL

Specimen Examined. Wielkawieś, 1.6 km NNW (WyPU: 125K); X/2018; mixed forest (*Q*, *Bt.p*, *Pi*, *Cp*, *Um*); a few ascomata on *Bt.p* log.

Notes. In Poland also known from Kampinos NP (Karasiński et al., 2015).

3.1.15. *Rutstroemia petiolorum* (Roberge ex Desm.) W. L. White

Specimens Examined. 1. Puszczykowo, 2.5 km NWW (JzPU: 74); X/2018; oak-hornbeam forest; a few apothecia on *Q* leaves. 2. Wielkawieś, 0.8 km NNW (WyPU: 123K); X/2018; oak-hornbeam forest; a few apothecia on *Q* leaves.

3.1.16. *Sarcoscypha austriaca* (Beck ex Sacc.) Boud.

Specimen Examined. Mosina, 1.6 km SWW (OGPU: 160); IV/2018; deciduous shrubs; numerous apothecia on twigs.

3.1.17. *Scutellinia patagonica* (Rehm) Gamundí; NICL

Specimen Examined. Jarosławiec, 1.5 km NW (WiPU: 103); IX/2018; *Al.g* forest; numerous ascomata on *Al.g* log.

Notes. Species known from Kampinos NP (Gierczyk, Szczepkowski, et al., 2019) and Las Marcelesiński in Poznań (Gierczyk & Ślusarczyk, 2020).

3.1.18. #*Scutellinia subhirtella* Svrček; NICL

Specimen Examined. Jarosławiec, 1.5 km NW (WiPU: 103); IX/2018; *Al.g* forest; numerous ascomata on *Al.g* log.

3.1.19. *Xylaria longipes* Nitschke

Specimen Examined. Puszczykowo, 2.5 km NWW (JzPU: 74); X/2018; oak-hornbeam forest; a dozen stromata on a log of a deciduous tree.

3.2. Basidiomycota

3.2.1. *Agaricus bitorquis* (Quél.) Sacc.

Specimens Examined. 1. Ludwikowo, 800 m N (OGPU: 90; by Kociołek Lake); IX/2018; mixed forest (*Pi*, *Q*, *Fg*, *Bt*, *Ac.ps*); a few basidiomata on soil. 2. Between Górka and Trzebaw (GrPU); X/2018; deciduous shrubs by the dirt road; one basidioma on soil.

3.2.2. #*Agaricus cupreobrunneus* (F. H. Møller) Pilát

Specimens Examined. Wypalanki, 0.6 km SSE (WyPU: 166); X/2018; *Medicago sativa* crop near the forest margin; a few basidiomata on soil.

Notes. In Poland also known from Lasy Łochowskie (Domański, 1997) and Kampinos NP (Karasiński et al., 2015).

3.2.3. *Agaricus impudicus* (Rea) Pilát; NICL

Specimen Examined. Trzebaw, 1 km NEE (WiPU: 223; by the road to Jarosławiec); X/2018; *Rb* avenue along a dirt road; a few basidiomata on soil.

Notes. In Poland also known from Białowieża Primeval Forest (Gierczyk et al., 2014), Kampinos NP (Karasiński et al., 2015), and Puszcza Zielonka LP (Gierczyk & Ślusarczyk, 2020).

3.2.4. *Agaricus porphyrrhizon* P. D. Orton (Figure 4)

Specimen Examined. Puszczykowo, 1.7 km E (PuPU: 18); X/2018; a humid place in a *Pi* forest (*Q*, *Cp*, *Po*); a few basidiomata on soil.

3.2.5. *Agrocybe putaminum* (Maire) Singer; NICL

Specimen Examined. Wypalanki, 0.6 km SSE (WyPU: 166); X/2018; *Medicago sativa* crop near the forest margin; a few basidiomata on soil.



Figure 4 Basidiomata of *Agaricus porphyrrhizon* P. D. Orton. Photography by Anna Kujawa.

Notes. In Poland also known from the vicinities of Domaszowice and Koło villages (Halama, 2016).

3.2.6. *Amylocorticium subincarnatum* (Peck) Pouzar; RL-V

Specimen Examined. Mosina, 3 km NWW (OGPU: 136); X/2018; mixed forest (Q, Pi, Cp); a few basidiomata on Pi log.

Notes. In Poland known from Kozi Rynek NR and Białowieża Primeval Forest (Szczepkowski et al., 2008; Wojewoda, 2002, 2003b).

3.2.7. *Anthrodia xantha* (Fr.) Ryvarden; RL-V

Specimen Examined. Rosnówko, 0.4 km W (WyPU: 177); XI/2018; mixed forest (Pi, La, Q); a few basidiomata on Pi log.

3.2.8. *Armillaria borealis* Marxm. & Korhonen

Specimens Examined. 1. Puszczykowo, 2.5 km NWW (JzPU: 74); X/2018; mixed forest (Pi, Q, Cp, Ti, Co); numerous basidiomata on soil. 2. Wielkawieś, 0.6 km N (WyPU: 122K); X/2018; riparian forest, numerous basidiomata on soil. 3. Between Wypalanki and DK5 road (WyPU); XI/2018; deciduous and mixed forests; very numerous basidiomata on soil, trunks, and logs. 4. Łęczyca, 2.2 km NEE (PuPU: 4); XI/2018; mixed forest; numerous basidiomata on stumps and dying oaks. 5. Wielkawieś, 0.8 km NNW (WyPU: 123K); X/2018; riparian forest; numerous basidiomata on stumps and logs.

3.2.9. *Armillaria mellea* (Vahl) P. Kumm. s. str. (Figure 5)

Specimens Examined. 1. Puszczykowo, 3 km W (JzPU: 75); X/2018; mixed forest (Pi, Q, Cp, Ti, Co); numerous basidiomata on the base of a trunk of a deciduous tree. 2. Wielkawieś, 1.2 km NNW (WyPU: 124K); X/2018; riparian forest; numerous basidiomata on the base of a trunk of a deciduous tree. 3. Wielkawieś, 0.8 km NNW (WyPU: 123K); X/2018; riparian forest; numerous basidiomata on trunks, logs, and basis of dying trees.



Figure 5 Basidiomata of *Armillaria mellea* (Vahl) P. Kumm. s. str. Photography by Anna Kujawa.

3.2.10. *Armillaria ostoyae* (Romagn.) Herink

Specimens Examined. **1.** Łęczycza, 2.2 km NEE (PuPU: 4); XI/2018; mixed forest; numerous basidiomata on soil, trunks, and dying trees. **2.** Wielkowieś, 0.6 km N (WyPU: 122K); X/2018; riparian forest; numerous basidiomata on soil. **3.** Between Wypalanki and DK5 road (WyPU); XI/2018; deciduous and mixed forests; very numerous on soil, trunks, and logs.

3.2.11. *Artomyces pyxidatus* (Pers.) Jülich; RL-V

Specimens Examined. **1.** Mosina, 3 km NWW (OGPU: 136); X/2018; mixed forest (*Q, Pi, Cp*); a few basidiomata on *Pi* log. **2.** Wielkowieś, 0.6 km N (WyPU: 122K); X/2018; riparian forest; a few basidiomata on a log of a deciduous tree.

3.2.12. *Athelia arachnoidea* (Berk.) Jülich

Specimen Examined. Wypalanki, 2.5 km S (WyPU: 183); XI/2018; mixed forest (*Q, Pi, Cp, Co*); a few basidiomata on a log of a deciduous tree.

3.2.13. *Basiodendron caesiocinereum* (Höhn. & Litsch.) Luck-Allen

Specimen Examined. Wypalanki, 2.5 km S (WyPU: 176); XI/2018; mixed forest (*Q, Pi, Fg, Co*); a few basidiomata on *Pi* log.

3.2.14. *Basidioradulum radula* (Fr.) Nobles

Specimen Examined. Wielkowieś, 0.8 km NNW (WyPU: 123K); X/2018; riparian forest; a few basidiomata on a branch of a deciduous tree.

3.2.15. *Botryobasidium robustius* Pouzar & Hol.-Jech.; NACL (Figure 6)

Specimen Examined. Wypalanki, 2 km S (WyPU: 179); XI/2018; mixed forest (*Q, Pi, Ac.ps, Fg, Fx, Co*); a few basidiomata on wood of a deciduous tree.

Notes. Basidiomata thin, pellicular, smooth, white to greyish white. Basidia six-spored, subcylindrical, with indistinct constriction, (12)14–18(21) μm long. Spores broadly navicular to subamygdaloid, 6.5–9.5 \times 3–4.5 μm , smooth, hyaline, thin-walled. Cystidia absent. Clamps absent.

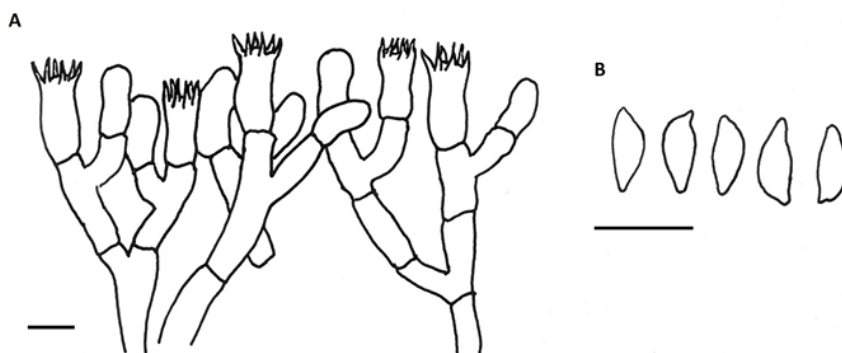


Figure 6 Microcharacters of *Botryobasidium robustius* Pouzar & Hol.-Jech.: (A) basidia and hyphal system; (B) spores. Scale bars: 10 μm .

3.2.16. *Botryobasidium subcoronatum* (Höhn. & Litsch.) Donk

Specimens Examined. 1. Wielkawieś, 0.6 km N (WyPU: 122K); X/2018; riparian forest; numerous basidiomata on a log of a deciduous tree. 2. Wypalanki, 1.5 km SE (WyPU: 177); XI/2018; mixed forest (Q, Pi, Fg, Co); a few basidiomata on Pi log.

3.2.17. *Calocera* aff. *glossoides* (Pers.) Fr.; RL-E

Specimen Examined. Puszczkowsko, 1.5 km E (PuPU: 14); X/2018; Pi forest; a few basidiomata on twigs of Fg (?).

3.2.18. *Ceriporia purpurea* (Fr.) Donk; RL-E

Specimen Examined. Wielkawieś, 1.2 km NNW (WyPU: 124K); X/2018; mixed forest (Pi, Q, Bt, Cp, Um); a few basidiomata on a log of a deciduous tree.

3.2.19. *Ceriporiopsis gilvescens* (Bres.) Domański; RL-E

Specimen Examined. Wielkawieś, 0.8 km NNW (WyPU: 123K); X/2018; riparian forest; a few basidiomata on a log of a deciduous tree.

3.2.20. #*Ceriporiopsis resinascens* (Romell) Domański; RL-E

Specimen Examined. Wypalanki, 2.5 km S (WyPU: 176); XI/2018; mixed forest (Q, Pi, Fg, La); a few basidiomata on a branch of a deciduous tree.

3.2.21. *Chlorophyllum olivieri* (Barla) Vellinga; NICL

Specimen Examined. Puszczkowsko, 3 km W (JzPU: 75); X/2018; oak-hornbeam forest; one basidioma on soil.

3.2.22. *Cinereomyces lindbladii* (Berk.) Jülich

Specimens Examined. 1. Jarosławiec, 0.7 km SE (JzPU: 114); VIII/2018; mixed forest (Pi, Q, Cp, Co); a few basidiomata on Pi log. 2. Puszczkowsko, 3 km W (JzPU: 75); X/2018; mixed forest (Pi, Q, Cp, Co, Ti); a few basidiomata on Pi log.

3.2.23. *Clitocybe agrestis* Harmaja; RL-R

Specimen Examined. Wypalanki, 0.6 km SSE (WyPU); X/2018; margin of young forest (Pi, Q), dry lawn; numerous basidiomata on soil.

3.2.24. *Coniophora arida* (Fr.) P. Karst.

Specimen Examined. Mosina, 3 km NWW (OGPU: 136); X/2018; mixed forest (Q, Pi, Cp); a few basidiomata on Pi log.

3.2.25. #*Coniophora olivacea* (Pers.) P. Karst.; RL-R

Specimens Examined. 1. Mosina, 3 km NWW (OGPU: 136); X/2018; mixed forest (Q, Pi, Cp); a few basidiomata on Pi log. 2. Jarosławiec, 0.7 km SE (JzPU: 114); X/2018; mixed forest (Q, Pi, Cp); a few basidiomata on Pi log. 3. Puszczkowsko, 3 km W (JzPU: 75); X/2018; mixed forest (Pi, Q, Cp, Co, Ti); a few basidiomata on Pi log.

3.2.26. *Coniophora puteana* (Schum.) P. Karst.

Specimen Examined. Stare Puszczykowo (PuPU: 49); XI/2018; oak-hornbeam forest; a few basidiomata on *Fg* log.

3.2.27. *Conocybe juniana* (Velen.) Hauskn. & Svrcek var. *juniana*

Specimen Examined. Wypalanki, 0.6 km SSE (WyPU: 166); X/2018; *Medicago sativa* crop near the forest margin; a few basidiomata on soil.

3.2.28. *Conocybe semiglobata* Kühner ex Singer var. *semiglobata*

Specimen Examined. Wypalanki, 0.6 km SE (WyPU: 166; by Chomęcickie Lake); X/2018; nitrophilous vegetation by the lake; a few basidiomata on soil.

3.2.29. *Conocybe siliginea* (Fr.) Kühner

Specimen Examined. Wypalanki, 0.6 km SSE (WyPU: 166); X/2018; *Medicago sativa* crop near the forest margin; numerous basidiomata on soil.

3.2.30. *Conocybe subovalis* Kühner & Watling

Specimen Examined. Wypalanki, 1.3 km S (WyPU: 174); XI/2018; by a dirt road in mixed forest (*Pi*, *Q*, *Ac.ps*, *Fg*); a few basidiomata on soil.

3.2.31. *Corioloopsis trogii* (Berk.) Domański

Specimen Examined. Górka, 1.2 km SEE (GrPU: 131; by Skrzynka Lake); VIII/2018; riparian forest; numerous basidiomata on *Al.g* log.

3.2.32. *Crepidotus luteolus* Sacc.; RL-V

Specimen Examined. Near Puszczykowo (JzPU: 67); X/2018; nitrophilous vegetation in mixed forest (*Pi*, *Q*, *Cp*, *Ac.pl*); numerous basidiomata on *Urtica dioica* stems.

3.2.33. #*Crepidotus malachus* Peck. var. *trichifer* Hesler & A. H. Sm.; NICL

Specimens Examined. **1.** Puszczykowo, 3 km W (JzPU: 75); X/2018; mixed forest (*Pi*, *Q*, *Cp*, *Ti*, *Co*); numerous basidiomata on a log of a deciduous tree. **2.** Puszczykowo, 1.5 km E (PuPU: 14); X/2018; *Pi* forest; one basidioma on *Pi* trunk. **3.** Puszczykowo, 1.7 km N (PuPU: 18); X/2018; floodplain terrace (*Sa*, *Ac.ng*, *Po*); numerous basidiomata on *Pi* log.

Notes. In Poland known from Kampinos NP (Karasiński et al., 2015) and Białowieża Primeval Forest (Gierczyk et al., 2014, 2015).

3.2.34. #*Dacryobolus karstenii* (Bres.) Oberw. ex Parmasto; RL-E

Specimen Examined. Puszczykowo, 3 km W (JzPU: 75); X/2018; mixed forest (*Pi*, *Q*, *Cp*, *Ti*, *Co*); numerous basidiomata on *Pi* log.

3.2.35. #*Dendrothele dryina* (Pers.) P. A. Lemke; RL-Ex

Specimen Examined. Wypalanki, 2.2 km SSW (WyPU: 184); XI/2018; deciduous forest (*Q*, *Fg*, *Cp*, *Fx*, *Ac.pl*); numerous basidiomata on *Q* log.

Notes. In Poland known only from a historical locality near Międzyrzec Podlaski (Bresadola, 1903).

3.2.36. *Gloeophyllum sepiarium* (Wulfen) P. Karst.

Specimen Examined. Wypalanki, 0.6 km SSE (WyPU); X/2018; margin of young forest (*Pi*, *Q*); numerous basidiomata on perch of a fence around camping place.

3.2.37. *Gloeoporus dichrous* (Fr.) Bres.; RL-E

Specimen Examined. Wielkowieś, 0.8 km NNW (WyPU: 123K); X/2018; riparian forest; a few basidiomata on a log of a deciduous tree.

3.2.38. *Hebeloma celatum* Grilli, U. Eberh. & Beker; NICL

Specimen Examined. Rosnówko (WiPU: 116A; near Dworcowa Street); X/2018; by dirt road, under *Ti*; a few basidiomata on soil.

3.2.39. *!Hebeloma subtortum* P. Karst.; NICL (Figure 7)

Specimen Examined. Rosnówko, 2 km SEE (WiPU: 116A); X/2018; young deciduous forest; numerous basidiomata on soil.

Notes. Representative of section *Hebeloma* (Fr.) P. Kumm. Cap hemispherical to broadly campanulate, then almost applanate to indistinctly concave, 4–7 cm in diameter, fleshy and firm, smooth, not hygrophanous, cream-colored to pale ochre or pale buff. Stipe cylindrical, fibrillose, 4–7 × 0.6–1.4 cm, almost white. Lamellae 55–70, adnate to emarginate, with fimbriate margin, without tears. Cortina present, white. Smell and taste raphanoid. Basidia four-spored. Spores ovoid to ovoid-ellipsoid, 6.5–11.5 × 4.5–7 μm, brownish yellow, weakly ornamented, indextrinoid, perispore not loosening. Cheilocystidia lageniform to subcylindrical, ventricose, not constricted, ca. 40–60 μm long, with 4.5–5.5 μm wide apex and 7–12 μm broad basal part. Pleurocystidia absent. Pileipellis an ixocutis ca. 250 μm thick, composed of encrusted hyphae. Caulocystidia similar to cheilocystidia.

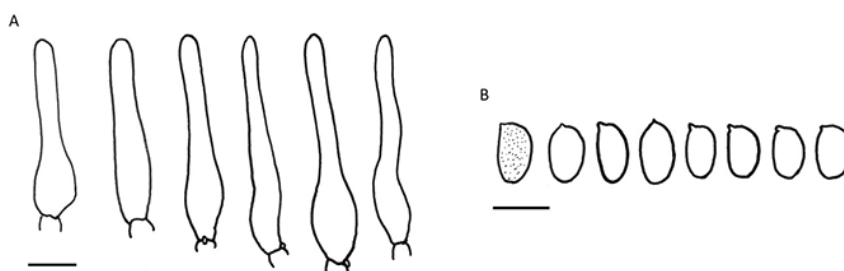


Figure 7 Microcharacters of *Hebeloma subtortum* P. Karst.: (A) cheilocystidia; (B) spores. Scale bars: 10 μm.

3.2.40. *Helicogloea lagerheimii* Pat.; NICL

Specimens Examined. **1.** Rosnówko, 0.4 km W (WyPU: 177); XI/2018; mixed forest (*Pi*, *La*, *Fg*, *Q*); a few basidiomata on *Q* log. **2.** Rosnówko, 1 km SWW (WyPU: 182); XI/2018; mixed forest (*Pi*, *Q*, *Fg*, *Um*, *Cp*, *Co*); a few basidiomata on *Pi* log.

Notes. In Poland also known from Las Marcelesiński in Poznań (Gierczyk & Ślusarczyk, 2020).

3.2.41. *#Henningsomyces candidus* (Pers.) Kuntze

Specimens Examined. Rosnówko, 0.4 km W (WyPU: 177); XI/2018; mixed forest (*Pi*, *La*, *Fg*, *Q*); numerous basidiomata on *Q* log.

3.2.42. *Hohenbuehelia mastrucata* (Fr.) Singer

Specimen Examined. Łęczycza, 2.2 km NEE (PuPU: 4); XI/2018; riparian forest; a few basidiomata on *Sa* (?) log.

3.2.43. *Hyphoderma medioburiense* (Burt) Donk; NICL

Specimen Examined. **1.** Wypalanki, 1.5 km S (WyPU: 169); XI/2018; mixed forest (*Pi*, *La*, *Q*, *Fg*); a few basidiomata on branch of deciduous tree.

Notes. In Poland known from Kampinos NP (Karasiński et al., 2015), Kaszuby LP (Karasiński, 2016), and Las Marcelesiński in Poznań (Gierczyk & Ślusarczyk, 2020).

3.2.44. *Hyphoderma nemorale* K. H. Larss.; NICL

Specimen Examined. Wielkawieś, 0.6 km N (WyPU: 122K); X/2018; riparian forest, few basidiomata on a log of a deciduous tree.

Notes. In Poland known from Kampinos NP (Karasiński et al., 2015), Kaszuby LP (Karasiński, 2016), and Poznań (Gierczyk & Ślusarczyk, 2020).

3.2.45. *Hyphoderma setigerum* (Fr.) Donk

Specimens Examined. 1. Górką, 1.4 km E (GrPU: 126); X/2018; mixed forest (Q, Pi, Cp); a few basidiomata on Cp log. 2. Jarosławiec, 1.5 km NW (WiPU: 103); X/2018; mixed forest (Q, Pi, Cp); a few basidiomata on *Padus* sp. log. 3. Wielkowieś, 0.8 km NNW (WyPU: 123K); X/2018; riparian forest; a few basidiomata on a log of a deciduous tree.

3.2.46. *Hyphodontia quercina* (Pers.) J. Erikss.

Specimens Examined. 1. Wielkowieś, 0.8 km NNW (WyPU: 123K); X/2018; riparian forest; a few basidiomata on a log of a deciduous tree. 2. Wypalanki, 2.5 km S (WyPU: 176); XI/2018; mixed forest (Q, Pi, Fg, Co); a few basidiomata on Pi log.

3.2.47. *Hyphodontia rimosissima* (Peck) Gilb.

Specimens Examined. 1. Jarosławiec, 0.7 km SE (JzPU: 114); VIII/2018; mixed forest (Pi, Q, Cp); a few basidiomata on Pi log. 2. Mosina, 3 km NWW (OGPU: 136); VIII/2018; mixed forest (Q, Pi); a few basidiomata on Pi log.

3.2.48. *Hypochnicium geogenium* (Bres.) J. Erikss.

Specimen Examined. Puszczykowo, 2.5 km NWW (JzPU: 74); X/2018; mixed forest (Pi, Q, Cp, Ti, Co); a few basidiomata on Pi log.

3.2.49. *Hypochnicium multiforme* (Berk. & Broome) Hjortstam

Specimen Examined. Wielkowieś, 0.6 km N (WyPU: 122K); X/2018; riparian forest, a few basidiomata on coniferous (?) log.

3.2.50. *Hypochnicium wakefieldiae* (Bres.) J. Erikss.

Specimen Examined. Puszczykowo, 2.5 km NWW (JzPU: 74); X/2018; mixed forest (Pi, Q, Cp, Ti, Co); a few basidiomata on Pi log.

Notes. In Poland known from Kraków (Wojewoda, 2003a), Kampinos NP (Karasiński et al., 2015) and Poznań (Gierczyk & Ślusarczyk, 2020).

3.2.51. *Inonotus hispidus* (Bull.) P. Karst.; RL-R

Specimen Examined. Wypalanki, 2.5 km S (WyPU: 183); XI/2018; mixed forest (Q, Pi, Cp, Co); a few basidiomata on roots of windthrow of *Prunus avium*.

3.2.52. *Ischnoderma benzoinum* (Wahlenb.) P. Karst.; RL-V

Specimens Examined. 1. Puszczykowo, 2.5–3 km W (JzPU: 74, 75); X/2018; mixed forest (Pi, Q, Cp, Ti, Co); a few basidiomata on Pi log. 2. Wypalanki, 2 km S (WyPU: 179); XI/2018; mixed forest (Q, Pi, Ac.ps, Fg, Fx, Co); a few basidiomata on Pi log. 3. Puszczykowo, 1.5 km E (PuPU: 14); X/2018; Pi forest; a few basidiomata on Pi trunk.

3.2.53. *Ischnoderma resinolum* (Schrad.) P. Karst.; RL-V

Specimens Examined. 1. Mosina, 2.5 km NWW (OGPU: 90; by Lake Kociołek); IV/2018; deciduous forest; a few basidiomata on a deciduous trunk. 2. Stare Puszczykowo (PuPU: 49); XI/2018; oak-hornbeam forest; a few basidiomata on Fg log.

3.2.54. *Junghuhnia nitida* (Pers.) Ryvarden; RL-R

Specimen Examined. Wielkowieś, 0.8 km NNW (WyPU: 123K); X/2018; riparian forest; a few basidiomata on a log of a deciduous tree.

3.2.55. *Kneiffella alutacea* (Fr.) Jülich & Stalpers

Specimens Examined. 1. Mosina, 3 km NWW (OGPU: 136); X/2018; mixed forest (Q, Pi, Cp); a few basidiomata on Pi log. 2. Puszczykowo, 2.5 km NWW (JzPU: 74); X/2018; mixed forest (Pi, Q, Cp, Ti, Co); a few basidiomata on Pi log.

3.2.56. *!Leccinum brunneogriseolum* Lannoy & Estadès; NICL (Figure 8)

Specimen Examined. Jarosławiec, 1.5 km NW (WiPU: 103); IX/2018; Al.g forest, under Bt, Al.g, Sa; a few basidiomata on soil.

Notes. Cap nut brown to ochre brown, hemispherical, minutely granulose or tomentose, 3–5 cm in diameter. Stipe indistinctly clavate, ca. 10 cm high, whitish, covered with brownish squamules. Pore surface white when young, becoming pale grayish-cream colored with age. Context almost white, becoming greenish-blue in the lower part of stipe and pale pink in stipe apex. Spores boletoid to narrowly fusiform with subhilar depression, brownish yellow, $12\text{--}23 \times 4\text{--}7 \mu\text{m}$, $Q_{av} > 3$. Basidia four-spored. Hymenial cystidia fusiform, lageniform to subcylindrical. Pileipellis a trichoderm, composed of filamentous, twisted hyphae and chain-forming, easily detachable cylindrocystis $3.5\text{--}7 \mu\text{m}$ wide; terminal elements cylindrical to conical, pigment intracellular, brown. Caulocystidia in clusters, intermixed with scattered basidia, variable – cylindrical, utriform, fusiform, narrowly clavate, or lageniform, often with a flexuous neck. Species variously interpreted, sometimes considered as a synonym of *L. cyaneobasileucum* Lannoy & Estadès (Knudsen & Vesterholt, 2012; Mikšik, 2017), its variety [*L. cyaneobasileucum* Lannoy & Estadès var. *brunneogriseolum* (Lannoy & Estadès) Lannoy & Estadès] (Noordeloos et al., 2018) or a separate species (Lannoy & Estadès, 1995).

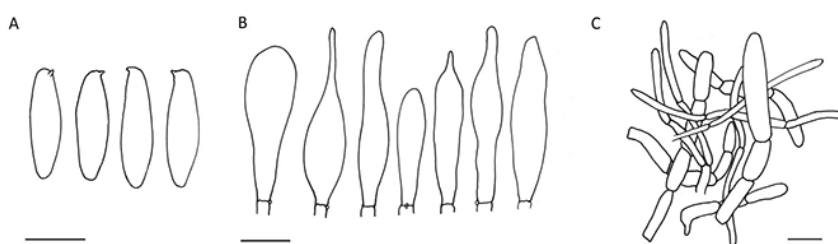


Figure 8 Microcharacters of *Leccinum brunneogriseolum* Lannoy & Estadès: (A) spores; (B) cheilocystidia; (C) pileipellis. Scale bars: 10 μm .

3.2.57. *Lentinellus flabelliformis* (Bolton) S. Ito; RL-E

Specimen Examined. Wielkowieś, 0.8 km NNW (WyPU: 123K); X/2018; riparian forest; numerous basidiomata on the base of *Fx*.

3.2.58. *Leucogyrophana mollusca* (Fr.) Pouzar

Specimens Examined. **1.** Mosina, 3 km NWW (OGPU: 136); X/2018; mixed forest (*Q*, *Pi*, *Cp*); a few basidiomata on *Pi* log. **2.** Puszczykowo, 2.5 km NWW (JzPU: 74); X/2018; mixed forest (*Pi*, *Q*, *Cp*, *Ti*, *Co*); a few basidiomata on *Pi* log. **3.** Wypalanki, 2.5 km S (WyPU: 183); XI/2018; mixed forest (*Q*, *Pi*, *Cp*, *Co*); a few basidiomata on *Pi* log.

3.2.59. #*Leucogyrophana romelii* Ginns; NICL

Specimen Examined. Wypalanki, 2.2 km SSW (WyPU: 184); XI/2018; deciduous forest (*Q*, *Fg*, *Cp*, *Fx*, *Ac.pl*); a few basidiomata on *Pi* log.

Notes. In Poland also known from Kampinos NP (Karasiński et al., 2015) and Białowieża NP (Gierczyk, Ślusarczyk, et al., 2019).

3.2.60. *Lyomyces juniperi* (Bourdot & Galzin) Riebesehl & E. Langer; NICL

Specimen Examined. Wypalanki, 2.5 km S (WyPU: 176); XI/2018; mixed forest (*Q*, *Pi*, *Fg*, *Co*); a few basidiomata on *Pi* log.

Notes. In Poland also known from Gorce Mts (Wojewoda et al., 2016) and Poznań (Gierczyk & Ślusarczyk, 2020).

3.2.61. *Macrolepiota konradii* (Huijsman ex P. D. Orton) M. M. Moser

Specimens Examined. **1.** Puszczykowo, 2.5–3 km W (JzPU: 74, 75); X/2018; mixed forest (*Pi*, *Q*, *Cp*, *Ti*, *Co*); a few basidiomata on soil. **2.** Wielkowieś, 1.2 km NNW (WyPU: 124K); X/2018; mixed forest (*Pi*, *Q*, *Bt*, *Cp*, *Um*); a few basidiomata on soil. **3.** Łęczyca, 2.2 km NEE (PuPU: 4); XI/2018; *Pi* forest; one basidioma on soil.

3.2.62. *Marasmius bulliardii* Quél.

Specimens Examined. 1. Górką, 1 km E (GrPU: 127); X/2018; nitrophilous vegetation by a dirt road in mixed forest, under *Rb*; numerous basidiomata on fallen Q leaves. 2. Puszczkowo, 1.7 km N (PuPU: 18); X/2018; humid place in a *Pi* forest (*Q*, *Cp*, *Po*); numerous basidiomata on fallen Q leaves.

3.2.63. *Melanoleuca polioleuca* (Fr.) Kühner & Maire f. *polioleuca*

Specimen Examined. Górką, 1 km E (GrPU: 127); X/2018; nitrophilous vegetation by a dirt road in mixed forest, under *Rb*; a few basidiomata on soil.

3.2.64. *Meruliopsis taxicola* (Pers.) Bondartsev; RL-R (Figure 9)

Specimens Examined. 1. Mosina, 1.5 km NWW (OGPU: 91); IV/2018; *Pi* forest; a few basidiomata on *Pi* log. 2. N from Jarosławiec (WiPU: 110); IX/2018; deciduous forest; a few basidiomata on *Pi* branch. 3. Łódź, 1,2 km NE (GrPU: 203); X/2018; *Pi* forest; a few basidiomata on *Pi* log.



Figure 9 Basidiomata of *Meruliopsis taxicola* (Pers.) Bondartsev. Photography by Anna Kujawa.

3.2.65. *Mucronella flava* Corner (Figure 10)

Specimen Examined. Puszczkowo, 2.5 km NWW (JzPU: 74); X/2018; mixed forest (*Pi*, *Q*, *Cp*, *Ti*, *Co*); numerous specimens on *Botryobasidium isabellinum* basidioma on *Pi* log.

3.2.66. *Mycena amicta* (Fr.) Quél.

Specimen Examined. Near Puszczkowo (JzPU: 67); X/2018; nitrophilous vegetation in mixed forest (*Pi*, *Q*, *Cp*, *Ac.pl*); a few basidiomata on litter.

3.2.67. *Mycena citrinomarginata* Gillet

Specimens Examined. 1. StarePuszczkowo (PuPU: 54); XI/2018; oak-hornbeam forest; a few basidiomata on litter. 2. Łódź, 1 km N (GrPU: 205); X/2018; *Pi* forest; a few basidiomata on litter.

3.2.68. *Mycena inclinata* (Fr.) Quél.

Specimens Examined. 1. Wielkowieś, 0.8 km NNW (WyPU: 123K); X/2018; riparian forest; numerous basidiomata on a log of a deciduous tree. 2. Jarosławiec, 1.5 km NW (WiPU: 103); IX/2018; mixed forest (*Q*, *Pi*, *Cp*); numerous basidiomata on *Q* trunk.

3.2.69. *Mycena purpureofusca* (Peck) Sacc.; RL-V

Specimens Examined. Mosina, 3 km NWW (OGPU: 136); X/2018; mixed forest (*Q*, *Pi*, *Cp*); one basidioma on litter.



Figure 10 Basidiomata of *Mucronella flava* Corner on basidiomata of *Botryobasidium isabellinum* (Fr.) D. P. Rogers. Photography by Anna Kujawa.

3.2.70. *Mycena rosea* (Bull.) Gramberg

Specimen Examined. Rosnówko, 0.4 km W (WyPU: 177); XI/2018; mixed forest (*Pi*, *La*, *Fg*, *Q*); one basidioma on litter.

3.2.71. *Mycena viridimarginata* P. Karst.

Specimens Examined. **1.** Puszczykowo, 2.5 km NWW (JzPU: 74); X/2018; oak-hornbeam forest; a few basidiomata on *Pi* log. **2.** Jarosławiec, 1 km S (JzPU: 119); V/2018; oak-hornbeam forest; one basidioma on *Pi* log.

3.2.72. *Mycenastrum corium* (Guers.) Desv.; RL-V

Specimen Examined. Szreniawa, by the train platform (WiPU); X/2018; by the dirt road, near manure heap; one basidioma on soil.

3.2.73. *Naucoria badiolateritia* P. D. Orton; NICL

Specimen Examined. Jarosławiec, 1.5 km NW (WiPU: 103); X/2018; alder forest by the drying lake; very numerous basidiomata on soil.

Notes. In Poland also known from the vicinity of Nowy Dworek near Świebodzin (Gierczyk & Ślusarczyk, 2020).

3.2.74. *Panaeolus olivaceus* F. H. Møller

Specimen Examined. Wypalanki, 0.6 km SSE (WyPU: 166); X/2018; *Medicago sativa* crop near the forest margin; a few basidiomata on soil.

3.2.75. #*Peniophora lilacea* Bourdot & Galzin; RL-E

Specimen Examined. Wypalanki, 2 km S (WyPU: 179); XI/2018; mixed forest (*Q*, *Pi*, *Ac.ps*, *Fg*, *Fx*, *Co*); a few basidiomata on a branch of a deciduous tree.

3.2.76. *Peniophora lycii* (Pers.) Höhn. & Litsch.

Specimens Examined. **1.** Wypalanki, 2 km S (WyPU: 179); XI/2018; mixed forest (*Q*, *Pi*, *Ac.ps*, *Fg*, *Fx*, *Co*); a few basidiomata on a branch of a deciduous tree. **2.** Wielkawieś, 1.2 km NNW (WyPU: 124K); X/2018; mixed forest (*Pi*, *Q*, *Bt*, *Cp*, *Um*); a few basidiomata on a branch of a deciduous tree.

3.2.77. *Peniophora quercina* (Pers.) Cooke

Specimens Examined. **1.** Wielkawieś, 1.2 km NNW (WyPU: 124K); X/2018; mixed forest (*Pi*, *Q*, *Bt*, *Cp*, *Um*); a few basidiomata on *Q* branch. **2.** Łęczyca, 2.2 km NEE (PuPU: 4); XI/2018; riparian forest; a few basidiomata on *Q* branch. **3.** Puszczykowo, 1.5 km SEE (PuPU: 19); X/2018; *Q* forest; numerous basidiomata on *Q* branches. **4.** Jarosławiec, 1 km N (98, 99); IX/2018; mixed forest; a few basidiomata on *Q* branch.

3.2.78. *Peniophora rufomarginata* (Pers.) Bourdot & Galzin

Specimen Examined. Wypalanki, 1.5 km S (WyPU: 169); XI/2018; mixed forest (*Pi, La, Q, Fg*); numerous basidiomata on a branch of a deciduous tree.

3.2.79. *Peniophorella pubera* (Fr.) P. Karst.

Specimens Examined. **1.** Wypalanki, 2.2 km SSW (WyPU: 184); XI/2018; deciduous forest (*Q, Fg, Cp, Fx, Ac.pl*); a few basidiomata on a log of a deciduous tree. **2.** Mosina, 3 km NWW (OGPU: 136); X/2018; mixed forest (*Q, Pi, Cp*); a few basidiomata on Q log. **3.** Mosina, 2.5 NWW (OGPU: 90; by Lake Kociołek); IX/2018; mixed forest (*Fg, Q, Pi, Bt, Ac.ps*); a few basidiomata on a log of a deciduous tree.

3.2.80. *Phanerochaete laevis* (Fr.) J. Erikss. & Ryvarden

Specimens Examined. **1.** Wielkowieś, 0.6 km N (WyPU: 122K); X/2018; riparian forest, few basidiomata on a deciduous log. **2.** Wypalanki, 2 km S (WyPU: 179); XI/2018; mixed forest (*Q, Pi, Ac.ps, Fg, Fx, Co*); a few basidiomata on a deciduous log.

Notes. Wojewoda (2003a) cited a locality in Ludwikowo after Szulczewski (Szulczewski, 1931); however, in this paper, *Kneiffia laevis* (= *Cylindrobasidium evolvens*) is listed.

3.2.81. *Phellinus contiguus* (Pers.) Pat.

Specimen Examined. Rosnówko, 0.4 km W (WyPU: 177); XI/2018; mixed forest (*Pi, La, Fg, Q*); one basidioma on Q branch.

3.2.82. *Phlebia subochracea* (Bres.) J. Erikss. & Ryvarden, RL-Ex (Figure 11)

Specimen Examined. Jarosławiec, 1.5 km NW (WiPU: 103); X/2018; alder forest by the drying lake; a few basidiomata on *Al.gl* log.

Notes. Contemporarily in Poland known from Wigry NP (Halama & Romański, 2010) and Kampinos NP (Karasiński et al., 2015).



Figure 11 Old basidiomata of *Phlebia subochracea* (Bres.) J. Erikss. & Ryvarden. Photography by Anna Kujawa.

3.2.83. *Phlebiopsis gigantea* (Fr.) Jülich

Specimen Examined. Wypalanki, 1.6 km S (WyPU: 175); XI/2018; mixed forest (*Pi, Q, Fg, Um, Ti, Ac.pl*); *Pi* trunk.

3.2.84. *Phlebiopsis ravenelii* (Cooke) Hjortstam; RL-E

Specimens Examined. **1.** Wielkowieś, 0.6 km N (WyPU: 122K); X/2018; riparian forest, few basidiomata on a log of a deciduous tree. **2.** Wielkowieś, 1.2 km NNW (WyPU: 124K); X/2018; mixed forest (*Pi, Q, Bt, Cp, Um*); a few basidiomata on *Pi* log.

3.2.85. *Pholiota adiposa* (Batsch) P. Kumm. s. str.; RL-R

Specimens Examined. Wielkowieś, 1.2 km NNW (WyPU: 124K); X/2018; mixed forest (*Pi*, *Q*, *Bt*, *Cp*, *Um*); a few basidiomata on *Bt* log.

3.2.86. #*Pholiota cerifera* (P. Karst.) P. Karst.

Specimen Examined. Puszczykowo, 1 km E (PuPU; by Warta River); X/2018; riverside thickets; a few basidiomata on *Sa* log.

3.2.87. *Pholiota conissans* (Fr.) M. M. Moser; RL-E

Specimens Examined. **1.** Jarosławiec, 1.5 km NW (WiPU: 103); X/2018; alder forest by the drying lake; numerous basidiomata on *Al.gl* log. **2.** Łęczyca, 1.9 km E (PuPU: 8); X/2018; riverside tickets; a few basidiomata on *Sa* trunk.

3.2.88. *Pholiota limonella* (Peck) Sacc.; NICL

Specimen Examined. Mosina, 2.5 NWW (OGPU: 90; by Kociołek Lake); IX/2018; mixed forest (*Fg*, *Q*, *Pi*, *Bt*, *Ac.ps*); a few basidiomata *Al.g* (?) log.

3.2.89. *Pholiotina dasypus* (Romagn.) P.-A. Moreau; NICL

Specimen Examined. Górka, 1 km E (GrPU: 127); X/2018; nitrophilous vegetation by a dirt road in mixed forest, under *Rb*; a few basidiomata on litter.

3.2.90. *Pleurotus pulmonarius* (Fr.) Quél., RL-V

Specimens Examined. **1.** Wypalanki, 2.5 km S (WyPU: 183); XI/2018; mixed forest (*Q*, *Pi*, *Cp*, *Co*); a few basidiomata on *Prunus avium* log. **2.** Trzebaw, 1.8 km SWW (WyPU: 186); X/2018; mixed forest (*Cp*, *Q*, *Pi*, *Ti*); a few basidiomata on a log of a deciduous tree.

3.2.91. *Pluteus atromarginatus* (Konrad) Kühner

Specimens Examined. **1.** Puszczykowo, 1.5 km E (PuPU: 14); X/2018; *Pi* forest; one basidioma on *Pi* stump. **2.** Łódź (GrPU: 208); X/2018; *Pi* forest; one basidioma on *Pi* stump.

3.2.92. #*Pluteus cervinus* (Schaeff.) P. Kumm. f. *albus* Peck

Specimen Examined. Wielkowieś, 1.2 km NNW (WyPU: 124K); X/2018; mixed forest (*Pi*, *Q*, *Bt*, *Cp*, *Um*); a few basidiomata on *Bt* log.

Notes. In Poland known from Białowieża Primeval Forest (Gierczyk et al., 2013) and Kampinos NP (Karasiński et al., 2015).

3.2.93. *Polyporus badius* (Pers.) Schwein.

Specimens Examined. **1.** Jarosławiec, 1 km SE (JzPU: 115); VIII/2018; mixed forest; a few basidiomata on a log of a deciduous tree. **2.** Jarosławiec, 1.5 km NW (WiPU: 103); X/2018; alder forest by the drying lake; a few basidiomata on wood. **3.** Wielkowieś, 0.6–0.8 km N (WyPU: 122K, 123K); X/2018; riparian forest, few basidiomata on a log of a deciduous tree.

3.2.94. *Polyporus tuberaster* (Jacq. ex Pers.) Fr.; RL-R

Specimen Examined. Jarosławiec, 0.6 km SE (JzPU: 113); V/2018; deciduous forest; one basidioma on *Q* log.

3.2.95. *Polyporus varius* (Pers.) Fr.

Specimen Examined. Puszczykowo, 1.5 km E (PuPU: 14); X/2018; *Pi* forest; a few basidiomata on branches of deciduous trees.

3.2.96. *Porostereum spadiceum* (Pers.) Hjortstam & Ryvarden; RL-R

Specimen Examined. Puszczykowo, 1.5 km E (PuPU: 14); X/2018; floodplain terrace (*Sa*, *Po*, *Ac.ng*, *Q*); numerous basidiomata on a log of a deciduous tree.

3.2.97. *Postia tephroleuca* (Fr.) Jülich

Specimens Examined. 1. Puszczykowo, 1.7 km N (PuPU: 18); X/2018; mixed forest (Q, *Pi*, *Cp*, *Ac.pl*, *Ac.ps*); a few basidiomata on a log of a deciduous tree. 2. Wielkowieś, 0.6 km N (WyPU: 122K); X/2018; mixed forest (Q, *Pi*, *Um*, *Cp*, *Bt*), few basidiomata on a log of a deciduous tree. 3. Trzebaw, 1.3 km SSW (GrPU: 204); XI/2018; *Pi* forest; a few basidiomata on *Bt* branch.

3.2.98. *Psathyrella fibrillosa* (Pers.) Maire

Specimen Examined. Jarosławiec, 1.5 km NW (WiPU: 103); X/2018; alder forest by the drying lake; numerous basidiomata on soil and litter.

Notes. In Poland known from Babia Góra Mt (Bujakiewicz, 2004) and Jelonka NR (Kałużka, 2009).

3.2.99. *Psathyrella marcescibilis* (Britzelm.) Singer

Specimen Examined. Near Puszczykowo (JzPU: 69); X/2018; mixed forest (Q, *Pi*, *Ac.pl*, *Cp*); a few basidiomata on soil and litter.

3.2.100. *Psathyrella orbicularis* (Romagn.) Kits van Wav.

Specimen Examined. Górką, 0.6 km E (GrPU: 126A); X/2018; margin of the ploughed-up field; very numerous basidiomata on soil.

3.2.101. *Psathyrella panaeoloides* (Maire) M. M. Moser

Specimens Examined. 1. Near Puszczykowo (JzPU: 67); X/2018; nitrophilous vegetation at the mixed forest margin (*Pi*, Q, *Cp*); one basidioma on soil. 2. Górką, 1 km E (GrPU: 127); X/2018; nitrophilous vegetation by a dirt road in mixed forest, under *Rb*; a few basidiomata on litter.

3.2.102. *Psathyrella pannucioides* (J. E. Lange) M. M. Moser

Specimen Examined. Rosnówko, 1 km SWW (WyPU: 182); XI/2018; mixed forest (*Pi*, Q, *Fg*, *Um*, *Cp*, *Co*); a few basidiomata on soil.

Notes. In Poland known only from Lasy Łochowskie (Domański, 2001).

3.2.103. *Radulomyces molaris* (Fr.) M. P. Christ.

Specimens Examined. 1. Wielkowieś, 0.8 km NNW (WyPU: 123K); X/2018; mixed forest (*Pi*, Q, *Um*, *Cp*); a few basidiomata on a branch of a deciduous tree. 2. Rosnówko, 0.4 km W (WyPU: 177); XI/2018; mixed forest (*Pi*, *La*, *Fg*, Q); one basidioma on a branch of a deciduous tree.

3.2.104. *Resinicium furfuraceum* (Bres.) Parmasto; NICL

Specimen Examined. Puszczykowo, 2.5 km NWW (JzPU: 74); X/2018; mixed forest (Q, *Pi*, *Cp*, *Ti*, *Co*); a few basidiomata on *Pi* log.

Notes. In Poland known only from Kaszuby LP (Karasiński, 2016).

3.2.105. *Rhodocybe gemina* (Paulet) Kuyper & Noordel.; NICL

Specimen Examined. Wypalanki, 0.6 km SE (WyPU: 166; by Chomęcickie Lake); X/2018; nitrophilous vegetation by the lake; one basidioma on soil.

3.2.106. *Rigidoporus sanguinolentus* (Alb. & Schwein.) Donk

Specimen Examined. Puszczykowo, 1.5 km E (PuPU: 14); X/2018; *Pi* forest; a few basidiomata on *Pi* stump.

3.2.107. *Rigidoporus undatus* (Pers.) Donk

Specimen Examined. Jarosławiec, 1.5 km NW (WiPU: 103); X/2018; alder forest by the drying lake; a few basidiomata on *Al.g* log.

Notes. In Poland known only from Białowieża Primeval Forest (Karasiński & Wołkowycki, 2015; Niemelä, 2013) and Międzyrzec Podlaski (Eichler, 1904).

3.2.108. *Scopuloides rimosa* (Cooke) Jülich

Specimen Examined. Jarosławiec, 1.5 km NW (WiPU: 103); X/2018; alder forest by the drying lake; a few basidiomata on *Al.g* log.

3.2.109. *Simocybe centunculus* (Fr.) Singer var. *centunculus*

Specimen Examined. Puszczykowo, 2.5 km NWW (JzPU: 74); X/2018; oak-hornbeam forest; one basidioma on a log of a deciduous tree.

3.2.110. *Sistotrema athelioides* Hallenb. (Figure 12)

Specimen Examined. Rosnówko, 0.4 km W (WyPU: 177); XI/2018; mixed forest (*Pi, La, Fg, Q*); a few basidiomata on a branch of a deciduous tree.

Notes. Basidiomata effused, very thin, inconspicuous, athelioid, smooth, forming a greyish to cream-white pellicle on the substratum. Basidia usually six-spored. Spores thin-walled, smooth, hyaline, subcylindrical, $6-8 \times 3-4 \mu\text{m}$. Cystidia absent. Hyphae with clamps.

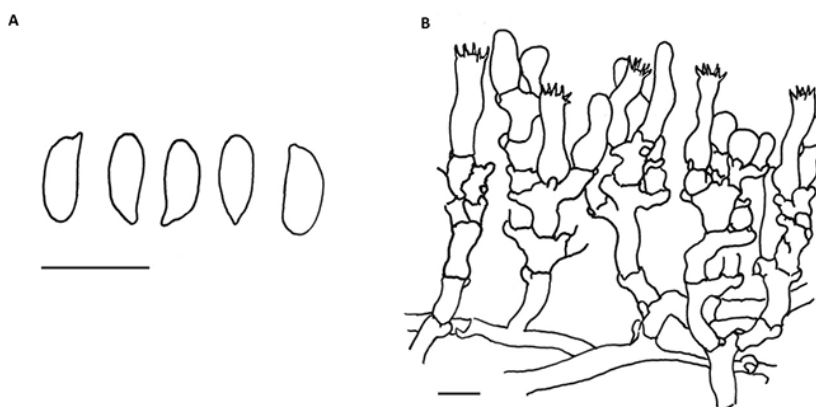


Figure 12 Microcharacters of *Sistotrema athelioides* Hallenb.: (A) spores; (B) basidia and hyphal system. Scale bars: 10 μm .

3.2.111. *Skeletocutis nivea* (Jungh.) Jean Keller

Specimens Examined. 1. Jarosławiec, 0.5 km N (WiPU: 109); IX/2018; mixed forest (*Pi, Q, Co*); a few basidiomata on a branch of a deciduous tree. 2. Rosnówko, 1 km SWW (WyPU: 182); XI/2018; mixed forest (*Pi, Q, Fg, Um, Cp, Co*); a few basidiomata on a branch of a deciduous tree.

3.2.112. *Steccherinum bourdotii* Saliba & A. David

Specimen Examined. Wypalanki, 2.2 km SSW (WyPU: 184); XI/2018; deciduous forest (*Q, Fg, Cp, Fx, Ac.pl*); numerous basidiomata on a branch of a deciduous tree.

3.2.113. *Stereum ochraceoflavum* (Schwein.) Sacc.

Specimens Examined. 1. Jarosławiec, 0.5 km N (WiPU: 109); IX/2018; mixed forest (*Pi, Q, Co*); numerous basidiomata on *Co* branches. 2. Wielkowieś, 1.2 km NNW (WyPU: 124K); X/2018; mixed forest (*Q, Pi, Cp, Bt, Um*); a few basidiomata on a branch of a deciduous tree.

3.2.114. *Trametes gibbosa* (Pers.) Fr.

Specimen Examined. Mosina, 2.5 NWW (OGPU: 90; by Kociołek Lake); IX/2018; mixed forest (*Fg, Q, Pi, Bt, Ac.ps*); a few basidiomata on *Fg* (?) log.

3.2.115. #*Trametopsis cervina* (Schwein.) Tomsovský; RL-E

Specimen Examined. Mosina, 3 km NWW (OGPU: 136); VIII/2018, X/2018; mixed forest (*Q, Pi, Cp*); a few basidiomata on *Pi* log.

3.2.116. #*Trechispora subsphaerospora* (Litsch.) Liberta; NICL

Specimen Examined. Wielkowieś, 0.8 km NNW (WyPU: 123K); X/2018; riparian forest; a few basidiomata on a branch of a deciduous tree.

Notes. In Poland known from Ochojec NR (Karasiński, 2009) and Kaszuby LP (Karasiński, 2016).

3.2.117. *Tulasnella eichleriana* Bres.

Specimen Examined. Wypalanki, 2.2 km SSW (WyPU: 184); XI/2018; deciduous forest (*Q, Fg, Cp, Fx, Ac.pl*); a few basidiomata on *Q* (?) log.

3.2.118. *Tulasnella violea* (Quél.) Bourdot & Galzin

Specimens Examined. 1. Wypalanki, 1.5 km S (WyPU: 169); XI/2018; mixed forest (*Pi, La, Q, Fg*); a few basidiomata on a branch of a deciduous tree. **2.** Wypalanki, 2 km S (WyPU: 179); XI/2018; mixed forest (*Q, Pi, Ac.ps, Fg, Fx, Co*); a few basidiomata on a branch of a deciduous tree.

3.2.119. *Xerocomus cisalpinus* Simonini, H. Ladurner & Peintner; NICL

Specimen Examined. Puszczkowo, 1.5 km E (PuPU: 14); X/2018; *Pi* forest, few basidiomata on soil.

Notes. In Poland known only from Biebrza NP (Kujawa, Wrzosek, et al., 2012) and Kampinos NP (Karasiński et al., 2015).

3.2.120. *Xerocomus ripariellus* Redeuilh; NICL

Specimen Examined. Wielkowieś, 0.8 km NNW (WyPU: 123K); X/2018; riparian forest; a few basidiomata on soil.

Notes. In Poland also known from Kampinos NP (Karasiński et al., 2015) and Poznań (Gierczyk & Ślusarczyk, 2020).

3.2.121. *Xylodon nesporii* (Bres.) Hjortstam & Ryvarden

Specimens Examined. 1. Jarosławiec, 0.7 km SE (JzPU: 114); VIII/2018; mixed forest (*Pi, Q, Cp*); a few basidiomata on *Pi* log. **2.** Wielkowieś, 0.6 km N (WyPU: 122K); X/2018; riparian forest; a few basidiomata on a log of a deciduous tree. **3.** Wypalanki, 2.5 km S (WyPU: 183); XI/2018; mixed forest (*Q, Pi, Cp, Co*); a few basidiomata on *Pi* log.

3.3. List of Taxa Reported from WPN Previously and Confirmed in 2018

3.3.1. Ascomycota

Adelphella babingtonii (Berk. & Broome) Pfister, Matočec & I. Kušan (103)²; *Ascocoryne cylichnium* (Tul.) Korf (49); *Bulgaria inquinans* (Pers.) Fr. (49, 177); *Encoelia furfuracea* (Roth) P. Karst. (74); *Hymenoscyphus scutula* (Pers.) W. Phillips (67); *Hypoxylon fuscum* (Pers.) Fr. (74); *Nectria cinnabarina* (Tode) Fr. (54); *Peziza micropus* Pers. (4); *Pezizella alniella* (Nyl.) Dennis; (122); *Rhytisma acerinum* (Pers.) Fr. (4); *Xylaria hypoxylon* (L.) Grev. (16, 49, 75, 123, 179, 183, 184, by Dymaczewskie Lake).

3.3.2. Basidiomycota

Amanita citrina (Schaeff.) Pers. f. *citrina* (14); *A. muscaria* (L.) Hook. var. *muscaria* (204); *Auricularia auricula-judae* (Bull.) J. Schröt. (14, 122, 136, 177); *Auriscalpium vulgare* Gray (54, 123); *Baeospora myosura* (Fr.) Singer (4, 14, 18, 49, 69, 74, 123, 184, 204); *Bjerkandera adusta* (Willd.) P. Karst. (4, 74, 90); *Bolbitius reticulatus* (Pers.) Ricken f. *aleuriatus* (Fr.) Enderle (49); *Botryohypochnus isabellinus* (Fr.) J. Erikss. (74); *Bovista nigrescens* Pers. (123); *Bulbillomyces farinosus* (Bres.) Jülich (14); *Calocera cornea* (Batsch) Fr. (75); *Ceraceomyces serpens* (Tode) Ginns (119, 179); *Chondrostereum purpureum* (Pers.) Pouzar (4, 14, 123); *Clitocybe nebularis* (Batsch) P. Kumm. var. *nebularis* (54, 74, 182); *C. odora* (Bull.) P. Kumm. var. *odora* (124); *Clitocybula platyphylla* (Pers.) Malençon & Bertault (90); *Clitopilus*

²Forest compartment numbers.

hobsonii (Berk.) P. D. Orton (49, 177, 183); *Conocybe echinata* (Velen.) Singer (166); *Coprinellus disseminatus* (Pers.) J. E. Lange (14, 184); *C. domesticus* (Bolton) Vilgalys, Hopple & Jacq. Johnson (116); *C. micaceus* (Bull.) Vilgalys, Hopple & Jacq. Johnson (49, 171); *C. xanthothrix* (Romagn.) Vilgalys, Hopple & Jacq. Johnson (14, 54, 124, 127, 169); *Coprinopsis atramentaria* (Bull.) Redhead, Vilgalys & Moncalvo (74); *Coprinus comatus* (O. F. Müll.) Pers. (69); *Crepidotus variabilis* (Pers.) P. Kumm. (4, 54, 75); *Dacrymyces stillatus* Nees (174); *Daedalea quercina* (L.) Pers. (35, 124); *Daedaleopsis confragosa* (Bolton) J. Schröt. (4, 14, 103, 108, 122, 204, between Górká and Trzebaw); *Datronia mollis* (Sommerf.) Donk (49, 122); *Echinoderma aspera* (Pers.) Bon (136); *Entoloma clypeatum* (L.) P. Kumm. var. *clypeatum* (208); *Exidia nigricans* (With.) P. Roberts (4, 90, 123, 124, 177, 179); *E. saccharina* (Alb. & Schw.) Fr. (74); *E. truncata* Fr. (74, 90, 176, 177); *Flammulina velutipes* (Curtis) P. Karst. var. *velutipes* (14, 49, 122, 123); *Fomes fomentarius* (L.) Fr. (4, 18, 49, 90, 103, 110, 122, 124, 179, 184, 211, 218, 219, 220, 221, near forest compartment No. 25, by Dymaczewskie Lake); *Fomitopsis pinicola* (Sw.) P. Karst. (83, 124); *Galerina hypnorum* (Schrank) Kühner s. Horak 2005 and de Haan & Walley 2006 (18); *G. marginata* (Batsch) Kühner s.l. (75, 122, 176); *G. triscopa* (Fr.) Kühner (74); *Ganoderma australe* (Fr.) Pat. (219); *G. lipsiense* (Batsch) G. F. Atk. (14, 18, 49, 74, 75, 90, 103, 119, 122, 124, 183, 219, by Dymaczewskie Lake); *Geastrum triplex* Jungh. s. auct. (91, by Dymaczewskie Lake); *Gloeophyllum trabeum* (Pers.) Murrill (85); *Gymnopilus penetrans* (Fr.) Murrill (4, 14, 18, 74, 179); *G. picreus* (Pers.) P. Karst. (75); *G. spectabilis* (Weinm.) A. H. Sm. (14); *Hapalopilus nidulans* (Fr.) P. Karst. (74, 83, 90); *Hebeloma mesophaeum* (Pers.) Quél. (166); *Hemipholiota populnea* (Pers.) Bon (28); *Heterobasidion annosum* (Fr.) Bref. s. l. (14, 74, 183, by Dymaczewskie Lake); *Hygrophoropsis aurantiaca* (Wulfen) Maire (4, 14, 18, 19, 74, 103, 169, 174, 175, 176, 184, 204, 208); *Hymenochaete rubiginosa* (Schrad.) Lév. (54, 65, 83, 113, 119, 122, 177); *Hyphoderma praetermissum* (P. Karst.) J. Erikss. & Å. Strid (183); *Hyphodontia sambuci* (Pers.) J. Erikss. (74, 110); *Hypholoma capnoides* (Fr.) P. Kumm. (14, 124); *H. fasciculare* (Huds.) Kumm. var. *fasciculare* (4, 14, 19, 47, 49, 74, 91, 122, 136, 170, 177, 178, 181, 182, 183, 184, 204, 205, 208); *H. lateritium* (Schaeff.) P. Kumm. (14, 124); *Infundibulicybe gibba* (Pers.) Harmaja (67); *Inonotus radiatus* (Sowerby) P. Karst. (74, 75, 103, 177); *Kuehneromyces mutabilis* (Schaeff.) Singer & A. H. Sm. (74); *Lactarius quietus* (Fr.) Fr. (19); *Laetiporus sulphureus* (Bull.) Murrill (83, 90, 103, 210, 222, between Górká and Trzebaw); *Lepiota cristata* (Bolton) P. Kumm. (29, 126); *Lepista nuda* (Bull.) Cooke (123); *L. sordida* (Schumach.) Singer (166); *Lycoperdon pyriforme* Schaeff. (49, 75, 90, 119, 123); *Macrolepiota excoriata* (Schaeff.) Wasser (222); *M. procera* (Scop.) Singer (14, 15, 115, 124, 127, 204, 210, between Górká and Trzebaw); *Macrotyphula filiformis* (Bull.) Rauschert (74); *Marasmius setosus* (Sowerby) Noordel. (18, 54); *Melanoleuca subpulverulenta* (Pers.) Métrod (124); *Mycena acicula* (Schaeff.) P. Kumm. (136); *M. capillaris* Peck. (54); *M. filipes* (Bull.) P. Kumm.; (4, 74, 204); *M. galericulata* (Scop.) Gray (14, 18, 19, 49, 74, 75, 90, 103, 113, 119, 122, 123, 126, 127, 170, 176, 177, 178, 179, 181, 182, 183, 184); *M. galopus* (Pers.) P. Kumm. (4, 67, 183, 208); *M. haematopus* (Pers.) P. Kumm. (18, 90, 123); *M. leptcephala* (Pers.) Gillet (74); *M. polyadelpa* (Lasch) Kühner (74); *M. polygramma* (Bull.) Gray (4, 54, 75, 124); *M. pseudocorticola* Kühner (49); *M. pura* (Pers.) P. Kumm. (123); *M. speirea* (Fr.) Gillet (183); *M. stipata* Maas Geest. & Schwobel (14, 74, 75, 126); *M. tintinabulum* (Fr.) Quél. (177); *M. vitilis* (Fr.) Quél. (49, 90, 123, 124, 179, 181); *M. zepirus* (Fr.) P. Kumm. (4, 14, 18, 49, 67, 169, 171, 175, 208); *Mycetinis querceus* (Britzelm.) Antonín & Noordel. (176); *Naucoria scolecina* (Fr.) Quél. (177); *N. subconspersa* Kühner (103); *N. submelinoides* (Kühner) Maire (14); *Neolentinus lepideus* (Fr.) Redhead & Ginns (90, 83, 108, 119); *Panaeolus cinctulus* (Bolton) Sacc. (166); *Panellus stipticus* (Bull.) P. Karst. (90); *Parasola conopilus* (Fr.) Örstadius & E. Larss. (123); *P. plicatilis* (Curtis) Redhead, Vilgalys & Hopple (127); *Paxillus involutus* (Batsch) Fr. s. l.; (4, 19, 204); *P. rubicundulus* P. D. Orton s. l. (166); *Peniophora cinerea* (Pers.) Cooke (114, 124); *Phaeolus schweinitzii* (Fr.) Pat. (18, 74); *Phanerochaete tuberculata* (P. Karst.) Parmasto (124); *Phellinus ferruginosus* (Schrad.) Pat. (85); *P. igniarius* (L.) Quél. s. l. (14, 103, by Dymaczewskie Lake, near Łódź forester lodge); *P. robustus* (P. Karst.) Bourdot & Galzin (36, 37, 74, 91, 98/104); *P. tuberculatus* (Baumg.) Niemelä (91); *Phlebia radiata* Fr. (19, 49, 74, 75, 122, 123, 126, 184); *P. rufa* (Pers.) M. P.

Christ. (126); *P. tremellosa* (Schrad.) Nakasone & Burds. (14, 18, 49, 75, 90, 177); *Pholiota lucifera* (Lasch) Quél. (123); *P. squarrosa* (Weigel) P. Kumm. (75, 122, 123); *Piptoporus betulinus* (Bull.) P. Karst. (87, 123, 124, 204, 208); *Pleurotus ostreatus* (Jacq.) P. Kumm. (4, 28, 49); *Plicatura crispa* (Pers.) Rea (183); *Pluteus cervinus* (Schaeff.) P. Kumm. f. *cervinus* (4, 14, 49, 74, 90, 99, 124, 175, 183, 184, 208, 211, by Dymaczewskie Lake); *P. podospileus* f. *minutissimus* (Maire) Vellinga (103); *P. salicinus* (Pers.) P. Kumm. (14); *Polyporus brumalis* (Pers.) Fr. (75); *P. squamosus* (Huds.) Fr. (90, 91, 160, 203, 218, 219, 220, 221); *Porodaedalea pini* (Brot.) Murrill (4, 14, 18, 19, 29, 49, 74, 91, 98, 99, 100, 101, 123, 136, 177); *Psathyrella candolleana* (Fr.) Maire (74); *P. corrugis* (Pers.) Konrad & Maubl. (124, 127, 169); *P. fatua* (Fr.) Konrad & Maubl. (126, 127); *P. microrrhiza* (Lasch) P. Kumm. (69, 170); *P. nolitangere* (Fr.) A. Pearson & Dennis (103, 179); *P. piluliformis* (Bull.) P. D. Orton (174, 183); *P. spadicea* (P. Kumm.) Singer (47, 204); *Radulomyces confluentis* (Chaillat) M. P. Christ. (177); *Ramaria stricta* (Pers.) Quél. (49); *Rhodocollybia butyracea* (Bull.) Lennox f. *asema* (Fr.) Antonín, Halling & Noordel (4, 49, 74, 170, 179); *Rickenella fibula* (Bull.) Raithel. (14, 18, 75, 179); *R. swartzii* (Fr.) Kuyper (67); *Russula cyanoxantha* (Schaeff.) Fr. (166); *R. ochroleuca* (Pers.) Fr. (54, 123); *Sarcomyxa serotina* (Pers.) P. Karst. (74, 75, 123, 183); *Schizophyllum commune* Fr. (90, 174); *Scleroderma citrinum* Pers. (90); *Serpula himantioides* (Fr.) P. Karst. (74, 136, 182, 183); *Sidera vulgaris* (Fr.) Miettinen (169); *Simocybe haustellaris* (Fr.) Watling (49); *Sparassis crispa* (Wulfen) Fr (46, 81); *Steccherinum ochraceum* (Pers. ex J. F. Gmel.) Gray (124); *Stereum hirsutum* (Willd.) Pers. (4, 14, 74, 123); *S. rugosum* Pers. (49, 91); *S. subtomentosum* Pouzar (90, 177); *Strobilurus tenacellus* (Pers.) Singer (36, 65, 113, 119, by Dymaczewskie Lake); *Stropharia coronilla* (Bull.) Quél. (126); *S. cyanea* (Bull.) Tuom. (68, 85); *Suillus granulatus* (L.) Roussel (75); *Tapinella atrotomentosa* (Batsch) Šutara (115); *Trametes hirsuta* (Wulfen) Pilát (14, 90, 122); *T. ochracea* (Pers.) Gilb. & Ryvarden (184); *T. versicolor* (L.) Pilát (4, 18, 90, 122, 123, 177, 183, 184); *Tremella mesenterica* Retz. (18, 49, 177); *Trichaptum abietinum* (Pers. ex J. F. Gmel.) Ryvarden (74, 110); *T. hollii* (J. C. Schmidt) Kreisel (4, 91, 183, 208); *Tricholoma terreum* (Schaeff.) P. Kumm. s. l. (75); *Tubaria furfuracea* (Pers.) Gillet s. l. (123, 127); *Typhula erythropus* (Pers.) Fr. (122); *Xylodon paradoxus* (Schrad.) Chevall. s. l. (74, 87, 114, 136, 179).

4. Discussion

Dry and warm summer in 2018 drastically limited the richness of fungi observed in the WPN. Remarkably poor fructification was noted for agaricoid fungi, e.g., no *Inocybe* or *Cortinari* specimens were collected. In total, 312 taxa of macrofungi were observed in the WPN in 2018. Among them, 140 have not been previously reported from the WPN. Five species have been collected for the first time in Poland (*Botryobasidium robustius*, *Hebeloma subtortum*, *Leccinum brunneogriseolum*, *Pachyella violaceonigra*, and *Sistotrema athelioides*). Another 26 taxa were new for the Wielkopolska region. Some taxa observed in the WPN are very rare and have been found in the recent years for the first time in Poland (e.g., *Crepidotus malachius* var. *trichifer*, *Leucogyrophana romelii*, and *Resinicium furfuraceum*) or were even recorded as new to Poland in 2018 from the Wielkopolska region, independently of the project conducted in the WPN (e.g., *Helicogloea lagerheimii*). Two taxa regarded as extinct in Poland (*Dendrothele dryina*, and *Phlebia subochracea*) were also collected in the Park. The current number of taxa known from the WPN is 975 (including those of uncertain status). The presented results and analysis of available data suggest that further studies should be focused on wood inhabiting fungi, especially the polyporoid and corticioid taxa, as well as on ascomycetes because the richness and diversity of these groups in the WPN are underestimated and are poorly known. The continuation of the studies in the WPN would also permit confirmation or verification of the occurrence of the taxa reported from this area in the first half of the twentieth century, which has not been observed again since then, e.g., *Auricularia mesenterica*, *Geastrum lageniforme*, *Gyromitra leucoxantha* (Jesse, 1947), *Clavulina amethystina* or *Discina ancilis* (Jesse, 1947; Teodorowicz, 1933); some historical data had already been confirmed in 2018 (e.g., the occurrence of *Botryohypochnus isabellinus*, *Macrolepiota excoriata*, and *Panaeolus cinctulus*). Depending on the weather conditions in the coming years,

the results of the planned field research may be miscellaneous, as the fungi growth and sporocarps development depend strongly on weather conditions. Regardless of the method of study, i.e., permanent plot, transect, or random route methods, the biology of fungi implies that the research duration should be of at least 5–6 years (Friedrich, 2008; Szczepkowski & Kujawa, 2018). Moreover, the extent of the area and high habitat diversity in the WPN suggest that even a few-year-long inventory will provide incomplete data on the fungal richness, chorology, and diversity. Therefore, independent, multifaceted mycological scientific projects should be initiated in the WPN.

Acknowledgments

The authors thank the management and staff of the WPN for their help during field works.

References

- Bałaży, S. (1982). Supplementary notes to the biology of *Cordyceps entomorrhiza* (Dicks. ex Fr.) Link and the morphology of its conidial stages. *Acta Mycologica*, 18(2), 231–238. <https://doi.org/10.5586/am.1982.019>
- Bałaży, S. (1988). Osobliwości i taksony nowe oraz szczególnie wartościowe elementy w przyrodzie żywej Wielkopolskiego Parku Narodowego [Curiosities, new taxa and particularly vulnerable elements of biota of Wielkopolska National Park]. In I. Dąbwska, S. Bałaży, & R. Pawła-Piwowarczyk (Eds.), *Wielkopolski Park Narodowy. Problemy ochrony i kształtowania środowiska przyrodniczego* [Wielkopolska National Park: Aspects of conservation and environment formation] (Vol. 6, pp. 125–138). Poznańskie Towarzystwo Przyjaciół Nauk.
- Baral, H. O., & Maron, G. (2005). *In Vivo Veritas. Over 10,000 scans of fungi and plants (microscopical drawings, water colour plates, macro- and micrographs), with materials on vital taxonomy and xerotolerance* [3rd ed., DVD]. Author-published.
- Bartkowski, T. (1972). Budowa wewnętrzna form strefy marginalnej na obszarze ostatniego zlodowacenia na Niżu Polskim [Internal structure of marginal zone forms in the area of last glaciation in the Polish Lowland]. *Poznańskie Towarzystwo Przyjaciół Nauk, Wydział Matematyczno-Przyrodniczy, Prace Komisji Geograficzno-Geologicznej*, 13, 27–66.
- Bas, C., Noordeloos, M. E., Kuyper, T. W., & Vellinga, E. C. (1988). *Flora Agaricina Neerlandica. Critical monographs on families of agarics and boleti occurring in the Netherlands* (Vol. 1). A. A. Balkema.
- Bas, C., Noordeloos, M. E., Kuyper, T. W., & Vellinga, E. C. (1990). *Flora Agaricina Neerlandica. Critical monographs on families of agarics and boleti occurring in the Netherlands* (Vol. 2). A. A. Balkema.
- Bas, C., Noordeloos, M. E., Kuyper, T. W., & Vellinga, E. C. (1995). *Flora Agaricina Neerlandica. Critical monographs on families of agarics and boleti occurring in the Netherlands* (Vol. 3). A. A. Balkema.
- Bas, C., Noordeloos, M. E., Kuyper, T. W., & Vellinga, E. C. (1999). *Flora Agaricina Neerlandica. Critical monographs on families of agarics and boleti occurring in the Netherlands* (Vol. 4). A. A. Balkema.
- Beker, H. J., Eberhardt, U., & Vesterholt, J. (2016). *Hebeloma* (Fr.) P. Kumm. Edizioni Tecnografica.
- Bernicchia, A. (2005). *Polyporaceae s. l.* Edizioni Candusso.
- Bernicchia, A., & Gorjón, S. P. (2010). *Corticaceae s. l.* Edizioni Candusso.
- Borowiec, S. (1971). Pararzędziny Wielkopolskiego Parku Narodowego [Pararendzinas of the Wielkopolska National Park]. *Sylvan*, 115(11), 37–46.
- Borowiec, S. (1973). *Związki między glebami i zespołami roślinnymi w Wielkopolskim Parku Narodowym* [Relations between soil and plant communities in the Wielkopolski National Park]. PWN.
- Breitenbach, J., & Kränzlin, F. (1984). *Fungi of Switzerland. Vol. 1. Ascomycetes*. Verlag Mycologia.
- Breitenbach, J., & Kränzlin, F. (1986). *Fungi of Switzerland. Vol. 2. Non Gilled Fungi. Heterobasidiomycetes, Aphyllophorales, Gastromycetes*. Verlag Mycologia.
- Breitenbach, J., & Kränzlin, F. (1991). *Fungi of Switzerland. Vol. 3. Boletes and Agarics (Part 1). Strobilomycetaceae and Boletaceae, Paxillaceae, Gomphidiaceae, Hygrophoraceae, Tricholomataceae, Polyporaceae (lamellate)*. Verlag Mycologia.

- Breitenbach, J., & Kränzlin, F. (1995). *Fungi of Switzerland. Vol. 4. Boletes and Agarics (Part 2). Entolomataceae, Pluteaceae, Amanitaceae, Agaricaceae, Coprinaceae, Bolbitiaceae, Strophariaceae*. Verlag Mycologia.
- Bresadola, G. (1903). Fungi polonici a cl. Viro B. Eichler lecti (Continuatio) [Polish fungi collected by Mr. B. Eichler (continuation)]. *Annales Mycologici*, 1(2), 97–131.
- Bujakiewicz, A. (1973). Udział grzybów wyższych w lasach łągowych i olesach Wielkopolski [Higher fungi in the alluvial and alder forests of Wielkopolska Province]. *Poznańskie Towarzystwo Przyjaciół Nauk, Wydział Matematyczno-Przyrodniczy, Prace Komisji Biologicznej*, 35(6), 335–423.
- Bujakiewicz, A. (1992). Stan zbadania grzybów macromycetes w Wielkopolskim Parku Narodowym [The current state of knowledge of macromycetes of Wielkopolska National Park]. *Proceedings of the conference "Przyroda Wielkopolskiego Parku Narodowego" ["Nature of Wielkopolska National Park"]*.
- Bujakiewicz, A. (2004). Grzyby wielkoowocnikowe Babiogórskiego Parku Narodowego [Macrofungi of the Babiogórski National Park]. In B. W. Wołoszyn, A. Jaworski, & J. Szwaagrzyk (Eds.), *Babiogórski Park Narodowy. Monografia Przyrodnicza* [Babia Góra National Park: Nature monograph] (pp. 215–257). Babiogórski Park Narodowy; Komitet Ochrony Przyrody PAN, Instytut Systematyki i Ewolucji Zwierząt PAN.
- Bujakiewicz, A., & Fiebich, R. (1991). *Grzyby wyższe (macromycetes) i śluzowce (myxomycota) zebrane w "Rezerwacie pod Dziadem" w Wielkopolskim Parku Narodowym* [Macromycetes and myxomycota of "Pod Dziadem" nature reserve in the Wielkopolska National Park] [Unpublished expertise]. Department of Plants Ecology and Environmental Protection, Faculty of Biology, Adam Mickiewicz University in Poznań.
- Bujakiewicz, A., & Fiebich, R. (1992). Udział ekologiczny grup macromycetes w płatach olsu w Wielkopolskim Parku Narodowym [Ecological groups of macromycetes in the wet alderwood of the Wielkopolska National Park]. *Acta Mycologica*, 27(1), 63–91. <https://doi.org/10.5586/am.1992.007>
- Bujakiewicz, A., & Fiebich, R. (1993). *Serpula himantoides* (Fr.) Bond. ex Parm. in Poland. *Acta Mycologica*, 28(2), 219–225. <https://doi.org/10.5586/am.1993.022>
- Bujakiewicz, A., & Szambelańczyk, K. (1997). *Uwagi do operatu ochrony grzybów wielkoowocnikowych Wielkopolskiego Parku Narodowego* [Comment to the protection plan of macromycetes of the Wielkopolska National Park] [Unpublished expertise]. Department of Plants Ecology and Environmental Protection, Faculty of Biology, Adam Mickiewicz University in Poznań.
- Chmiel, M. A. (1997). Miseczniki (Discomycetes) Parku Krajobrazowego "Lasy Janowskie" [Discomycetes of the Janów Forest Landscape Park]. In S. Radwan, B. Sałata, & M. Harasimiuk (Eds.), *Środowisko Przyrodnicze Parku Krajobrazowego "Lasy Janowskie"* [Natural environment of Lasy Janowskie Landscape Park] (pp. 65–73). Wydawnictwo UMCS.
- Chmiel, M. A. (2006). *Checklist of Polish larger Ascomycetes*. W. Szafer Institute of Botany, Polish Academy of Sciences.
- Consiglio, G., & Setti, L. (2008). *Il genere Crepidotus in Europa* [Genus *Crepidotus* in Europe]. A. M. B. Fondazione Centro Studi Micologici.
- Danielewicz, W., & Maliński, T. (1999). Materiały do znajomości rozmieszczenia purchawicy olbrzymiej *Langermannia gigantea* (Batsch: Pers.) Rostk. w zachodniej Polsce [Materials to knowledge of distribution of the *Langermannia gigantea* (Batsch: Pers.) Rostk. in the western Poland]. *Badania Fizjograficzne nad Polską Zachodnią, Seria B – Botanika*, 48, 239–248.
- Domański, S. (1955). *Grzyby kapeluszowe (Aphyllphorales, Agaricales) zebrane w Wielkopolskim Parku Narodowym w latach 1948–1952* [Aphyllphorales and Agaricales collected in the National Park of Great Poland in the years 1948–1952]. Poznańskie Towarzystwo Przyjaciół Nauk.
- Domański, S. (1960). Morfologia owocników *Polystictus tomentosus* (Fr.) Karst. var. *circinatus* (Fr.) Sart. et Maire występujących w Wielkopolskim Parku Narodowym w Ludwikowie [Morphology of the basidiocarps of *Polystictus tomentosus* (Fr.) Karst. var. *circinatus* (Fr.) Sart. et Maire growing in Ludwikowo in Wielkopolska National Park]. *Monographiae Botanicae*, 10(2), 107–132. <https://doi.org/10.5586/mb.1960.010>
- Domański, S. (1965). *Podstawczaki (Basidiomycetes). Bezblaszkowe (Aphyllphorales). Żagwiowate I (Polyporaceae I). Szczecinkowate I (Mucronoporaceae I)* [Basidiomycetes. Aphyllphorales. Polyporaceae I, Mucronoporaceae I]. PWN.
- Domański, S. (1991). *Podstawczaki (Basidiomycetes). Bezblaszkowe (Aphyllphorales). Skórnikowate (Stereaceae). Pucharkowate (Podoscyphaceae)* [Basidiomycetes. Aphyllphorales. Stereaceae, Podoscyphaceae]. PWN.

- Domański, S., Orłoś, H., & Skirgiełło, A. (1967). *Podstawczaki (Basidiomycetes). Bezblaszkowe (Aphylophorales). Żagwiowate II (Polyporaceae pileatae), szczeciniakowate II (Mucronoporaceae pileatae), lakownicowate (Ganodermataceae), bondarzewiowate (Bondarzewiaceae), boletkowate (Boletopsidaceae), ozorkowate (Fistulinaceae)* [Basidiomycetes. Aphylophorales. Polyporaceae II (pileatae), Mucronoporaceae II (pileatae), Ganodermataceae, Bondarzewiaceae, Boletopsidaceae, Fistulinaceae]. PWN.
- Domański, Z. (1997). *Nowe stanowiska rzadkich i interesujących grzybów w Polsce* [New localities of rare and interesting fungi in Poland]. Author-published.
- Domański, Z. (2001). *Grzyby Lasów Łochowskich* [Fungi of the Lasy Łochowskie Forest]. Author-published.
- Dzięczkowski, A. (1961). Purchawka olbrzymia (*Lasiosphaera gigantea* F. Šmarda = *Calvatia gigantea* Lloyd) w Polsce ze szczególnym uwzględnieniem stanowisk z Wielkopolski [The giant puff-bal (*Lasiosphaera gigantea* F. Šmarda = *Calvatia gigantea* Lloyd) in Poland with special references to stands in Major Poland]. *Przyroda Polski Zachodniej*, 5(1–4), 95–102.
- Eichler, B. (1904). Drugi przyczynek do flory grzybów okolic Międzyrzecza [Second contribution to mycoflora of the vicinity of Międzyrzec]. *Pamiętnik Fizyograficzny*, 18(3), 1–31.
- Fiebich, R. (1989). *Udział ekologicznych grup grzybów (macromycetes) w płatach olszyn w Wielkopolskim Parku Narodowym* [The share of ecological groups of fungi (macromycetes) in alder patches in the Wielkopolska National Park] [Unpublished master's thesis]. Department of Plants Ecology and Environmental Protection, Faculty of Biology, Adam Mickiewicz University in Poznań.
- Fiedotjew, M. (1936). Grzyby wyższe [Higher fungi]. *Wydawnictwo Okręgowego Komitetu Ochrony Przyrody na Wielkopolskę i Pomorze w Poznaniu*, 6, 16–21.
- Friedrich, S. (2008). Metody stosowane w badaniach grzybów wielkoowocnikowych (Macromycetes) [Methods used in the study of macrofungi (macromycetes)]. In W. Mułenko (Ed.), *Mykologiczne badania terenowe. Przewodnik metodyczny* [Mycological field studies: Methodological guide] (pp. 30–47). Wydawnictwo Uniwersytetu Marii Curie-Skłodowskiej.
- Gierczyk, B., Kujawa, A., Szczepkowski, A., & Karasiński, D. (2014). Materiały do poznania mykobioty Puszczy Białowieskiej [Materials to the knowledge of mycobiota of the Białowieża Primeval Forest]. *Przegląd Przyrodniczy*, 25(1), 3–36.
- Gierczyk, B., Kujawa, A., Szczepkowski, A., Ślusarczyk, T., Kozak, M., & Mleczek, P. (2015). XXI Wystawa Grzybów Puszczy Białowieskiej. Materiały do poznania mykobioty Puszczy Białowieskiej [21st Exhibition of Fungi of the Białowieża Forest. Materials to the knowledge of mycobiota of the Białowieża Primeval Forest]. *Przegląd Przyrodniczy*, 26(3), 10–50.
- Gierczyk, B., & Ślusarczyk, T. (2020). Materiały do poznania mykobioty Wielkopolski [Contribution to the knowledge of the mycobiota of Wielkopolska region]. *Przegląd Przyrodniczy*, 31(1), 3–83.
- Gierczyk, B., Ślusarczyk, T., Szczepkowski, A., & Kujawa, A. (2019). XXIV Wystawa Grzybów Puszczy Białowieskiej. Materiały do poznania mykobioty Puszczy Białowieskiej [24th Exhibition of Fungi of the Białowieża Forest. Materials to the knowledge of mycobiota of the Białowieża Primeval Forest]. *Przegląd Przyrodniczy*, 30(2), 3–32.
- Gierczyk, B., Soboń, R., Pachlewski, T., & Ślusarczyk, T. (2018). Contribution to the knowledge of mycobiota of the Western Sudety Mountains and Western Sudety Foothills (SW Poland). Part 1. *Acta Mycologica*, 53(2), Article 1106. <https://doi.org/10.5586/am.1106>
- Gierczyk, B., Szczepkowski, A., & Kujawa, A. (2013). XVIII Wystawa Grzybów Puszczy Białowieskiej [The XVIII Fungi Exposition of The Białowieża Forest]. *Parki Narodowe i Rezerваты Przyrody*, 32(2), 88–112.
- Gierczyk, B., Szczepkowski, A., Kujawa, A., & Ślusarczyk, T. (2019). Contribution to the knowledge of the fungal biota of Kampinos National Park (Poland). Part 3. *Acta Mycologica*, 54(2), Article 1129. <https://doi.org/10.5586/am.1129>
- Halama, M. (2016). *Agrocybe putaminum* (Agaricales, Basidiomycota), new for Poland. *Polish Botanical Journal*, 61(2), 293–299. <https://doi.org/10.1515/pbj-2016-0022>
- Halama, M., & Romański, M. (2010). Grzyby makroskopijne (macromycetes) [Macromycetes]. In L. Krzysztofak (Ed.), *Śluzowce Myxomycetes, grzyby Fungi i mszaki Bryophyta Wigierskiego Parku Narodowego* [Myxomycetes, Fungi and Bryophyta of Wigry National Park] (pp. 87–201). Stowarzyszenie “Człowiek i Przyroda”.
- Hansen, L., & Knudsen, H. (Eds.). (1992). *Nordic Macromycetes. Vol. 2. Polyporales, Boletales, Agaricales, Russulales*. Nordsvamp.

- Hansen, L., & Knudsen, H. (Eds.). (1997). *Nordic Macromycetes. Vol. 3. Heterobasidioid, aphyllorphoroid and gasteromycetoid genera*. Nordsvamp.
- Hansen, L., & Knudsen, H. (Eds.). (2000). *Nordic Macromycetes. Vol. 1. Ascomycetes*. Nordsvamp.
- Hausknecht, A. (2009). *Conocybe Fayod. Pholiotina Fayod*. Edizioni Candusso.
- Hohmeyer, H. (1986). Ein Schlüssel zu den europäischen Arten der Gattung *Peziza* L. [Key to the European species of the genus *Peziza* L.]. *Zeitschrift für Mykologie*, 52(1), 161–188.
- Jaklitsch, W. M. (2009). European species of *Hypocrea* Part I. The green-spored species. *Studies in Mycology*, 63, 1–91. <https://doi.org/10.3114/sim.2009.63.01>
- Jaklitsch, W. M. (2011). European species of *Hypocrea* part II: Species with hyaline ascospores. *Fungal Diversity*, 48(1), 1–250. <https://doi.org/10.1007/s13225-011-0088-y>
- Jesse, M. (1947). Grzyby wyższe Wielkopolskiego Parku Narodowego [Higher fungi of Wielkopolska National Park]. *Sprawozdania Poznańskiego Towarzystwa Przyjaciół Nauk*, 14, 94–95.
- Jülich, W. (1984). *Die Nichtblätterpilze, Gallertpilze und Bauchpilze. Aphyllorphorales, Heterobasidiomycetes, Gastromycetes* [The non-gilled, gelatinous and gasteroid fungi. Aphyllorphorales, Heterobasidiomycetes, Gastromycetes]. VEB Gustav Fischer Verlag.
- Kałużka, I. (2009). *Macrofungi in the secondary succession on the abandoned farmland near the Białowieża old-growth forest*. Polish Botanical Society. <https://doi.org/10.5586/mb.2009.001>
- Karasiński, D. (2009). Grzyby większe rezerwatu przyrody “Ochojec” [Macrofungi of the Ochojec Nature Reserve]. In J. B. Parusel (Ed.), *Rezerwat przyrody “Ochojec” w Katowicach (Górny Śląsk). Monografia naukowo-dydaktyczna* [“Ochojec” Nature Reserve in Katowice (Upper Silesia): Scientific and educational monograph] (pp. 86–103). Centrum Dziedzictwa Przyrody Górnego Śląska.
- Karasiński, D. (2016). Grzyby aphylloroidalne Kaszubskiego Parku Krajobrazowego. Tom. 1. Charakterystyka mykobioty [Aphylloroid fungi of the Kaszuby Landscape Park. Vol. 1. Characteristics of the mycobiota]. *Acta Botanica Cassubica Monographiae*, 7, 1–198.
- Karasiński, D., Kujawa, A., Gierczyk, B., Ślusarczyk, T., & Szczepkowski, A. (2015). *Grzyby wielkoowocnikowe Kampinoskiego Parku Narodowego* [Macrofungi of the Kampinos National Park]. Kampinoski Park Narodowy.
- Karasiński, D., & Wołkowycki, M. (2015). An annotated and illustrated catalogue of polypores (Agaricomycetes) of the Białowieża Forest (NE Poland). *Polish Botanical Journal*, 60(2), 217–292. <https://doi.org/10.1515/pbj-2015-0034>
- Knudsen, H., & Vesterholt, J. (Eds.). (2008). *Funga Nordica. Agaricoid, boletoid and cyphelloid genera*. Nordsvamp.
- Knudsen, H., & Vesterholt, J. (Eds.). (2012). *Funga Nordica. Agaricoid, boletoid, clavarioid, cyphelloid and gasteroid genera* (2nd ed.). Nordsvamp.
- Krygowski, B. (Ed.). (2007). *Mapa geomorfologiczna Niziny Wielkopolsko-Kujawskiej 1:300 000* [Geomorphological map of Wielkopolska-Kujawy Lowland 1:300 000]. Instytut Paleogeografii i Geoekologii Uniwersytetu im. Adama Mickiewicza w Poznaniu.
- Kujawa, A. (2017). Stan poznania różnorodności gatunkowej makrogrzybów w polskich parkach narodowych [Current status of knowledge on species diversity of macrofungi in Polish national parks]. *Roczniki Bieszczadzkie*, 25, 74–81.
- Kujawa, A. (2018). *Grzyby makroskopijne Polski w literaturze mykologicznej*. Retrieved July 25, 2019, from <http://www.grzyby.pl/grzyby-makroskopijne-Polski-w-literaturze-mikologicznej.htm>
- Kujawa, A., Gierczyk, B., Szczepkowski, A., Karasiński, D., Wołkowycki, M., & Wójtowski, M. (2012). Ocena obecnego stanu zagrożenia gatunków z rodzaju *Geastrum* w Polsce [Assessment of current threat level of species of the genus *Geastrum* in Poland]. *Acta Botanica Silesiaca*, 8, 5–42.
- Kujawa, A., Wrzosek, M., Domian, G., Kędra, K., Szkodziak, J., Rudawska, M., Leski, T., Karliński, L., Pietras, M., Gierczyk, B., Dynowska, M., Ślusarczyk, D., Kałużka, I., & Ławrynowicz, M. (2012). Preliminary studies of fungi in the Biebrza National Park (NE Poland). II. Macromycetes. *Acta Mycologica*, 47(2), 235–264. <https://doi.org/10.5586/am.2012.027>
- Ladurner, H., & Simonini, G. (2003). *Xerocomus s. l.* Edizioni Candusso.
- Lannoy, G., & Estades, A. (1995). *Monographie des Leccinum d'Europe* [Monograph of European *Leccinum* species]. Fédération Mycologique Dauphiné-Savoie.
- Lisiewska, M. (1961). *Badania nad grzybami wyższymi w grądach Wielkopolskiego Parku Narodowego i Promna pod Poznaniem* [Investigations on higher fungi in the *Quercus-Carpinetum* in the Wielkopolski National Park and Promno near Poznań]. Poznańskie Towarzystwo Przyjaciół Nauk.

- Lisiewska, M. (1965). Udział grzybów wyższych w grądach Wielkopolski [Higher fungi of the *Quercus-Carpinetum* of the Wielkopolska Province]. *Acta Mycologica*, 1, 169–268. <https://doi.org/10.5586/am.1965.012>
- Lisiewska, M. (2011). Grzyby wielkoowocnikowe (macromycetes) Wielkopolskiego Parku Narodowego [Macrofungi of the Wielkopolska National Park]. *Morena*, 15, 97–100.
- Lisiewska, M., & Madeja, J. (2003). Rozmieszczenie ściśle chronionych gatunków grzybów w Wielkopolsce [Distribution of strictly protected macrofungi in the Wielkopolska region]. *Badania Fizjograficzne nad Polską Zachodnią, Seria B – Botanika*, 52, 7–25.
- Ludwig, E. (2000). *Pilzkompendium. Band 1. Abbildungen. Die kleineren Gattungen der Makromyzeten mit lamelligem Hymenophor aus den Ordnungen Agaricales, Boletales und Polyporales* [Compendium of fungi. Part 1. Iconography. The species-poor genera of the macromycetes with lamellar hymenophore from the orders Agaricales, Boletales and Polyporales]. IHW-Verlag.
- Ludwig, E. (2001). *Pilzkompendium. Band 1. Beschreibungen. Die kleineren Gattungen der Makromyzeten mit lamelligem Hymenophor aus den Ordnungen Agaricales, Boletales und Polyporales* [Compendium of fungi. Part 1. Descriptions. The species-poor genera of the macromycetes with lamellar hymenophore from the orders Agaricales, Boletales and Polyporales]. IHW-Verlag.
- Ludwig, E. (2007a). *Pilzkompendium. Band 2. Abbildungen. Die größeren Gattungen der Agaricales mit farbigem Sporenpulver (ausgenommen Cortinariaceae)* [Compendium of fungi. Part 2. Iconography. The species-rich genera of the Agaricales with colored spore-print (except Cortinariaceae)]. Fungicon-Verlag.
- Ludwig, E. (2007b). *Pilzkompendium. Band 2. Beschreibungen. Die größeren Gattungen der Agaricales mit farbigem Sporenpulver (ausgenommen Cortinariaceae)* [Compendium of fungi. Part 2. Descriptions. The species-rich genera of the Agaricales with colored spore-print (except Cortinariaceae)]. Fungicon-Verlag.
- Ludwig, E. (2012a). *Pilzkompendium. Band 3. Abbildungen. Die übrigen Gattungen der Agaricales mit weißem Sporenpulver* [Compendium of fungi. Part 3. Iconography. The remaining genera of the Agaricales with white spore-print]. Fungicon-Verlag.
- Ludwig, E. (2012b). *Pilzkompendium. Band 3. Beschreibungen. Die übrigen Gattungen der Agaricales mit weißem Sporenpulver* [Compendium of fungi. Part 3. Descriptions. The remaining genera of the Agaricales with white spore-print]. Fungicon-Verlag.
- Ludwig, E. (2017a). *Pilzkompendium. Band 4. Abbildungen. Cortinariaceae (Galerina, Hebeloma, Hebelomina, Inocybe, Phaeogalera, Cortinarius Teil I mit den Untergattungen Cortinarius, Dermocybe, Leprocybe, Phlegmacium)* [Compendium of fungi. Part 4. Iconography. Cortinariaceae (*Galerina*, *Hebeloma*, *Hebelomina*, *Inocybe*, *Phaeogalera*, *Cortinarius* part I including sections: *Cortinarius*, *Dermocybe*, *Leprocybe*, *Phlegmacium*)]. Fungicon-Verlag.
- Ludwig, E. (2017b). *Pilzkompendium. Band 4. Beschreibungen. Cortinariaceae (Galerina, Hebeloma, Hebelomina, Inocybe, Phaeogalera, Cortinarius Teil I mit den Untergattungen Cortinarius, Dermocybe, Leprocybe, Phlegmacium)* [Compendium of fungi. Part 4. Descriptions. Cortinariaceae (*Galerina*, *Hebeloma*, *Hebelomina*, *Inocybe*, *Phaeogalera*, *Cortinarius* part I including sections: *Cortinarius*, *Dermocybe*, *Leprocybe*, *Phlegmacium*)]. Fungicon-Verlag.
- Matuszkiewicz, J. M. (Ed.). (2008). *Potential natural vegetation of Poland 1:300 000*. Instytut Geografii i Przestrzennego Zagospodarowania Polskiej Akademii Nauk.
- Mikšík, M. (2017). *Hřibovitě houby Evropy* [Boletoid fungi of Europe]. Svojtka & Co.
- Młynarek, A. (1971). Purchawica olbrzymia *Langermannia gigantea* (Batsch ex Pers.) Rostk. w Wielkopolskim Parku Narodowym [The fungus *Langermannia gigantea* (Batsch ex Pers.) Rostk. in the Wielkopolski National Park]. *Chrońmy Przyrodę Ojczystą*, 27(5), 45–46.
- Muńko, W., Majewski, T., & Ruszkiewicz-Michalska, M. (Eds.). (2008). *A preliminary checklist of micromycetes in Poland*. W. Szafer Institute of Botany, Polish Academy of Sciences.
- Nespiak, A. (1975). *Podstawczaki (Basidiomycetes). Bedłkowe (Agaricales). Zastónakowate (Cortinariaceae). Zastónak I (Cortinarius I)* [Basidiomycetes. Agaricales. Cortinariaceae. Cortinarius I]. PWN.
- Nespiak, A. (1981). *Podstawczaki (Basidiomycetes). Bedłkowe (Agaricales). Zastónakowate (Cortinariaceae). Zastónak II (Cortinarius II)* [Basidiomycetes. Agaricales. Cortinariaceae. Cortinarius II]. PWN.
- Nespiak, A. (1990). *Podstawczaki (Basidiomycetes). Bedłkowe (Agaricales). Zastónakowate (Cortinariaceae). Strzeziak (Inocybe)* [Basidiomycetes. Agaricales. Cortinariaceae. *Inocybe*]. PWN.

- Niemelä, T. (2013). *Grzyby poliporoidalne Puszczy Białowieskiej. Klucz do oznaczania wraz z opisami gatunków* [Polypores of the Białowieża Forest. Determination keys and species descriptions]. Białowieża Park Narodowy.
- Noordeloos, M. E. (2011). *Strophariaceae s. l.* Edizioni Candusso.
- Noordeloos, M. E., Bakker, H. C., & Linde, S. (2018). Boletales. In M. E. Noordeloos, T. W. Kuyper, I. Somhorst, & E. C. Vellinga (Eds.), *Flora agaricina neerlandica. Critical monographs on families of agarics and boleti occurring in the Netherlands* (Vol. 7, pp. 65–225). Candusso Editrice.
- Noordeloos, M. E., Kuyper, T. W., & Vellinga, E. C. (2001). *Flora Agaricina Neerlandica. Critical monographs on families of agarics and boleti occurring in the Netherlands* (Vol. 5). A. A. Balkema Publishers.
- Noordeloos, M. E., Kuyper, T. W., & Vellinga, E. C. (2005). *Flora Agaricina Neerlandica. Critical monographs on families of agarics and boleti occurring in the Netherlands* (Vol. 6). CRC Press.
- Parra, L. A. (2008). *Agaricus L. Allopsalliota Nauta & Bas. Part I.* Edizioni Candusso.
- Parra, L. A. (2013). *Agaricus L. Allopsalliota Nauta & Bas. Part II.* Candusso Edizioni s.a.s.
- Pawlak, B. (1977). *Macromycetes w lasach i borach mieszanych z udziałem dębu Wielkopolskiego Parku Narodowego* [Macromycetes of mixed forests with oaks in the Wielkopolska National Park] [Unpublished master's thesis]. Department of Plants Ecology and Environmental Protection, Faculty of Biology, Adam Mickiewicz University in Poznań.
- Pfuhl, F. (1896). Mitteilungen vom Posener Pilzmarkte [Messages from the Poznań mushroom market]. *Zeitschrift der Botanischen Abteilung Naturwissenschaftlicher Verein der Provinz Posen*, 2(3), 88–91.
- Pfuhl, F. (1898). Die Pilzflora im Jahre 1898 [The mushroom flora in 1898]. *Zeitschrift der Botanischen Abteilung Naturwissenschaftlicher Verein der Provinz Posen*, 5(2), 57–59.
- Raszka, B. (1994). Stanowisko purchawicy olbrzymiej *Langermannia gigantea* w Wielkopolskim Parku Narodowym [Locality of *Langermannia gigantea* in Wielkopolski National Park]. *Chrońmy Przyrodę Ojczystą*, 50(3), 70–72.
- Rozporządzenie Ministra Środowiska z dnia 9 października 2014 roku, w sprawie ochrony gatunkowej grzybów (Dz. U. z 2014 r., poz. 1408) [Regulation of the Minister of Environment dated November 9, 2014 on the legally protected fungi (Journal of Laws, 2014, item 1408)]. (2014). <http://prawo.sejm.gov.pl/isap.nsf/DocDetails.xsp?id=WDU20140001408>
- Ryvarden, L., Melo, I., & Niemelä, T. (2017). *Poroid Fungi of Europe* (2nd ed.). Fungiflora AS.
- Schumacher, T. (1990). *The genus Scutellinia (Pyronemataceae)*. AiO Print Ltd.
- Skirgiełło, A. (1976). Materiały do poznania rozmieszczenia geograficznego grzybów wyższych w Europie. V [Contributions to the knowledge of the geographical distribution of higher fungi in Europe. V]. *Acta Mycologica*, 12(2), 155–189. <https://doi.org/10.5586/am.1976.009>
- Skirgiełło, A. (1984). Materiały do poznania rozmieszczenia geograficznego grzybów wyższych w Europie. VI [Contributions to the knowledge of the geographical distribution of higher fungi in Europe. VI]. *Acta Mycologica*, 20(1), 129–157. <https://doi.org/10.5586/am.1984.012>
- Skirgiełło, A. (1998). *Podstawczaki (Basidiomycetes). Gołąbkowe (Russulales). Gołąbkowate (Russulaceae) II. Mleczaj (Lactarius)* [Basidiomycetes. Russulales. Russulaceae II. Milk-caps (*Lactarius*)]. Instytut Botaniki im. W. Szafera Polskiej Akademii Nauk.
- Skirgiełło, A. (2000). *Volvariella* genus in Poland. In G. Consiglio (Ed.), *Micologia 2000* (pp. 505–510). A. M. B. Fondazione Centro Studi Micologici.
- Skirgiełło, A., & Wosińska, A. (1963). O rozmieszczeniu jeleniaków (*Elaphomyces*) w Polsce [Elaphomyces distribution in Poland]. *Monographiae Botanicae*, 15, 361–371. <https://doi.org/10.5586/mb.1963.008>
- Skowrońska, J. (1986). *Obserwacje mikologiczne na doświadczalnej powierzchni grądowej w Wielkopolskim Parku Narodowym* [Mycological notes from experimental plot in hornbeam-oak forest in the Wielkopolska National Park] [Unpublished master's thesis]. Department of Plants Ecology and Environmental Protection, Faculty of Biology, Adam Mickiewicz University in Poznań.
- Solon, J., Borzyszkowski, J., Bidłasik, M., Richling, A., Badora, K., Balon, J., Brzezińska-Wójcik, T., Chabudziński, Ł., Dobrowolski, R., Grzegorzczak, I., Jodłowski, M., Kistowski, M., Kot, R., Krąż, P., Lechnio, J., Macias, A., Majchrowska, A., Malinowska, E., Migoń, P., ... Ziaja, W. (2018). Physico-geographical mesoregions of Poland: Verification and adjustment of boundaries on the basis of contemporary spatial data. *Geographia Polonica*, 91(2), 143–170. <https://doi.org/10.7163/GPol.0115>
- Susicka, M. (1994). *Udział grzybów (macromycetes) w fitocenozach łągi Violo odoratae-Ulmetum ((Weevers 1940) Doing 1962) i łągi wiązowego Ficario-Ulmetum campestris*

- (Matuszkiewicz 1982) w Rezerwacie Puszczykowskie Góry w Wielkopolskim Parku Narodowym [Fungi (macromycetes) in phytocenoses of *Viola odoratae*-*Ulmelum* ((Weevers 1940) Doing 1962) and *Ficario-Ulmelum campestris* (Matuszkiewicz 1982) in Puszczykowskie Góry nature reserve in the Wielkopolska National Park] [Unpublished master's thesis]. Department of Plants Ecology and Environmental Protection, Faculty of Biology, Adam Mickiewicz University in Poznań.
- Szczepkowski, A., & Kujawa, A. (2018). Grzyby wielkoowocnikowe [Macromycetes]. In A. Obidziński (Ed.), *Inwentaryzacja i waloryzacja przyrodnicza. Metody naziemne i geomatyczne* [Inventory and valorization of the natural environment: Geomatic and terrestrial methods] (pp. 162–174). Wydawnictwo Szkoły Głównej Gospodarstwa Wiejskiego.
- Szczepkowski, A., Kujawa, A., Karasiński, D., & Gierczyk, B. (2008). Grzyby zgromadzone na XIV Wystawie Grzybów Puszczy Białowieskiej [Fungi gathered for the XIV Fungi Exposition of the Białowieża Forest]. *Parki Narodowe i Rezerваты Przyrody*, 27(4), 115–133.
- Szulczewski, J. M. (1931). Przyczynek do zimowej flory Poznania i okolicy [Contribution to the knowledge on winter flora of Poznań and its surroundings]. *Kosmos, Seria A – Biologia*, 55, 233–248.
- Szyndlerówna, N. (1928). *Grzyby lasów Ludwikowa* [Fungi of the forests near Ludwikowo] [Unpublished master's thesis]. Institute of General Botany, Poznań University.
- Ślusarczyk, T. (2016). Grzyby makroskopijne Gryżyńskiego Parku Krajobrazowego [Macromycetes of Gryżyna Landscape Park]. In M. Maciantowicz (Ed.), *20 lat. Gryżyński Park Krajobrazowy. Monografia przyrodnicza* [20 years of Gryżyna Landscape Park: The nature monograph] (pp. 90–97). Zespół Parków Krajobrazowych Województwa Lubuskiego.
- Teodorowicz, F. (1932). Osobliwości flory grzybów wyższych w Wielkopolsce [Peculiarities of mushrooms flora of Poznań]. *Wydawnictwo Okręgowego Komitetu Ochrony Przyrody na Wielkopolskę i Pomorze w Poznaniu*, 3, 50–56.
- Teodorowicz, F. (1933). Grzyby zachodniej i południowej Polski w zbiorze Zakładu Botaniki Ogólnej Uniwersytetu Poznańskiego [The higher fungi in western and southern Poland as collected in the Institute of General Botany, University of Poznań]. *Wydawnictwo Okręgowego Komitetu Ochrony Przyrody Wielkopolski*, 4, 75–108.
- Wilczyńska, I. (1994). *Udział grzybów w fitocenozie łągi Astrantio-Fraxinetum w Rezerwacie Puszczykowskie Góry w Wielkopolskim Parku Narodowym* [Fungi in phytocenosis of *Astrantio-Fraxinetum* in Puszczykowskie Góry nature reserve in the Wielkopolska National Park] [Unpublished master's thesis]. Department of Plants Ecology and Environmental Protection, Faculty of Biology, Adam Mickiewicz University in Poznań.
- Wojewoda, W. (1977). Polish Dacrymycetales. II. *Calocera furcata* (Fr.) Fr. *Fragmenta Floristica et Geobotanica*, 23(1), 113–117.
- Wojewoda, W. (1979). Rozmieszczenie geograficzne grzybów tremelloidalnych w Polsce [The geographical distribution of the tremellaceous fungi in Poland]. *Acta Mycologica*, 15(1), 75–144. <https://doi.org/10.5586/am.1979.006>
- Wojewoda, W. (2002). *Amylocorticium subincarnatum* (Peck) Pouzar. In W. Wojewoda (Ed.), *Atlas of the geographical distribution of fungi in Poland* (Vol. 2, pp. 11–13). W. Szafer Institute of Botany, Polish Academy of Sciences.
- Wojewoda, W. (2003a). *Checklist of Polish larger Basidiomycetes*. W. Szafer Institute of Botany, Polish Academy of Sciences.
- Wojewoda, W. (2003b). Morphology of some rare and threatened Polish Basidiomycota. *Acta Mycologica*, 38(1–2), 3–20. <https://doi.org/10.5586/am.2003.001>
- Wojewoda, W., Kozak, M., Mleczko, P., & Karasiński, D. (2016). *Grzyby makroskopijne Gorców (Karpaty Zachodnie)* [Macrofungi of the Gorce Mts (Western Carpathians)]. Instytut Botaniki im. W. Szafera Polskiej Akademii Nauk.
- Wojewoda, W., & Ławrynowicz, M. (2006). Red list of the macrofungi in Poland. In Z. Mirek, K. Zarzycki, W. Wojewoda, & Z. Szelaż (Eds.), *Red list of plants and fungi in Poland* (pp. 54–70). W. Szafer Institute of Botany, Polish Academy of Sciences.
- Żukowski, W., Latowski, K., Jackowiak, B., & Chmiel, J. (1995). *Rośliny naczyniowe Wielkopolskiego Parku Narodowego* [The vascular plants of the Wielkopolska National Park]. Bogucki Wydawnictwo Naukowe.