



Article ID: 574  
DOI: 10.5586/am.574

**Publication History**  
Received: 2022-02-18  
Accepted: 2022-08-30  
Published: 2022-11-28

**Handling Editor**  
Anna Ronikier; W. Szafer  
Institute of Botany, Polish  
Academy of Sciences, Poland;  
<https://orcid.org/0000-0003-0193-8685>

**Authors' Contributions**  
AS: coordination of the work, field research, specimen identification, manuscript writing, and photographic documentation; BG: field research, specimen identification, and writing of the manuscript; AK: field research, specimen identification, photographic documentation, and correction of the manuscript; TŚ: field research, specimen identification, manuscript writing, and photographic documentation

**Funding**  
This study was financed by the Forest Fund of the Polish State Forests in 2021 as part of a project "Environmental changes after windfall and evaluation of the microsuccession of biota of organisms inhabiting fallen trees – Stage IV"

**Competing Interests**  
AS is the associate editor of *Acta Mycologica*; other authors: no competing interests have been declared.

**Copyright Notice**  
© The Author(s) 2022. 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 Fungi of the Kampinos National Park (Central Poland): Part 6 – With Particular Emphasis on the Species Occurring on Windthrown Areas

Andrzej Szczepkowski <sup>1\*</sup>, Błażej Gierczyk <sup>2</sup>, Anna Kujawa <sup>3</sup>, Tomasz Ślusarczyk<sup>4</sup>

<sup>1</sup>Institute of Forest Sciences, Warsaw University of Life Sciences – SGGW, Nowoursynowska 159, 02-776 Warsaw, Poland

<sup>2</sup>Faculty of Chemistry, Adam Mickiewicz University in Poznań, Uniwersytetu Poznańskiego 8, 61-614 Poznań, Poland

<sup>3</sup>Institute for Agricultural and Forest Environment, Polish Academy of Sciences, Bukowska 19, 60-809 Poznań, Poland

<sup>4</sup>Naturalists' Club, 1 Maja 22, 66-200 Świebodzin, Poland

\* To whom correspondence should be addressed. Email: [andrzej\\_szczepkowski@sggw.edu.pl](mailto:andrzej_szczepkowski@sggw.edu.pl)

## Abstract

We identified 17 species of fungi that are new to Kampinos National Park. Sixteen were found during surveys of areas damaged by a strong wind in 2017. The remaining species was found outside the windthrow area. Descriptions of four species new to Poland (*Cortinarius subcompar*, *Hyaloscypha quercicola*, *Hypocrea tremelloides*, and *Trechispora* aff. *invisitata*) are also provided. The current number of macromycetes taxa identified in Kampinos National Park is 1,654.

## Keywords

Ascomycota; Basidiomycota; fungal biota; ecological disturbance; windfall

## 1. Introduction

Kampinos National Park (KNP) is located in central Poland, west of Warsaw. The current number of macromycetes taxa identified in KNP is 1,637 (1,413 Basidiomycota and 224 Ascomycota) (Szczepkowski et al., 2022). KNP is one of the most mycologically explored areas in Poland. However, each year, new species of fungi have been reported for KNP (e.g., Gierczyk, Szczepkowski, et al., 2019; Marciszewska et al., 2020; Szczepkowski et al., 2021). After the forest was wind-damaged in the western part of KNP (summer 2017), a 4-year project surveying fungi on windthrown trees was undertaken (2018–2021). The survey has revealed many interesting findings concerning taxa of all lignicolous fungi and has identified new species of non-lignicolous fungi in KNP (Szczepkowski et al., 2021, 2022; Zaniewski et al., 2019).

This paper presents newly identified species of fungi in windthrow areas of KNP during the final year of the project (2021) and provides condensed information on their distribution in Poland. Additionally, one interesting fungal species, new to KNP, which was found outside the windthrow area, is included.

## 2. Material and Methods

The study involved two plots located in the Rózin and Grabina protective subdistricts/forest subdistricts (in Kampinos Protective District/Forest District).

The Grabina plot is located in an 84-year-old damaged stand dominated by *Pinus sylvestris*, with singly occurring *Populus tremula* and two birch species (*Betula pendula* and *B. pubescens*). The Rózin plot is located in an approximately 104-year-old damaged stand dominated by two oak taxa (*Quercus petraea* and *Q. ×rosacea*) with a 10% proportion of *B. pendula* and sparse *P. sylvestris* trees. Thirty windthrown trees, with 10 trees of each species (*Quercus* spp., *B. pendula*, and *P. sylvestris*), were extensively studied in the windfall plots. Detailed information on the study area and methods has been previously published (Szczepkowski et al., 2021, 2022; Zaniewski et al., 2019).

The collected specimens were identified using standard mycotaxonomical methods (Clemençon, 2009) by light microscopy. The dried material was rehydrated with 10% ammonia and stained with Congo red, Melzer reagent, cotton blue in lactophenol, and brilliant cresyl blue (CRB). All measurements were performed directly using a light microscope equipped with an oil immersion objective (×100). The spore dimensions were established from measurements of 50 randomly selected, well-formed spores (deformed or atrophied spores were excluded from the analysis). The 95% population limits for the mean were calculated, and the lower and upper values are given. For the other structures, extreme size values were presented. The dimensions of these structures were obtained after measuring 25 elements. Specimens were identified using the following monographs: *Buchwaldoboletus*, *Galerina*, *Inocybe*, *Mycenella*, *Russula* (Knudsen & Vesterholt, 2012), *Cortinarius* (Brandrud et al., 2012; Knudsen & Vesterholt, 2012; Moser, 2001), *Hyalorbilia* (Baral et al., 2020), *Hyaloscypha* (Raitviir, 2004), *Hypocrea* (Jaklitsch, 2011), *Ischmoderma* (Ryvarden et al., 2017), *Mollisia* (Baral & Marson, 2005), *Phellodon* (Hansen & Knudsen, 1997), *Ramaria* (Christan, 2008), *Tomentella* (Dämmrich, 2006; Kõljalg, 1996), and *Trechispora* (Bernicchia & Gorjón, 2010). Nomenclature was used according to these monographs. The forest compartment numbers were obtained from the Forest Data Bank (<https://www.bdl.lasy.gov.pl/>). Dried specimens were deposited in the fungarium of the Department of Forest Protection of the Warsaw University of Life Sciences – SGGW (WAML) and the private fungaria of Błażej Gierczyk (BGF) and Tomasz Ślusarczyk (TŚF). Each number represents a collection.

### 3. Results – List of the Species

In 2021, 16 species of fungi new to Kampinos National Park were found in wind-damaged areas affected by a strong wind in 2017. The remaining species of fungus was novel to KNP and was found outside the windthrow area.

Abbreviations: AK – Anna Kujawa; AS – Andrzej Szczepkowski; BG – Błażej Gierczyk; TŚ – Tomasz Ślusarczyk; FD – forest district; KNP – Kampinos National Park; LP – landscape park; NP – national park; PD – protective district/forest district; PSD – protective subdistrict/forest subdistrict; res. – nature reserve.

#### 3.1. Ascomycota

***Hyalorbilia fagi*** E. Weber, Baral & J. W. Guo. **Specimen examined:** KNP, Zaborówek, 1.5 km NNW, Leszno municipality, Kampinos PD, Rózin PSD, forest compartment No.: 258b; numerous ascomata on the trunk of the fallen *Quercus petraea*; 2021-09-04; leg., det. TŚ; TŚF 299/2021. **Notes:** The species have been distinguished recently. In Poland, only known from the vicinity of Śrem (Greater Poland) (Baral et al., 2020).

***Hyaloscypha quercicola*** (Velen.) Huhtinen. **Specimen examined:** KNP, Zaborówek, 1.5 km NNW, Leszno municipality, Kampinos PD, Rózin PSD, forest compartment No.: 258a; numerous ascomata on a branch of the fallen *Betula pendula*; 2021-10-09; leg., det. TŚ; TŚF 300/2021. **Notes:** Species hitherto not reported from Poland. Widely distributed, mentioned from Europe and North America (Raitviir, 2004). **Species description:** Apothecia small, cup-shaped, sessile, 0.2–0.4 mm in diameter, white, translucent. Margin and outside of receptacle covered with short, white hairs. Asci eight-spored, cylindric-clavate, 30–45 × 2–4 μm, without croziers and with non-amyloid apical pore. Paraphyses filiform. Spores cylindric-ellipsoid, sometimes slightly curved, aseptate, 6–11 × 2–3 μm, with small drops at each end.



**Figure 1** Stromata of *Hypocrea auranteffusa* from Kampinos National Park; October 9, 2021. Photography by A. Kujawa.

Ectal excipulum of textura prismatica. Hairs narrowly conical, aseptate, hyaline, thin-walled, smooth,  $30\text{--}50 \times 2\text{--}4 \mu\text{m}$ . From other Hyaloscypha with asci arising from simple septa and with finely warted hairs [*H. fuckelii* var. *alniseda* (Velen.) Huhtinen, *H. leucostigma* (Fuckel) Baral, *H. priapi* Velen., *H. tigillaris* (P. Karst.) Raitv.] distinguishes by non-amyloid apical pore of asci.

***Hypocrea auranteffusa*** Jaklitsch (Figure 1). **Specimen examined:** KNP, Zaborówek, 1.5 km NNW, Leszno municipality, Kampinos PD, Rózin PSD, forest compartment No.: 258b; numerous stromata on a branch of the fallen *Quercus* sp.; 2021-10-09; leg. AK, BG, det. BG; BGF0008267. **Notes:** Very rare species, in Poland hitherto reported from the Kaczawskie Foothills (Gierczyk, Soboń et al., 2018).

***Hypocrea tremelloides*** (Schumach.) Fr. (Figure 2). **Specimen examined:** KNP, Zaborówek, 1.5 km NNW, Leszno municipality, Kampinos PD, Rózin PSD, forest compartment No.: 258a; numerous stromata on a branch of the fallen *Quercus* sp.; 2021-10-09; leg. AK, det. BG; BGF0008279. **Notes:** Species not reported from Poland. Hitherto mentioned from Austria, Denmark, Italy, and the United Kingdom (Jaklitsch, 2011). **Species description:** Stromata lenticular, up to 3 mm in diameter, smooth, waxy gelatinous when young, pale flesh-colored, with age becoming darker (orange-brown to reddish-brown), with papillate, concolor ostioles. Surface hairs lacking. Spores bicellular, hyaline, verrucose, cells dimorphic: distal one  $2.7\text{--}4.2 \times 2.4\text{--}3.7 \mu\text{m}$ , broadly ellipsoid, proximal one  $3.5\text{--}5.4 \times 2.0\text{--}3.2 \mu\text{m}$ , oblong. The other species with hyaline, dimorphic spores and waxy appearance is *H. sambuci* Jaklitsch & Voglmayr; however, it is restricted to *Sambucus nigra*.

***Mollisia olivaceocinerea*** Svrček agg. **Specimen examined:** KNP, Zaborówek, 1.5 km NNW, Leszno municipality, Kampinos PD, Rózin PSD, forest compartment No.: 258b; numerous ascomata on a branch of the fallen *Quercus petraea*; 2021-09-04; leg., det. TŚ; TŚF 301/2021. **Notes:** Rare or overlooked species complex, in Poland hitherto known from Gryżyński LP (Ślusarczyk, 2019) and Żurawno res. (Ślusarczyk, 2020). Group of several taxa of the genus *Mollisia* with ectal excipulum staining green with NaOH, were recently transferred to the new genus *Phialocephala* W. B. Kendr. Certain identification is only possible based on morphological studies





**Figure 2** Stromata (young in left panel, mature in right panel) of *Hypocrea tremelloides* from Kampinos National Park; October 9, 2021. Photography by A. Kujawa.

of the culture of the anamorphic state and molecular methods (Crous et al., 2020; Gminder, 2012; Tanney et al., 2016; Tanney & Seifert, 2020).

### 3.2. Basidiomycota

***Buchwaldoboletus lignicola*** (Kallenb.) Pilát. (**Figure 3**). **Specimen examined:** KNP, Granica, 2 km N Kampinos municipality E, the Granica strictly protected area (Polish: Obszar Ochrony Ścisłej Granica), forest compartment No.: 169a; one basidioma on soil near sporocarps of *Phaeolus schweinitzii* (Fr.) Pat growing at the base old *Pinus sylvestris* in *Tilio-carpinetum tipicum*; 2021-08-12; leg., det. AS; WAML1068. **Notes:** It is not rare, known from approximately 20 localities published (Kujawa, 2022; Wojewoda, 2003) and one unpublished locality from Modrzewina res. (Szczepkowski, unpubl. data).

***Cortinarius orellanus*** Fr. **Specimen examined:** KNP, Zaborówek, 1.5 km NNW, Leszno municipality, Kampinos PD, Rózin PSD, forest compartment No.: 258; a few basidiomata on soil in an oak (*Quercus petraea* and *Q. × rosacea*) forest with a 10% proportion of *Betula pendula* and sparse *Populus tremula* and *Pinus sylvestris* trees; 2021-09-04; leg., det. TŚ; TŚF 302/2021. **Notes:** It is not rare, known from over 30 localities (Kujawa, 2022; Wojewoda, 2003).

***Cortinarius subcompar*** Bohus. (**Figure 4**). **Specimen examined:** KNP, Zaborówek, 1.5 km NNW, Leszno municipality, Kampinos PD, Rózin PSD, forest compartment No.: 258; a few basidiomata on soil in an oak (*Quercus petraea* and *Q. × rosacea*) forest with a 10% proportion of *Betula pendula* and sparse *Populus tremula* and *Pinus sylvestris* trees; 2021-09-04; leg., det. TŚ; TŚF 303/2021. **Notes:** Species not reported from Poland. Hitherto mentioned from Germany, Hungary, Norway, and Spain (Brandrud et al., 2012). **Species description:** Pileus 20–70 mm, convex, often slightly umbonate, silky fibrillose, ocher-grey to ocher-brown with bluish tinges, slightly hygrophanous. Lamellae emarginate, first bluish-grey, then yellowish-brown. Stipe 30–80 × 0.5–1.1 mm, with a bulb at the base, whitish fibrillose, with bluish tinges at apex, covered with very scanty veil remains. Flesh greyish, often bluish in the apex of the stem, taste mild, smell neutral. Basidiospores ovoid to ellipsoid, rusty brown, strongly verrucose, moderately dextrinoid, 7–9 × 4–5 μm. Basidia four-spored, with clamps. Pileipellis a cutis. There are some other similar species in section *Firmiores* (Fr.) Hennings. In deciduous woods grow: *C. alboviolaceus* (Pers.) Fr. with smaller basidiomata, brighter pileus, stipe without bulb, abundant universal velum and bigger spores, *C. turgidus* Fr. with stipe tapering at the base and bigger spores, *C. acutispissipes* Rob. Henry with more violet shades, stipe tapering at the





**Figure 3** Basidioma of *Buchwaldoboletus lignicola* adjacent to sporocarps of *Phaeolus schweinitzii* from Kampinos National Park; August 12, 2021. Photography by A. Szczepkowski.

base and bigger spores and *C. paralbocyanus* Eyssart. with smaller basidiomata, more violet shades, stipe without bulb and bigger spores.

***Galerina uncialis*** (Britzelm.) Kühner. **Specimen examined:** KNP, Zaborówek, 1.5 km NNW, Leszno municipality, Kampinos PD, Rózin PSD, forest compartment No.: 258a; a few basidiomata on soil among the mosses in *Quercus* sp. windthrow pit and soil of lower side root disc in oak forest; 2021-09-04; leg., det. BG; BGF0007955. **Notes:** It is rare in Poland, known from a few localities, e.g., the Babia Góra NP (Bujakiewicz, 1979, 2004, 2018), Buki nad Jeziorem Lutomskim res. (Bujakiewicz & Springer, 2009), near Gryżyna (Kujawa & Gierczyk, 2011b), the Izera Mts, the Kaczawskie Mts, Izerskie Foothills, Sudetes Foreland (Gierczyk, Soboń et al., 2018), and Poznań (Gierczyk & Ślusarczyk, 2020; Kujawa et al., 2020).

***Inocybe griseolilacina*** J. E. Lange. **Specimen examined:** KNP, Zaborówek, 1.5 km NNW, Leszno municipality, Kampinos PD, Rózin PSD, forest compartment No.: 258b; a few basidiomata on soil in *Betula pendula* windthrow pit in an oak forest; 2021-09-04; leg., det. BG; BGF0007959. **Notes:** It is not rare in Poland, known from over 20 localities (Kujawa, 2022; Wojewoda, 2003).

***Ischnoderma resinatum*** (Schrad.) P. Karst. (Figure 5). **Specimen examined:** KNP, Zaborówek, 1.5 km NNW, Leszno municipality, Kampinos PD, Rózin PSD, forest





**Figure 4** Basidiomata of *Cortinarius subcompar* from Kampinos National Park; September 4, 2021. Photography by T. Ślusarczyk.



**Figure 5** Basidiomata of *Ischnoderma resinatum* from Kampinos National Park; October 9, 2021. Photography by A. Szczepkowski.





**Figure 6** Basidiomata of *Phellodon confluens* from Kampinos National Park; September 4, 2021. Photography by A. Kujawa.

compartment No.: 258b; a few basidiomata on trunks of fallen *Quercus* sp.; 2021-10-09; leg. AS, det. AS; WAML1072, WAML1073. **Notes:** It is not rare in Poland, known from over 40 localities (Kujawa, 2022; Wojewoda, 2003).

***Mycenella lasiosperma*** (Bres.) Singer. **Specimen examined:** KNP, Zaborówek, 1.5 km NNW, Leszno municipality, Kampinos PD, Rózin PSD, forest compartment No.: 258b; one basidioma among the mosses on the soil of lower side root disc of *Betula pendula* windthrow in oak forest 2021-09-04; leg. AK, det. BG; BGF0007964. **Notes:** It is not rare in Poland, known from over 20 localities (Komorowska, 2005; Kujawa, 2022; Wojewoda, 2003).

***Phellodon confluens*** (Pers.) Pouzar. (**Figure 6**). **Specimen examined:** KNP, Zaborówek, 1.5 km NNW, Leszno municipality, Kampinos PD, Rózin PSD, forest compartment No.: 258b; several dozen basidiomata on soil in oak forest; 2021-09-04; leg. AK, BG, det. BG; BGF0007978, WAML1080. **Notes:** It is rare in Poland, known from seven localities: Kaszubski LP (Karasiński, 2016), Knyszyńska Forest (Kujawa et al., 2019), Olsztyn (Fiedorowicz, 2011; „Allenstein” Gramberg, 1923, as *Hydnum amicum* Quél.; „bei Allenstein” Neuhoff, 1933, as *Hydnum amicum* Quél.), Biebrza NP (Kujawa et al., 2012, 2015), Gryżyński LP (Ślusarczyk, 2019), Kłodnica (Flisińska, 2004), and Czernichów in the Little Beskids (Kujawa & Gierczyk, 2011a).

***Ramaria fennica*** (Peck) Schild. var. ***fumigata*** (**Figure 7**). **Specimen examined:** KNP, Zaborówek, 1.5 km NNW, Leszno municipality, Kampinos PD, Rózin PSD, forest compartment No.: 258b,a; numerous basidiomata on soil in an oak forest;





**Figure 7** Basidiomata of *Ramaria fennica* var. *fumigata* from Kampinos National Park; September 4, 2021. Photography by A. Kujawa.

2021-09-04; leg. BG, det. BG; BGF0007970, WAML1069. **Notes:** In Poland, the species hitherto known only from Kaszuby LP (Karasiński, 2016).

***Russula acrifolia*** Romagn. **Specimen examined:** KNP, Zaborówek, 1.5 km NNW, Leszno municipality, Kampinos PD, Rózin PSD, forest compartment No.: 258b; a few basidiomata on soil in oak forest; 2021-09-04; leg. BG, det. BG; BGF0007979. **Notes:** It is rare in Poland, known from six localities: Dolina Huczka res. (Ślusarczyk, 2020), Knyszyńska Forest (Kujawa et al., 2019), Poznań (Gierczyk & Ślusarczyk, 2020), the Gorce Mts (Wojewoda et al., 2016), Pieniny NP (Gumińska, 1999), and Przemyśl Foothills (Gierczyk, Szczepkowski, et al., 2018).

***Tomentella coerulea*** (Bres.) Höhn. & Litsch. **Specimen examined:** KNP, Zaborówek, 1.5 km NNW, Leszno municipality, Kampinos PD, Rózin PSD, forest compartment No.: 258a; a few basidiomata on branch of the fallen *Quercus* sp.; 2021-10-09; leg., det. TŚ; TŚF 304/2021. **Notes:** It is rare in Poland, known from a few localities: Białowieża NP (Faliński, & Mułenko, 1997; Holec et al., 2019), in the vicinity of Międzyrzec Podlaski (Bresadola, 1903, as *Odontia crinalis* Fr.; Eichler, 1907, as *Hypochnus coeruleus* Bres.; Flisińska, 2004); in the vicinity of Olkusz (Mleczek & Beszczyńska, 2015), and Bieszczady Mts (Domański et al., 1967; Gierczyk, Kujawa, et al., 2019; Kujawa et al., 2016). This species is mentioned from Kraków by Wojewoda (2003) with reference to the work of Wojewoda (1991), but it is not included in the quoted report.

***Trechispora* aff. *invisitata*** (H. S. Jacks.) Liberta. KNP, Łubiec, 2.5 km NW, Leszno municipality, Kampinos PD, Grabina PSD, forest compartment No.: 125a; a few basidiomata on a pine cone lying on the ground; 2021-10-10; leg. AK, det. BG;

BGF0008281. **Notes:** Species hitherto not reported from Poland. It is widely distributed, known from Belarus, Belgium, Denmark, Estonia, Finland, France, Germany, Italy, Spain, Sweden, and the United Kingdom (Bernicchia & Gorjón, 2010). **Species description:** Basidiomata effused, resupinate, thin, white with a farinaceous surface and slightly fibrillose margin. Hyphal system dimitic, generative hyphae clamped, short celled, skeletal hyphae in hyphal cords, with slightly thickened walls. Basidia four-spored. Spores ellipsoid to ovoid, verrucose, inamyloid,  $3.8\text{--}4.5 \times 3\text{--}3.5 \mu\text{m}$  (literature values are slightly higher:  $4.5\text{--}5.5 \times 3\text{--}4 \mu\text{m}$ ). Conidia ellipsoid,  $4.5\text{--}6 \times 4\text{--}5 \mu\text{m}$ , with distinct, rounded warts or lobes. Conidia ornamentation is a unique feature, making this fungus clearly distinct from other *Trechispora* species. The difference in spores size between literature data and values obtained for specimens from KNP needs further studies, i.e., if it is the effect of intraspecific diversity or it has a taxonomic consequences.

#### 4. Conclusions

During the course of the study on the windthrow area of KNP, 222 taxa were collected (identified to the level of species, forms, varieties, and, in a few cases, genera). Field research in KNP in 2021 yielded interesting mycological findings. Seventeen taxa new to KNP were noted comprising five ascomycetes and 12 basidiomycetes. One species (*Buchwaldoboletus lignicola*) was found in a strictly protected area in Granica. Sixteen species were found during studies of areas damaged by the gale in 2017. Some recorded fungi (for example *Hypocrea auranteffusa*, *Mollisia* cfr. *olivaceocinerea*, and *Ramaria fennica* var. *fumigata*) are rare in Poland, having hitherto been mentioned in single localities. Four species (*Cortinarius subcompar*, *Hyaloscypha quercicola*, *Hypocrea tremelloides*, and *Trechispora* aff. *invisitata*) have not been reported previously in Poland. The current number of macromycete taxa identified in KNP is 1,654 (1,425 Basidiomycota and 229 Ascomycota). Detailed results and analyses of the succession of fungal biota in wind-damaged areas will be presented in a separate publication.

#### References

- Baral, H.-O., & Marson, 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* [DVD] (3rd ed.). Author-published.
- Baral, H.-O., Weber, E., & Marson, G. (2020). *Monograph of Orbiliomycetes (Ascomycetes) based on vital taxonomy* (Pt. 1). National Museum of Natural History Luxembourg.
- Bernicchia, A., & Gorjón, S. P. (2010). *Corticaceae s. l.* Edizioni Candusso.
- Brandrud, T. E., Dima, B., & Schmidt-Stohn, G. (2012). *Cortinarius* species in acidophilous-eutrophic (but not calciphilous) oak forests of S Norway and Hungary. *Journal des J. E. C.*, 14, 7–26.
- Bresadola, G. (1903). Fungi polonici a cl. Viro B. Eichler lecti [Polish fungi collected by Mr. B. Eichler]. *Annales Mycologici*, 1(1), 65–96.
- Bujakiewicz, A. (1979). Fungi of Mount Babia Eastern. I. Mycoflora of forests. *Acta Mycologica*, 15(2), 213–294. <https://doi.org/10.5586/am.1979.012>
- Bujakiewicz, A. (2004). Grzyby wielkoowocnikowe Babiogórskiego Parku Narodowego [Macrofungi of the Babiogórski National Park]. In B. W. Wołoszyn, A. Jaworski, & J. Szwagrzyk (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. (2018). Grzyby wielkoowocnikowe Babiogórskiego Parku Narodowego [Macrofungi of the Babia Góra National Park]. In W. Mułenko & J. Holeksa (Eds.), *Grzyby Babiej Góry* [Fungi of Babia Góra Mt] (pp. 47–84). Babiogórski Park Narodowy.
- Bujakiewicz, A., & Springer, N. (2009). Udział macromycetes w lasach łęgowych rezerwatu “Buki nad Jeziolem Lutomskim” (nadleśnictwo Sieraków) [Macrofungi in carr forests of the “Buki nad Jeziolem Lutomskim” reserve (Sierakow Forest Inspectorate)]. *Badania Fizjograficzne Polski Zachodniej*, 58, 171–204.
- Christan, J. (2008). *Die Gattung Ramaria in Deutschland. Monografie zur Gattung Ramaria in Deutschland mit Bestimmungsschlüssel zu den europäischen Arten* [The genus *Ramaria* in Germany. Monograph of genus *Ramaria* in Germany with determination key of European taxa]. IHW-Verlag.

- Clemençon, H. (2009). *Methods for working with macrofungi. Laboratory cultivation and preparation of larger fungi for light microscopy*. IHW-Verlag.
- Crous, P. W., Cowan, D. A., Maggs-Kölling, G., Yilmaz, N., Larsson, E., Angelini, C., Brandrud, T. E., Dearnaley, J. D. W., Dima, B., Dovana, F., Fechner, N., García, D., Gené, J., Halling, R. E., Houbaken, J., Leonard, P., Luangsa-Ard, J. J., Noisripoom, W., Rea-Ireland, A. E., ... Groenewald, J. Z. (2020). Fungal planet description sheets: 1112–1181. *Persoonia: Molecular Phylogeny and Evolution of Fungi*, 45, 251–409. <https://doi.org/10.3767/persoonia.2020.45.10>
- Dämmrich, F. (2006). Studien der tomentelloiden Pilze in Deutschland – unter besonderer Berücksichtigung der Zeichnungen von Frau Dr. H. Maser aus den Jahren 1988–1994. Teil 1: Die Gattung *Tomentella* [The genus *Tomentella*: Standard of knowledge]. *Zeitschrift für Mykologie*, 72(2), 167–212.
- Domański, S., Gumińska, B., Lisiewska, M., Nespiak, A., Skirgiełło, A., & Truskowska, W. (1967). Mikoflora Bieszczadów Zachodnich. III (Baligród, 1962) [Mycoflora of the West Bieszczady. III]. *Acta Mycologica*, 3(1), 63–114. <https://doi.org/10.5586/am.1967.003>
- Eichler, B. (1907). Trzeci przyczynek do flory grzybów okolic Międzyrzecza [Third contribution to mycoflora of the vicinity of Międzyrzec]. *Pamiętnik Fizyograficzny*, 19, 3–40.
- Faliński, J. B., & Mułenko, W. (Eds.). (1997). *Cryptogamous plants in the forest communities of Białowieża National Park. Ecological atlas. (Project CRYPTO 4)*. Uniwersytet Warszawski.
- Fiedorowicz, G. (2011). Grzyby wielkoowocnikowe Olsztyna – gatunki chronione i zagrożone [Macrofungi (macromycetes) of Olsztyn City – Protected and endangered species]. In M. Ławrynowicz, M. Ruszkiewicz-Michalska, & I. Kałucka (Eds.), *Polskie tradycje użytkowania grzybów oraz ich ochrony wkładem do europejskiego dziedzictwa kultury. Streszczenia referatów i posterów* [Traditional use and protection of fungi in Poland: A contribution to the European cultural heritage. Proceedings] (p. 43). Sekcja Mikologiczna Polskiego Towarzystwa Botanicznego; Katedra Algologii i Mikologii Uniwersytetu Łódzkiego.
- Flisińska, Z. (2004). *Grzyby Lubelszczyzny. Wielkoowocnikowe podstawczaki (Basidiomycetes). 2* [Fungi of the Lublin region. Macromycetes (Basidiomycetes). 2]. Lubelskie Towarzystwo Naukowe.
- Gierczyk, B., Kujawa, A., Szczepkowski, A., Ślusarczyk, T., Pachlewski, T., Chachuła, P., & Domian, G. (2019). Macrofungi of the Bieszczady Mountains. *Acta Mycologica*, 54(2), Article 1124. <https://doi.org/10.5586/am.1124>
- 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., & Chachuła, P. (2018). Grzyby projektowanego Turnickiego Parku Narodowego i jego otuliny – wstępne wyniki badań [Fungi of the planned Turnicki National Park and its buffer zone – Preliminary research results]. In M. D. Boćkowski (Ed.), *Projektowany Turnicki Park Narodowy. Stan walorów przyrodniczych – 35 lat od pierwszego projektu parku narodowego na Pogórzu Karpackim* [The planned Turnicki National Park. The state of natural values after 35 years from the Park's first project] (pp. 176–227). Fundacja Dziedzictwo Przyrodnicze.
- 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>
- Gierczyk, B., & Ślusarczyk, T. (2020). Materiały do poznania mykobioty Wielkopolski [Contribution to the knowledge of the mycobiota of the Greater Poland]. *Przegląd Przyrodniczy*, 31(1), 3–83.
- Gminder, A. (2012). Studies in the genus *Mollisia* s. l. III: Revision of some species of *Mollisia* and *Tapesia* described by J. Velenovský (Part 2). *Czech Mycology*, 64(2), 105–126. <https://doi.org/10.33585/cmy.64201>
- Gramberg, E. (1923). Seltener Pilze Ostpreussens [Rare fungi of East Prussia]. *Zeitschrift für Pilzkunde*, 2(6), 132–136.
- Gumińska, B. (1999). Mikoflora Pienińskiego Parku Narodowego (część VII) [Mycoflora of the Pieniny National Park. Part 7]. *Fragmenta Floristica et Geobotanica Polonica*, 6, 179–187.
- Hansen, L., & Knudsen, H. (1997). *Nordic Macromycetes. Vol. 3. Heterobasidioid, aphyllorphoroid and gasteromycetoid genera*. Nordsvamp.
- Holec, J., Běťák, J., Dvořák, D., Kříž, M., Kuchařková, M., Krzyściak-Kosińska, R., & Kučera, T. (2019). Macrofungi on fallen oak trunks in the Białowieża Virgin Forest – Ecological role of trunk parameters and surrounding vegetation. *Czech Mycology*, 71(1), 65–89. <https://doi.org/10.33585/cmy.71105>



- Jaklitsch, W. M. (2011). European species of *Hypocrea* part II: Species with hyaline ascospores. *Fungal Diversity*, 48, 1–250. <https://doi.org/10.1007/s13225-011-0088-y>
- Karasiński, D. (2016). Grzyby afyloforoidalne Kaszubskiego Parku Krajobrazowego. Tom 1. Charakterystyka mykobioty [Aphyloporoid fungi of the Kaszuby Landscape Park. Vol. 1. Characteristics of the mycobiota]. *Acta Botanica Cassubica, Monographiae*, 7, 1–198.
- Knudsen, H., & Vesterholt, J. (Eds.). (2012). *Funga Nordica. Agaricoid, boletoid, clavarioid, cyphelloid and gastroid genera* (2nd ed.). Nordsvamp.
- Köljal, U. (1996). *Tomentella (Basidiomycota) and related genera in Temperate Eurasia*. Fungiflora.
- Komorowska, H. (2005). The genus *Mycenella* (Agaricales, Tricholomataceae) in Poland. *Polish Botanical Journal*, 50(1), 83–92.
- Kujawa, A. (2022). Grzyby makroskopijne Polski w literaturze mikologicznej [Macroscopic fungi of Poland in mycological literature]. Retrieved January 10, 2022, from <http://www.grzyby.pl/grzyby-makroskopijne-Polski-w-literaturze-mikologicznej.htm>
- Kujawa, A., & Gierczyk, B. (2011a). Rejestr gatunków grzybów chronionych i zagrożonych w Polsce. Część IV. Wykaz gatunków przyjętych do rejestru w roku 2008 [Register of protected and endangered fungi species in Poland. Part 4. A list of species recorded in 2008]. *Przegląd Przyrodniczy*, 22(1), 17–83.
- Kujawa, A., & Gierczyk, B. (2011b). Rejestr gatunków grzybów chronionych i zagrożonych w Polsce. Część V. Wykaz gatunków przyjętych do rejestru w roku 2009 [Register of protected and endangered fungi species in Poland. Part 5. A list of species recorded in 2009]. *Przegląd Przyrodniczy*, 22(4), 16–68.
- Kujawa, A., Gierczyk, B., Domian, G., Wrzosek, M., Stasińska, M., Szkodzik, J., Leski, T., Karliński, L., Pietras, M., Dynowska, M., Henel, A., Ślusarczyk, D., & Kubiak, D. (2015). Preliminary studies of fungi in the Biebrza National Park. Part IV. Macromycetes – New data and the synthesis. *Acta Mycologica*, 50(2), Article 1070. <https://doi.org/10.5586/am.1070>
- Kujawa, A., Gierczyk, B., Gryc, M., & Wołkowycki, M. (2019). Grzyby Puszczy Knyszyńskiej [Fungi of the Knyszyńska Forest]. Stowarzyszenie Przyjaciół Puszczy Knyszyńskiej Wielki Las; Park Krajobrazowy Puszczy Knyszyńskiej.
- Kujawa, A., Gierczyk, B., Kudławiec, B., Stokłosa, N., & Bujakiewicz, A. (2020). Macromycetes of the Palace Park in Poznań-Radojewo (Wielkopolska Region, Poland). *Acta Mycologica*, 55(1), Article 5513. <https://doi.org/10.5586/am.5513>
- Kujawa, A., Szczepkowski, A., Gierczyk, B., Ślusarczyk, T., Chachula, P., & Karasiński, D. (2016). Grzyby wielkoowocnikowe w Bieszczadzkim Parku Narodowym [Macromycetes of Bieszczady National Park]. In A. Górecki & B. Zemanek (Eds.), *Bieszczadzki Park Narodowy [Bieszczady National Park]* (pp. 199–210). Bieszczadzki Park Narodowy.
- Kujawa, A., Wrzosek, M., Domian, G., Kędra, K., Szkodzik, J., Rudawska, M., Leski, T., Karliński, L., Pietras, M., Gierczyk, B., Dynowska, M., Ślusarczyk, D., Kałucka, 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>
- Marciszewska, K., Szczepkowski, A., & Otręba, A. (2020). Black cherry (*Prunus serotina* Ehrh.) colonization by macrofungi in the fourth season of its decline due to different control measures in the Kampinos National Park. *Folia Forestalia Polonica, Series A – Forestry*, 62(1), 78–87. <https://doi.org/10.2478/ffp-2020-0009>
- Mleczko, P., & Beszczyńska, M. (2015). Macroscopic fungi of pine forests in the Olkusz Orebearing Region. In B. Godzik (Ed.), *Natural and historical values of the Olkusz Orebearing Region* (pp. 227–250). W. Szafer Institute of Botany, Polish Academy of Sciences.
- Moser, M. (2001). *Rare, debated and new taxa of the genus Cortinarius (Agaricales). Fungi non delineati raro vel haud perspete et explore descripti aut definite pictii, Pars XV*. Libreria Mykoflora.
- Neuhoff, W. (1933). Die Hymenomyceten Ostpreussens. Eine systematische Zusammenstellung [The Hymenomycetes of East Prussia. A systematic compilation]. *Unser Ostland*, 2(7), 317–397.
- Raitviir, A. (2004). Revised synopsis of the Hyaloscyphaceae. *Scripta Mycologica*, 20, 1–133.
- Ryvarden, L., Melo, I., & Niemelä, T. (2017). *Poroid fungi of Europe* (2nd ed.). Fungiflora.
- Szczepkowski, A., Gierczyk, B., Ślusarczyk, T., & Kujawa, A. (2021). Contribution to the knowledge of fungi of the Kampinos National Park (central Poland): Part 4 – With particular emphasis on the species occurring on windthrown trees. *Acta Mycologica*, 56, Article 5610. <https://doi.org/10.5586/am.5610>
- Szczepkowski, A., Gierczyk, B., Ślusarczyk, T., & Kujawa, A. (2022). Contribution to the knowledge of fungi of the Kampinos National Park (central Poland): Part 5 – With

- particular emphasis on the species occurring on windthrown trees. *Acta Mycologica*, 57, Article 572. <https://doi.org/10.5586/am.572>
- Ślusarczyk, T. (2019). Grzyby wielkoowocnikowe Gryżyńskiego Parku Krajobrazowego [Macromycetes of Gryżyna Landscape Park]. *Przegląd Przyrodniczy*, 30(1), 3–51.
- Ślusarczyk, T. (2020). Rzadkie i zagrożone grzyby wielkoowocnikowe w wybranych rezerwach Polski północnej i zachodniej [Rare and endangered macromycetes of selected reserves in north and west Poland]. *Przegląd Przyrodniczy*, 31(2), 90–108.
- Tanney, J. B., Douglas, B., & Seifert, K. A. (2016). Sexual and asexual states of same endophytic *Phialocephala* species of *Picea*. *Mycologia*, 108(2), 255–280. <https://doi.org/10.3852/15-136>
- Tanney, J. B., & Seifert, K. A. (2020). Mollisiaceae: An overlooked lineage of diverse endophytes. *Studies in Mycology*, 95, 293–380. <https://doi.org/10.1016/j.simyco.2020.02.005>
- Wojewoda, W. (1991). Changes in macrofungal flora of Cracow (S. Poland). *Veröffentlichungen des Geobotanischen Institutes der Eidgenössische Technische Hochschule, Stiftung Rübel, in Zürich*, 106, 150–161.
- Wojewoda, W. (2003). *Checklist of Polish larger Basidiomycetes*. W. Szafer Institute of Botany, Polish Academy of Sciences.
- 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, Polska Akademia Nauk.
- Zaniewski, P. T., Szczepkowski, A., Gierczyk, B., Kujawa, A., Ślusarczyk, T., & Fojcik, B. (2019). Pionowe różnicowanie bogactwa i składu gatunkowego myko-, lichen- i briobioty drzew powiatrolomowych w Kampinoskim Parku Narodowym [Vertical differentiation of the richness and species composition of the myco-, lichen-, and briobiota of windthrown trees in Kampinos National Park]. *Sylwan*, 163(12), 980–988. <https://doi.org/10.26202/sylwan.2019091>