ACTA MYCOLOGICA
Vol. 35 (1): 61–77
2000

Studies on the macromycetes of the Janów Forests Landscape Park (SE Poland)

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Flisińskah Z.: *Studies on the macromycetes of the Janów Forests Landscape Park (SE Poland)*. Acta Mycol. 35 (1): 61–77, 2000.

The article presents a list of 357 macromycetes species found so far in the Janów Forests Landscape Park (SE Poland), and takes into account their abundance in individual localities, categories of threat, and gives a preliminary mycological evaluation of the Park.

Key words: macromycetes, forest fungi, ecology, distribution, protected areas.

INTRODUCTION

The Janów Forests Landscape Park (39150 ha) is a part of the protected landscape area comprising Puszcza Solska and Sandomierska (Solska and Sandomierska Forests), and the valleys of the San and Vistula rivers. It is situated in the south-west part of the Lublin Province in the area of Kotlina Sandomierska (Sandomierska Basin) (Fig. 1). Its unique geological and water relations gave rise to an abundance of habitat configurations. Kotlina Sandomierska is a fault block depression filled with Miocene marine clay deposits that were then covered by Quaternary sands of fluvial and morainal origin. Due to air flows, these sands created numerous dunes and banks. They, in turn, led to creation of heavily inundated interior basins. Impervious clays gave rise to and then maintained marshes and swamps. They are also sustained in result of accumulation of precipitation and seepage of deep waters coming from Roztocze. The latter phenomenon is possible due to mild subsidence of hardly pervious Cretaceous and Tertiary rocks into Miocene clays and Pleistocene sands. Owing to these processes, the surface features of the area are numerous and complex, and led to creation of specific soils (boggy soils – ca. 20%, podzolic soils – ca. 80%, alluvial, brown and lessive soils – ca. 1%), as well as water relations and plant cover. Distribution of plants and communities on different soil types is dependent on the depth of ground

waters and the degree of their stagnation. Generally, the area of the Park is heavily inundated, with a complex river network and numerous ponds. Water basins and rivers together take almost 10% of the total area of the Park. Vast forest swamps occupy almost 20% of its surface.

Dry pine forests (*Vaccinio vitis-idaeae-Pinetum*) occupy areas with waters below 5 meters (sandy dunes). Areas with ground water at the level of 1 – 5 meters are dominated by fresh pine forests (*Leucobryo-Pinetum*, *Peucedano-Pinetum*), mainly with *Pinus sylvestris*, and sometimes with a share of *Abies alba* and *Picea abies*. More fertile areas are occupied by fir forests (*Abietetum polonicum*). Where ground waters oscillate around the surface level, moist oak-spruse forests (*Querco-Piceetum*) and marshy pine forests (*Vaccinio uliginosi-Pinetum*) prevail. Constantly inundated habitats or those where ground waters are at the level of ca. 50 cm are occupied by high moors (*Ledo-Sphagnetum magellanici*, *Sphagnetum magellanici*, *Eriophoro-Sphagnetum recurvi*) and transitional moors of the *Scheuchzerio-Caricetea-Fuscae* class (*Caricetum limosae*, *C. diandrae* and others), as well as by communities of high sedges of the *Molinio-Arrhenatheretea* class and bog alder forests of the *Alnetea glutinosae* class. Fragments of river-side alluvial areas are covered by reverine forests of *Alno-Padion* type. Dry alluvial soils and brown soils that originated from loamy sands, with ground waters at the level of 100 – 200 cm, are occupied by oak-hornbeam forests of the *Querco-Fagetea* class with *Quercus robur*, *Carpinus betulus*, and less frequently *Abies alba* and *Fagus sylvatica*.

The biggest value of the Park are natural or almost natural vast forests that in many areas retained their primeval character, especially those with mountains species – *Abies alba*, *Acer pseudoplatanus*, *Fagus sylvatica*, *Picea abies*. Vast high moors and transitional bogs, and other plant communities are also very precious. In total, 202 species were identified in the Park (F i j a ł k o w s k i 1997).

Particularly valuable areas have been given legal protection. Six reserves were created: Imielty Ług, Jastkowice, Kacze Błota, Lasy Janowskie, Łęka, Szklarnia, as well as an area of ecological interest – Bagno Rakowskie (Fig. 1).

Lasy Janowskie (2673 ha) – a natural and historical reserve, the biggest of all six. It comprises areas alongside the Branew River. A monument to commemorate the II World War partisan warfare has been erected in its eastern part. Diverse plant communities appear here. The prevailing ones are coniferous forests with *Pinus sylvestris*, *Abies alba* and *Picea abies* (*Leucobryo-Pinetum*, *Molinio-Pinetum*, *Querco-Piceetum*, *Abietetum polonicum*, *Festuco ovinae-Pinetum*). Less frequent or appearing only fragmentarily are marshy pine forests (*Vaccinio uliginosi-Pinetum*), and oak-hornbeam forests (*Tilio-Carpinetum*) with *Tilia cordata*. In total, 150 plant species were identified here (F i j a ł k o w s k i and P o l s k i 1990) and 177 macromycetes species were collected (F l i s i ń s k a 2000a). Localities of some interesting macromycetes species were described by F l i s i ń s k a (1997b), and F l i s i ń s k a and S a ł a t a (1998).

Imielty Ług (802 ha) – a water and peat-bog reserve comprising natural ponds, a large and magnificently formed high moor, and diverse pine forest. The prevailing plant communities are subsequently: *Leucobryo-Pinetum, Ledo-Sphagnetum, Eriophoro-Sphagnetum, Molinio-Pinetum, Vaccinio uliginosi-Pinetum* with *Abies alba* and *Caricetum limosae*. In total, 115 plant species and 122 macromycetes species have been identified here so far (Fijałkowski et al. 1992). Moreover, some rare macromycetes species found in the reserve were described by Flisińska (1997b), and Flisińska and Sałata (1998).

Łęka (378 ha) – a plant reserve with diverse water and trophic conditions. It is heavily inundated and hardly accessible throughout the year. Riverside floodplain forests, bog-alder forests, mixed coniferous forests, and oak-hornbeam forests are to be found here. Dominating communities are subsequently: *Querco-Piceetum, Circaeo-Alnetum, Tilio-Carpinetum, Leucobryo-Pinetum, Molinio-Pinetum, Vaccinio uliginosi-Pinetum*. As far as the trees are concerned, the dominating species are: *Pinus sylvestris, Quercus robur, Abies alba, Picea abies, Alnus glutinosa, Fraxinus excelsior*. Less frequent are: *Fagus sylvatica, Carpinus betulus, Betula pendula*. Particularly interesting are self-sowing *Acer pseudoplatanus, Fraxinus excelsior*, and *Ulmus laevis*. In total, 89 plant species were identified here (Fijałkowski, Adamczyk and Polski 1991), and 176 macromycetes species were identified (Flisińska 2000b). Information on several rare macromycetes species found in the reserve is given in Flisińska (1997b), and Flisińska and Sałata (1998).

Szklarnia (278 ha) – a plant reserve with well-preserved stand of old firs (*Abies alba*) growing in a fir forest (*Abietetum polonicum*) and a moist oak-spruce forest (*Querco-Piceetum*). *Alnus glutinosa* and *Picea abies* are also numerous. Singular representatives of *Quercus robur, Fagus sylvatica* and others are to be found as well. Dominating communities are also *Molinio-Pinetum, Leucobryo-Pinetum* and *Caricetum elatae*. The area includes also transitional moors and vast marshes with dominating rushes communities. In total, 68 plant species (Fijałkowski, Mucha and Polski 1990), and 136 macromycetes species (Flisińska 1999) were identified here. Information on several rare macromycetes species found in the reserve is given in Flisińska (1997b), and Flisińska and Sałata (1998).

Kacze Błota (168 ha) – a forest and peat-bog reserve comprising a vast high moor and fragments of a transitional moor. The moors are encircled by forests (*Vaccinio uliginosi-Pinetum, Molinio-Pinetum, Leucobryo-Pinetum*). The central and most inundated part has been crosscut with drainage ditches. Due to the lowering of ground water level, the moors have started to overgrow with trees. In total, 41 plant species (Fijałkowski and Wawer 1994) were identified here. There is no data on macromycetes species in the Kacze Błota reserve yet.

Jastkowice (46 ha) – a forest reserve comprising a well preserved oak-hornbeam forest (*Tilio-Carpinetum*) with *Abies alba, Fagus sylvatica, Quercus petraea, Tilia cordata* that renew themselves in a natural way here.

In total, 8 plant species (Szynal and Izdebska 1970) and 167 macromycetes species (Flisińska 1997c) were identified.

Bagno Rakowskie (618 ha) – the area was planned as a forest and peat-bog reserve, but finally it was classified as an area of ecological interest. It includes an inundated basin. The bottom of the basin is occupied by transitional moors of the *Scheuchzerio-Caricetea fuscae* class. The west and north-west parts include high moors of the *Oxycocco-Sphagnetea* class. From south and north they border with coniferous forests (*Vaccinio uliginosi-Pinetum, Abietetum polonicum, Querco-Piceetum, Molinio-Pinetum, Leucobryo-Pinetum*). In total, 103 plant species and 98 macromycetes species were identified here (Fijałkowski et al 1992).

First information on higher fungi from this forest region comes from the end of last century (Błoński 1896, Gordziałowski 1899) and is very scarce – each of the two authors identified 13 species. Further data appeared only ca 100 years later as a result of my preliminary studies carried out with a group of botanists (Fijałkowski et al 1992a; Fijałkowski et al 1992b). The observations gave an incentive to continue the research.

This article provides quantitative and qualitative data on fungi found in the Janów Forests Landscape Park – an area never studied from the point of view of mycology.

MATERIALS AND METHODS

Field research was carried out in the Janów Forests Landscape Park in the years 1994–1998. It included the area of ecological interest Bagno Rakowskie, as well as the reserves: Imielty Ług, Jastkowice, Kacze Błota, Lasy Janowskie, Łęka and Szklarnia. The route method was applied and collections were made during the whole vegetation season in accordance with principles applied in mycological studies. Abundance of fruit-bodies was determined according to the three-grade scale: r – rarus, n – numerous, a – abundans (Jahn, Nespiak and Tüxen 1967). Observations in individual localities were carried out usually for three years and the results were revealed subsequently (Flisińska 1996, 1997a, 1997b, 1997c, 1999, 2000a, 2000b; Flisińska and Sałata 1998).

The paper includes all information (published and unpublished) from 1896–1998 on macrofungi and their localities (Fig. 1, Table 1). Collections from occasional localities (Kalenne, Szewce) and from those quoted by Błoński (1896) and Gordziałowski (1899) were included together under the "other" heading (Table 1). Basing on the data gathered, a systematic list (alphabetically within orders) was compiled. Species that were found in singular localities and assessed as rare in the Park were marked in bold (Table 1).

Nomenclature for most of the species was adopted after Jülich (1984) and Moser (1983).

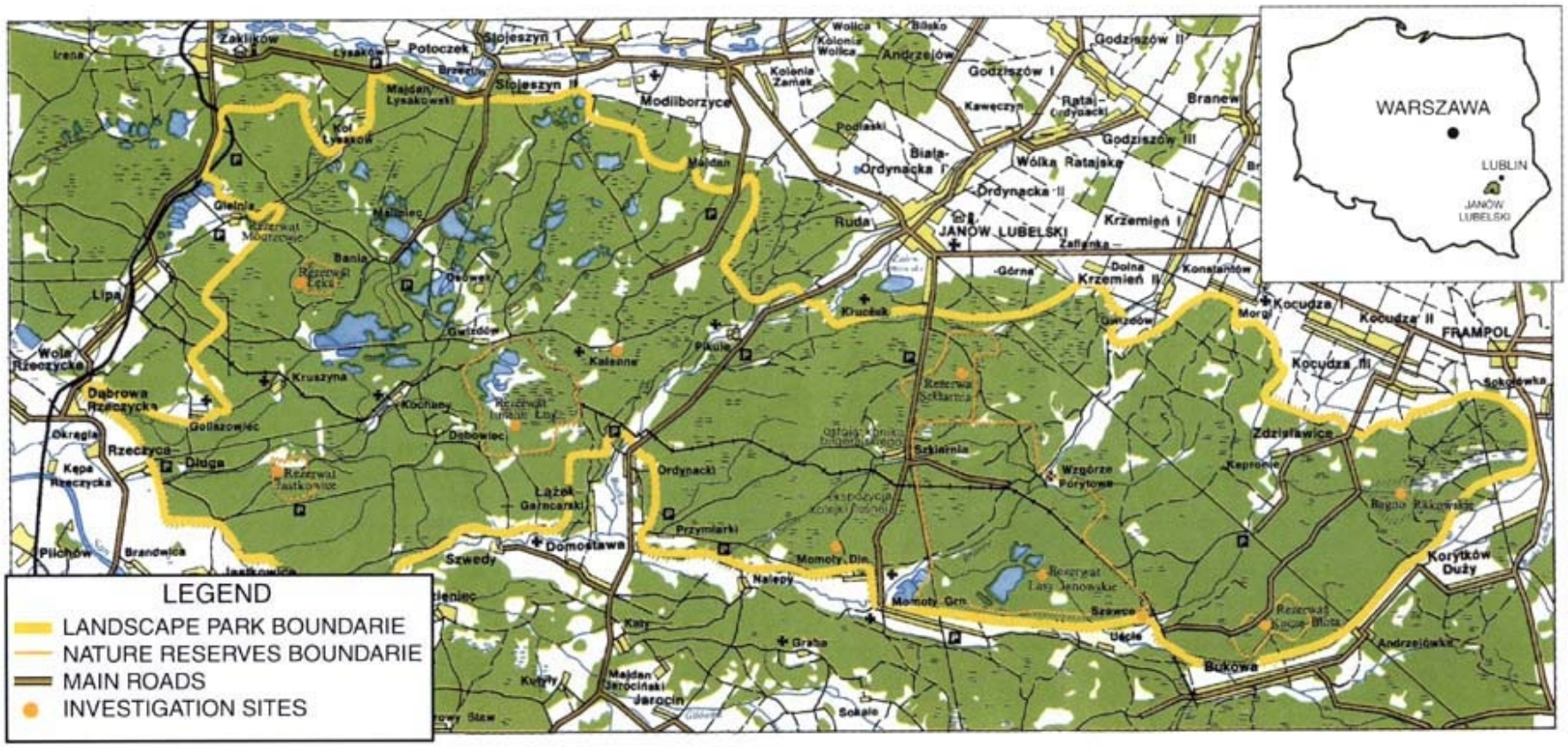

Fig. 1. Janów Forests Landscape Park

Table 1
Abundance of species in individual localities

Taxons	LOCALITIES								Categories of threat
	Bagno Rakowskie	Imielty Ług	Jastkowice	Kącze Błota	Lasy Janowskie	Łęka	Szklarnia	Other*	
1	2	3	4	5	6	7	8	9	10
1 *HYPOCREALES*	**0**	**0**	**0**	**0**	**1**	**1**	**0**	**0**	**0**
Hypocrea citrina (Pers.: Fr.) Fr.	–	–	–	–	r	r	–	–	–
9 *PEZIZALES*	**0**	**5**	**3**	**0**	**1**	**0**	**0**	**0**	**2**
Aleuria aurantia (Fr.) Fuck.	–	n	–	–	–	–	–	–	–
Gyromitra esculenta (Pers.: Fr.) Fr.	–	n	–	–	–	–	–	–	–
Helvella crispa Fr.	–	n	–	–	–	–	–	–	–
Helvella lacunosa Afz.: Fr.	–	–	r	–	–	–	–	–	–
Leptopodia atra (Kõnig: Fr.) Boud.	–	–	–	–	r	–	–	–	V
Morchella esculenta Pers.	–	r	–	–	–	–	–	–	V
Otidea abietina (Pers.) Fuck.	–	–	r	–	–	–	–	–	–
Otidea onotica (Pers.: Fr.) Fuck.	–	r	–	–	–	–	–	–	–
Paxina acetabulum (L.) O. Kuntze	–	–	r	–	–	–	–	–	–
5 *HELOTIALES*	**0**	**0**	**1**	**0**	**0**	**2**	**2**	**0**	**1**
Ascocoryne cylichnium (Tul.) Korf.	–	–	–	–	–	–	n	–	–
Bulgaria inquinans Fr.	–	–	–	–	–	r	–	–	R
Cudoniella aciculare (Bull.: Fr.) Schroet.	–	–	r	–	–	–	–	–	–
Geoglossum nigritum Cooke	–	–	–	–	–	r	–	–	–
Leotia lubrica Pers.	–	–	–	–	–	–	r	–	–
3 *SPHAERIALES*	**0**	**2**	**3**	**0**	**0**	**2**	**0**	**0**	**0**
Nectria cinnabarina (Tode: Fr.) Fr.	–	–	n	–	–	–	–	–	–
Xylaria hypoxylon (L.) Grev.	–	n	a	–	–	a	–	–	–
Xylaria polymorpha (Pers.) Grev.	–	n	a	–	–	a	–	–	–
1 *PLECTASCALES*	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**
Elaphomyces asperulus Vitt.	–	–	–	–	–	–	r	–	–
7 *TREMELLALES*	**3**	**3**	**2**	**2**	**6**	**5**	**3**	**0**	**1**
Exidia glandulosa Fr.	–	–	–	–	n	n	–	–	–
Exidia saccharina (Alb. et Schw.) Fr.	–	–	–	–	n	–	–	–	–
Exidia truncata Fr.	–	–	–	–	–	n	–	–	–
Pseudohydnum gelatinosum (Scop.: Fr.) Karst.	n	a	–	a	r	n	a	–	–
Tremella encephala Pers.: Pers.	n	a	n	–	a	n	a	–	–
Tremella foliacea (Pers. ex S.F. Gray) Pers.	–	–	–	–	r	–	–	–	I
Tremella mesenterica Retz. in Hook.	n	n	a	n	a	a	n	–	–
3 *DACRYMYCETALES*	**0**	**1**	**1**	**2**	**3**	**3**	**2**	**0**	**0**
Calocera cornea (Batsch: Fr.) Fr.	–	–	–	–	r	r	r	–	–
Calocera viscosa (Pers.: Fr.) Fr.	–	a	n	n	a	a	a	–	–
Dacryomyces stillatus Nees: Fr.	–	–	–	n	n	n	–	–	–

Tab. 1 cont.

1	2	3	4	5	6	7	8	9	10
70 *APHYLLOPHORALES*	**19**	**37**	**28**	**16**	**34**	**41**	**30**	**21**	**21**
Aleurodiscus amorphus (Pers.: Fr.) Schroet.	–	–	–	–	n	n	r	–	–
Artomyces pyxidatus (Pers.: Fr.) Jülich	r	r	–	–	–	n	n	–	I
Auriscalpium vulgare S. F. Gray	–	n	r	n	a	n	n	–	–
Bjerkandera adusta (Willd.: Fr.) Karst.	a	a	a	a	a	a	a	–	–
Cantharellus cibarius Fr.	r	n	r	n	n	n	–	3	I
Cantharellus tubaeformis Fr.	–	a	a	–	a	a	a	3	–
Chondrostereum purpureum (Pers.: Fr.) Pouz.	–	–	–	–	a	n	–	–	–
Clavulina cinerea (Fr.) Schroet.	n	n	n	–	n	–	–	–	–
Clavulina cristata (Fr.) Schroet.	–	–	n	r	n	n	n	–	–
Climacocystis borealis (Fr.) Kotl. et Pouz.	–	–	–	–	–	–	–	4	I
Coltricia perennis (L.: Fr.) Murr.	–	n	r	n	n	n	–	3	–
Columnocystis abietina (Pers.: Fr.) Pouz.	–	–	r	–	–	–	–	–	–
Coriolellus vaporarius (Fr.) Dom. = *Antrodia sinuosa* Fr.	–	–	–	–	–	–	–	4	R
Craterellus cornucopioides (L.): Pers.	n	n	a	–	–	a	–	–	–
Cylindrobasidium evolvens (Fr.: Fr.) Jülich	r	n	–	–	–	–	–	–	–
Daedalea quercina (L.): Fr.	–	n	n	–	–	n	–	4	–
Daedaleopsis confragosa (Bolt.: Fr.) Schroet.	n	n	–	–	n	n	n	3	–
Fomes fomentarius (L.: Fr.) Fr.	n	r	r	–	–	r	n	4	–
Fomitopsis pinicola (Sw.: Fr.) Karst.	–	n	n	–	n	n	n	3	–
Ganoderma lipsiense (Batsch) Atk.	n	n	–	–	n	n	n	–	–
Ganoderma lucidum (Fr.) Karst.	–	r	–	–	–	–	–	–	R
Gloeophyllum sepiarium (Wulf.: Fr.) Karst.	–	n	–	–	n	n	n	–	–
Hericium clathroides (Pallas: Fr.) Pers.	–	–	–	–	–	r	–	–	V
Hericium flagellum (Scop.) Pers.	–	–	–	–	r	–	–	–	V
Heterobasidion annosus (Fr.) Bref.	–	n	–	–	n	n	n	4	–
Hydnum repandum L.: Fr.	–	n	r	–	n	r	–	–	–
Hymenochaete cruenta (Pers.: Fr.) Donk	–	r	–	–	–	r	–	–	R
Hymenochaete tabacina (Sow.: Fr.) Lév.	–	–	–	–	r	–	–	–	R
Inonotus dryadeus (Pers.: Fr.) Murr.	–	–	–	–	–	r	–	–	V
Inonotus radiatus (Sow.: Fr.) Karst.	r	r	–	–	–	–	r	–	–
Junghuhnia nitida (Pers.: Fr.) Ryv.	–	–	–	–	–	r	–	–	R
Laetiporus sulphureus (Bull.: Fr.) Murr.	–	–	–	–	–	–	–	4	–
Lasiochlaena benzoina (Wahlenb.: Fr.) Pouz.	–	–	–	–	r	–	r	–	R
Lentinellus cochleatus (Pers.: Fr.) Karst.	–	–	–	–	–	r	–	–	–
Lenzites betulina (L.: Fr.) Fr.	–	–	r	–	–	–	r	–	–
Meripilus giganteus (Pers.: Fr.) Karst.	–	–	–	–	r	–	–	–	–
Merulius tremellosus Schrad.: Fr.	–	–	r	–	n	n	n	–	–
Peniophora incarnata (Pers.: Fr.) Karst.	–	–	–	n	–	n	–	–	–
Peniophora quercina (Pers.: Fr.) Cooke	n	n	a	–	–	–	–	4	–
Phaeolus schweinitzii (Fr.) Pat.	–	–	–	–	–	–	–	2,4	R
Phellinus conchatus (Fr.) Quél.	–	–	–	–	–	–	–	4	R
Phellinus hartigii (Allesch. et Schnabl) Bond.	–	–	r	–	r	–	–	4	I
Phellinus igniarius (L.: Fr.) Quél.	–	–	–	–	–	r	–	4	–
Phellinus pini (Thore: Fr.) Pil.	–	r	–	–	–	–	–	3,4	R
Phlebia radiata Fr.	–	–	–	n	–	n	n	–	–
Phlebiopsis gigantea (Fr.) Jülich	–	a	n	–	n	–	–	–	–
Piptoporus betulinus (Bull.: Fr.) Karst.	n	n	r	–	–	r	n	4	–
Polyporus arcularius (Batsch) Fr.	–	–	–	n	–	–	–	–	–
Polyporus ciliatus (Fr.): Fr.	–	n	–	–	–	–	n	–	–

Polyporus lepideus Fr.	–	–	–	–	–	n	–	–	–
Postia caesia (Schrad.: Fr.) Karst.	–	a	a	n	a	a	a	–	–
Postia stiptica (Pers.: Fr.) Jülich	n	–	–	n	n	n	n	–	–
Postia subcaesia (David) Jülich	–	–	r	–	–	–	–	–	–
Ramaria abietina (Pers.: Fr.) Quél.	–	n	–	–	–	–	–	–	–
Sarcodon imbricatus (L.: Fr.) Karst.	–	r	–	–	–	–	–	–	V
Schizophyllum commune Fr.: Fr.	n	a	n	n	n	n	–	1	–
Schizopora paradoxa (Schrad.: Fr.) Donk	–	–	–	–	–	n	n	–	–
Sparassis crispa (Wulf.): Fr.	–	r	r	–	–	–	–	–	R
Steccherinum fumbriatum (Pers.: Fr.) Erikss.	–	–	–	–	–	r	–	–	I
Stereum hirsutum (Willd.: Fr.) S.F. Gray	a	a	a	a	a	a	a	–	–
Stereum rugosum (Pers.: Fr.) Fr.	–	–	–	–	r	–	–	–	–
Stereum sanquinolentum (Alb. et Schw.: Fr.) Fr.	–	n	n	–	n	–	n	–	–
Stereum subtomentosum Pouz.	–	–	–	–	–	–	r	–	R
Thelephora palmata (Scop.): Fr.	–	r	–	–	r	r	–	–	–
Thelephora terrestris Pers.: Fr.	a	a	a	a	a	a	a	2	–
Trametes hirsuta (Wulf.: Fr.) Pil.	n	a	–	n	–	a	a	–	–
Trametes pubescens (Schum.: Fr.) Pil.	r	–	–	–	–	–	–	–	V
Tramates versicolor (L.: Fr.) Pil.	a	a	a	n	a	a	a	–	–
Trichaptum abietinum (Pers.: Fr.) Ryv.	–	–	–	–	n	n	n	–	–
Trichaptum fuscoviolaceum (Ehrenb.: Fr.) Ryv.	–	a	a	n	a	a	a	3	–
30 *BOLETALES*	**11**	**19**	**17**	**11**	**18**	**20**	**15**	**4**	**7**
Boletus edulis Bull.: Fr.	r	n	r	–	n	n	r	2	V
Boletus erythropus (Fr.: Fr.) Pers.	–	–	r	–	n	–	–	–	–
Boletus reticulatus Schaeff.	–	–	r	–	–	–	–	–	V
Chalciporus piperatus (Bull.: Fr.) Bat.	–	–	–	–	–	–	r	–	–
Chroogomphus rutilus (Schff.: F.) O.K. Muller	–	n	n	–	–	n	n	–	–
Gomphidius roseus (L.) Fr.	–	r	–	–	–	–	–	–	R
Gyroporus castaneus (Bull.: Fr.) Quél.	–	r	r	–	–	r	–	–	I
Gyroporus cyanescens (Bull.: Fr.) Quél.	–	r	–	–	–	–	–	–	–
Hygrophoropsis aurantiaca (Wulf.: Fr.) R. Mre.	n	a	a	n	a	a	a	–	–
Leccinum aurantiacum (Bull.) S.F. Gray	n	–	–	–	n	n	–	–	–
Leccinum duriusculum (Schulz.) Sing.	r	–	–	–	–	–	–	–	–
Leccinum griseum (Quél.) Sing.	–	r	–	–	–	n	–	–	–
Leccinum holopus (Rostk.) Watling	–	–	–	r	–	r	r	–	V
Leccinum scabrum (Bull.: Fr.) S.F. Gray	a	a	n	n	a	a	a	1	–
Leccinum testaceoscabrum (Secr.) Sing.	–	n	–	–	n	n	–	–	–
Paxillus atrotomentosus (Batsch) Fr.	–	n	r	n	n	n	n	–	–
Paxillus involutus (Batsch) Fr.	n	a	a	n	a	a	a	–	–
Paxillus panuoides Fr.	–	–	–	–	r	–	–	–	–
Suillus bovinus (L.: Fr.) O. Kuntze	n	a	n	n	a	n	n	–	–
Suillus granulatus (L.: Fr.) O. Kuntze	n	a	–	–	a	n	n	2	–
Suillus grevillei (Klotzsch) Sing.	–	–	–	–	r	–	–	–	–
Suillus luteus (L.: Fr.) S.F. Gray	–	a	n	–	a	–	n	–	–
Suillus variegatus (Swartz: Fr.) Kuntze	–	n	–	–	n	n	n	–	–
Tylopilus felleus (Bull.: Fr.) Karst.	a	a	a	a	a	a	–	–	–
Xerocomus armeniacus (Quél.) Quél.	–	–	r	–	–	–	–	–	I
Xerocomus badius (Fr.) Kuhn. ex Gilb.	–	a	a	a	a	a	a	–	–
Xerocomus chrysenteron (Bull. ex St.-Am.) Quél.	a	a	a	a	a	a	a	2	–
Xerocomus parasoticus (Bull.: Fr.) Quél.	–	–	r	–	–	r	–	R	
Xerocomus rubellus (Krombh.) Quél.	–	–	–	–	–	n	–	–	–
Xerocomus subtomentosus (L.: Fr.) Quél.	n	a	a	n	a	a	–	–	–

Tab. 1 cont.

1	2	3	4	5	6	7	8	9	10
169 *AGARICALES*	**54**	**58**	**77**	**23**	**81**	**77**	**62**	**12**	**28**
Agaricus campester (L.) Fr.	–	–	–	–	–	–	–	3	–
Agaricus dulcidulus Schulz.	–	–	–	–	r	–	–	–	–
Agaricus silvicola (Vitt.) Sacc.	–	–	n	–	–	–	–	–	–
Amanita alba Gill.	–	–	–	–	–	–	r	–	I
Amanita citrina (Schaeff.) S.F. Gray	–	a	a	a	a	a	a	–	–
Amanita eliae Quél.	–	–	–	–	r	–	–	–	–
Amanita fulva Schaeff.: Pers.	a	a	a	a	a	a	a	–	–
Amanita muscaria (L.: Fr.) Hooker	–	n	n	–	a	n	n	1	–
Amanita pantherina (DC: Fr.) Secr.	–	n	n	–	–	–	–	–	–
Amanita phalloides (Vaill.) Secr.	n	n	n	–	n	n	n	–	–
Amanita porphyria (Alb. et Schw.: Fr.) Secr.	–	a	a	–	n	a	n	–	–
Amanita rubescens (Pers.: Fr.) Gray	–	a	a	a	a	a	a	2,3	–
Amanita vaginata (Bull.: Fr.) Quél.	a	a	a	–	a	a	a	2,3	–
Amanita verna (Bull.) Pers. et Vitt.	–	–	–	–	–	r	–	–	–
Armillariella mellea (Vahl. in Fl. Dan.: Fr.) Karst.	a	a	a	a	a	a	a	4	–
Arrhenia spathulata (Fr.) Redh.	–	–	–	–	n	–	–	–	I
Calocybe gambosa (Fr.) Donk	–	–	–	–	r	–	–	–	–
Cantharellula umbonata (Gmel.: Fr.) Sing.	r	n	–	–	–	–	n	–	–
Clitocybe clavipes (Pers.: Fr.) Kumm.	–	–	a	n	a	a	a	–	–
Clitocybe flaccida (Sow.: Fr.) Kumm.	–	–	–	–	r	–	–	–	–
Clitocybe gibba (Pers.: Fr.) Kumm.	–	a	a	–	–	–	–	–	–
Clitocybe inornata (Sow.: Fr.) Gill.	–	–	a	–	a	a	–	–	–
Clitocybe odora (Bull.: Fr.) Kumm.	n	n	–	–	–	–	n	–	–
Clitocybe vibecina (Fr.) Quél.	–	–	–	–	–	–	r	–	–
Collybia asema (Fr.: Fr.) Kumm.	–	–	n	–	n	–	–	–	–
Collybia butyracea (Bull.: Fr.) Quél.	n	a	a	–	a	a	a	2	–
Collybia cookei (Bres.) J.D. Arnold	–	–	–	–	r	–	–	–	–
Collybia distorta (Fr.) Quél.	–	–	–	–	n	n	n	–	–
Collybia dryophila (Bull.: Fr.) Kumm.	a	a	–	n	a	a	a	2	–
Collybia maculata (Alb. et Schw.: Fr.) Quél.	a	a	–	–	a	a	a	–	–
Collybia peronata (Bolt.: Fr.) Sing.	n	a	n	–	a	n	a	–	–
Coprinus atramentarius (Bull.: Fr.) Fr.	n	–	–	–	–	–	–	–	–
Coprinus disseminatus (Pers.: Fr.) S.F. Gray	–	–	–	–	n	–	–	–	–
Coprinus micaceus (Bull.: Fr.) Fr.	n	–	–	–	–	–	–	–	–
Coprinus xanthotrix Romagn.	–	–	n	–	–	–	–	–	–
Cortinarius alboviolaceus (Pers.: Fr.) Fr.	–	–	–	–	n	n	n	–	–
Cortinarius armeniacus (Schaeff.: Fr.) Fr.	–	r	–	–	–	–	–	–	I
Cortinarius armillatus (Fr.: Fr.) Fr.	n	–	n	–	n	–	–	–	–
Cortinarius bolaris (Pers.: Fr.) Fr.	–	–	–	–	n	n	–	–	–
Cortinarius collinitus Fr.	–	–	n	–	–	n	n	–	–
Cortinarius delibutus Fr.	–	–	–	–	–	–	n	–	–
Cortinarius hinnuleus Fr.	–	–	r	–	–	–	–	–	–
Cortinarius mucifluus Fr.	–	–	r	–	–	–	–	–	–
Cortinarius paleaceus Fr.	–	–	–	–	–	n	n	–	–
Cortinarius torvus (Bull.: Fr.) Fr.	–	–	r	–	–	–	–	–	–
Cortinarius tragamus Fr.	–	n	r	–	–	–	–	–	–
Crepidotus mollis (Schaeff.: Fr.) Kumm.	n	a	a	–	–	–	–	–	–
Crepidotus variabilis (Pers.: Fr.) Kumm.	a	a	n	n	–	a	–	–	–
Crinipellis stipitaria (Fr.) Pat.	–	–	–	–	r	–	–	–	–

Cystoderma amiantinum (Scop.: Fr.) Konr. et Maubl.	–	n	r	–	n	n	n	–	–
Cystoderma carcharias (Pers.) Konr. et Maubl.	–	–	–	n	n	n	–	–	–
Cystoderma cinnabarinum (Alb. et Schw. ex Secr.) Fay.	–	–	–	r	–	n	–	–	R
Cystoderma granulosum (Batsch.: Fr.) Kühn.	–	–	r	–	n	–	r	–	R
Dermocybe cinnamomea (L.: Fr.) Wünsche	a	a	a	a	a	a	a	–	–
Dermocybe sanquinea (Wulf.: Fr.) Wünsche	–	n	–	–	–	n	n	–	–
Dermocybe semisanquinea Fr.	n	a	n	–	a	a	a	–	–
Entoloma clypeatum (L.: Fr.) Kumm.	r	–	–	–	–	n	–	–	–
Entoloma nidrorosum (Fr.) Quél.	n	–	–	–	–	n	n	–	–
Entoloma rhodopolium (Fr.) Kumm.	r	–	–	–	–	n	–	–	–
Flammulina velutipes (Curt.: Fr.) Sing.	n	n	–	–	–	n	–	–	–
Galerina marginata (Fr.) Kumm.	–	–	–	–	–	n	n	–	–
Galerina paludosa (Fr.) Kuhn.	a	a	–	n	–	n	–	–	I
Galerina sphagnorum (Pers.: Fr.) Kühn.	n	a	–	n	–	n	n	–	I
Gerronema strombodes (Berk. et Mont.) Sing.	–	–	–	–	–	–	r	–	R
Gymnopilus penetrans (Fr.: Fr.) Murr.	–	–	n	–	n	n	–	–	–
Gymnopilus spectabilis (Fr.) Sing.	–	–	–	–	–	n	–	–	–
Hebeloma crustuliniforme (Bull.) Quél.	–	–	n	–	–	–	–	–	–
Hebeloma radicosum (Bull.: Fr.) Ricken	–	–	–	–	r	–	–	–	R
Hydropus atramentosus (Kalchbr.) Kotl. et Pouz.	–	–	–	–	–	r	–	–	E
Hygrophorus hypothejus (Fr.: Fr.) Fr.	–	–	–	–	n	–	–	–	–
Hygrophorus nemoreus (Lasch) Fr.	–	–	n	–	–	–	–	–	–
Hypholoma capnoides (Fr.) Kumm.	–	–	n	a	a	a	a	–	–
Hypholoma elongatipes Peck	–	–	–	–	r	–	–	–	–
Hypholoma fasciculare (Huds.: Fr.) Kumm.	a	a	a	a	a	a	a	–	–
Hypholoma myosotis (Fr.) Mos.	–	–	–	–	–	n	–	–	–
Hypholoma sublateritium (Fr.) Quél.	a	a	a	–	a	a	a	–	–
Hypholoma udum (Pers.: Fr.) Kühn.	n	n	–	–	–	–	–	–	R
Inocybe asterospora Quél.	–	–	n	–	–	–	–	–	–
Inocybe fastigiata (Schaeff.: Fr.) Quél.	–	–	n	–	–	a	n	–	–
Inocybe geophylla (Sow.: Fr.) Kumm.	–	–	n	n	a	n	n	–	–
Inocybe lanuginosa (Bull.: Fr.) Kumm.	–	–	–	–	–	n	–	–	–
Inocybe scabra Müller.: Fr.	r	–	–	–	–	–	–	3	–
Kuehneromyces mutabilis (Schaeff.: Fr.) Sing et Smith	n	a	n	–	–	n	n	–	–
Laccaria amethystina (Bolt.: Fr.) Berk. et Br.	–	a	a	a	a	a	a	–	–
Laccaria laccata (Scop.: Fr.) Berk. et Br.	a	a	a	a	a	a	a	–	–
Laccaria proxima (Boud.) Pat.	r	–	–	–	–	–	–	–	–
Lentinus lepideus (Fr.: Fr.) Fr.	–	r	–	–	–	–	–	–	–
Lentinus suavissimus Fr.	–	–	–	–	r	–	–	–	–
Lentinus tigrinus (Bull.: Fr.) Fr.	r	–	–	r	–	–	–	–	I
Lepiota acutesquamosa (Weinm.) Kumm.	r	–	–	–	–	–	–	–	–
Lepiota cristata (Alb. et Schw.: Fr.) Kumm.	–	–	n	–	–	–	–	–	–
Lepista nebularis (Fr.) Harmaja	n	–	–	–	–	–	–	–	–
Lepista nuda (Bull.: Fr.) Cke.	n	a	a	–	a	n	–	–	–
Leucopaxillus gentianeus (Quél.) Kotl.	–	–	–	–	–	r	–	–	–
Lyophyllum connatum (Schum.: Fr.) Sing.	–	–	–	–	r	–	–	–	–
Macrocystidia cucumis (Pers.: Fr.) Heim	–	–	–	–	n	–	–	–	–
Macrolepiota mastoidea (Fr.) Sing.	–	–	r	–	–	–	–	–	–
Macrolepiota procera (Scop.: Fr.) Sing.	n	n	–	–	–	–	–	1	I
Macrolepiota rhacodes (Vitt.) Sing.	–	–	n	–	n	n	–	–	I

Tab. 1 cont.

1	2	3	4	5	6	7	8	9	10
Marasmiellus ramealis (Bull.: Fr.) Sing.	–	–	r	–	n	–	–	–	–
Marasmius alliaceus (Jacq.: Fr.) Fr.	–	–	–	–	–	n	–	–	–
Marasmius androsaceus (L.: Fr.) Fr.	–	a	n	–	a	–	a	–	–
Marasmius oreades (Bolt.: Fr.) Fr.	n	a	a	–	n	n	n	1,2	–
Marasmius scorodonius (Fr.) Fr.	–	–	n	–	n	–	–	–	–
Marasmius wynnei Berk. et Br.	–	–	–	–	–	–	r	–	–
Micromphale foetidum (Sow.: Fr.) Sing.	–	–	r	–	–	–	–	–	R
Micromphale perforans (Hofm. et Fr.) Sing.	–	–	–	–	n	–	n	–	–
Mycena adonis (Bull.: Fr.) S.F. Gray	–	–	–	–	–	–	r	–	R
Mycena aetites (Fr.) Quél.	–	–	–	–	r	–	–	–	–
Mycena alcalina (Fr.) Kumm.	–	n	n	r	n	n	n	–	–
Mycena epipterigia (Scop.) S.F. Gray	–	–	a	–	a	a	a	–	–
Mycena erubescens v.H.	–	–	–	–	–	–	r	–	–
Mycena galericulata (Scop.: Fr.) S.F. Gray	n	n	n	–	–	–	–	–	–
Mycena galopoda (Pers.: Fr.) Kumm.	–	a	a	–	a	–	a	–	–
Mycena haematopoda (Pers.: Fr.) Kumm.	–	–	–	–	–	n	–	–	–
Mycena inclinata (Fr.) Quél.	n	–	n	–	–	–	–	–	–
Mycena metata (Fr.) Kumm.	–	–	–	–	–	–	n	–	–
Mycena pelianthina (Fr.) Quél.	–	–	–	–	–	r	–	–	I
Mycena pura (Pers.: Fr.) Quél.	–	–	a	n	n	a	a	–	–
Mycena rorida (Scop.: Fr.) Quél.	–	–	–	–	–	–	r	–	–
Mycena rosella (Fr.) Kumm.	–	–	–	–	–	–	n	–	–
Mycena sanquinolenta (Alb. et Schw.: Fr.) Kumm.	–	–	–	–	–	n	–	–	–
Mycena stylobates (Pers.: Fr.) Kumm.	–	–	–	–	–	n	–	–	–
Mycena tintinabulum (Fr.) Quél.	n	–	–	–	–	–	–	–	–
Mycena viscosa (Secr.) R. Mre.	n	n	–	–	n	–	n	–	–
Mycena vitrea (Fr.) Quél.	–	–	r	–	–	–	–	–	R
Mycena zephirus (Fr.: Fr.) Kumm.	–	–	r	–	–	–	–	–	–
Naucoria subconspersa Kühn.	n	–	–	–	–	–	–	–	–
Neolentinus adhaerens (Alb. et Schw.: Fr.) Redh. et Gin	–	–	–	–	n	–	–	–	R
Omphalina ericetorum (Pers.: Fr.) M. Lge.	r	n	–	–	–	–	–	3	I
Omphalina sphagnicola (Berk.) Mos.	n	n	–	–	n	–	–	–	V
Oudemansiella platyphylla (Pers.: Fr.) Mos.	–	–	a	–	a	a	–	–	–
Oudemansiella radicata (Relhan.: Fr.) Sing.	–	a	a	–	–	n	–	–	–
Panaeolus rickenii Hora	n	–	–	–	–	–	–	–	–
Panellus mitis (Pers.: Fr.) Sing.	–	a	a	–	a	a	n	–	–
Panellus stypticus (Bull.: Fr.) Karst.	a	–	n	–	–	–	–	–	–
Phaeomarasmius erinaceus (Fr.) Kühn.	–	–	r	r	–	–	–	–	R
Pholiota astragalina (Fr.) Sing.	–	–	–	–	–	n	–	–	–
Pholiota aurivella (Batsch.: Fr.) Kumm.	r	–	n	–	n	r	–	–	–
Pholiota carbonaria (Fr.) Sing.	–	–	n	–	n	–	–	–	–
Pholiota flammans (Batsch.: Fr.) Kumm.	–	–	–	–	n	n	–	–	–
Pholiota lenta (Pers.: Fr.) Sing.	–	–	r	–	–	n	–	–	–
Pholiota squarrosa (Pers.: Fr.) Kumm.	n	n	n	–	–	–	n	–	–
Pleurotus dryinus (Pers.: Fr.) Kumm.	–	–	–	–	–	–	r	–	R
Pleurotus ostreatus (Jacq.: Fr.) Kumm.	n	n	–	–	n	n	–	–	–
Pleurotus pulmonarius Fr.	–	–	–	–	–	n	–	–	V
Pluteus atricapillus (Secr.) Sing.	n	a	a	–	a	a	–	–	–
Pluteus atromarginatus (Konr.) Kühn.	–	–	–	–	n	n	–	–	–

Pluteus salicinus (Pers.: Fr.) Kumm.	–	–	–	–	r	–	–	–	–
Psathyrella candolleana (Fr.) Mre.	n	–	n	–	n	n	–	–	–
Pseudoclitocybe cyathiformis (Bull.: Fr.) Sing.	–	n	n	–	n	–	–	–	–
Rhodocybe parilis (Fr.) Sing.	–	–	–	–	r	–	–	–	–
Rhodocybe popinalis (Fr.) Sing.	–	–	–	–	r	–	–	–	V
Rickenella fibula (Bull.: Fr.) Raith.	–	–	n	–	n	n	n	–	–
Rozites caperata (Pers.: Fr.) Karst.	–	a	n	–	a	n	n	–	–
Stropharia aeruginosa (Curt.: Fr.) Quél.	–	–	n	–	n	n	–	–	–
Stropharia semiglobata (Batsch.: Fr.) Quél.	n	–	–	–	–	–	–	–	–
Tephrocybe palustris (Peck) Donk	n	n	–	n	–	–	–	–	I
Tricholoma equestre (L.: Fr.) Kumm.	–	r	–	–	–	–	–	–	I
Tricholoma portentosum (Fr.) Quél.	–	n	–	–	n	–	–	–	–
Tricholoma saponaceum (Fr.) Kumm.	r	n	r	–	–	–	–	–	–
Tricholoma sulphureum (Bull.: Fr.) Kumm.	–	–	r	–	–	–	r	–	–
Tricholoma terreum (Schaeff.) Kumm.	n	n	–	–	n	–	–	–	–
Tricholoma ustale (Fr.: Fr.) Kumm.	–	–	–	–	–	–	n	–	–
Tricholoma virgatum (Fr.) Kumm.	–	–	–	–	n	–	–	–	–
Tricholomopsis decora (Fr.) Sing.	–	–	–	–	–	r	–	–	R
Tricholomopsis rutilans (Schaeff.:) Sing.	–	a	r	–	a	r	–	–	–
Xeromphalina campanella (Batsch.: Fr.) R. Mre.	–	–	a	a	a	a	a	2	–
Xeromphalina cornui (Quél.) Favre	–	–	–	–	–	–	n	–	–
44 *RUSSULALES*	**17**	**17**	**29**	**8**	**25**	**16**	**10**	**3**	**4**
Lactarius aurantiacus Fr.	–	n	–	–	n	–	n	–	–
Lactarius blennius Fr.	r	–	n	–	–	n	–	–	–
Lactarius camphoratus (Bull.) Fr.	n	n	–	–	n	n	–	–	–
Lactarius deliciosus (L.) S.F. Gray	–	r	–	–	r	–	r	–	V
Lactarius glyciosmus Fr.	–	–	–	–	n	–	–	–	–
Lactarius helvus Fr.	a	a	a	a	a	a	a	1,2	–
Lactarius mitissimus Fr.	n	a	a	–	a	a	–	–	–
Lactarius necator (Bull. em. Pers.: Fr.) Karst.	a	a	a	a	a	a	a	–	–
Lactarius piperatus (L.: Fr.) S.F. Gray	n	–	n	–	n	–	–	–	–
Lactarius pubescens Fr.	–	–	–	–	n	–	n	–	–
Lactarius quietus Fr.	–	–	n	–	n	–	n	2	–
Lactarius rufus (Scop.: Fr.) Fr.	a	a	a	a	a	a	a	–	–
Lactarius serifluus DC: Fr.	n	–	n	–	n	–	–	–	–
Lactarius subdulcis Bull.: Fr.	–	n	–	–	–	–	–	–	–
Lactarius theiogalus (Bull.) Fr.	–	–	r	–	–	–	–	–	–
Lactarius torminosus (Schaeff.: Fr.) S.F. Gray	–	–	–	–	n	–	–	–	–
Lactarius vellereus (Fr.) Fr.	n	a	n	n	a	–	a	–	–
Lactarius volemus Fr.	n	–	–	–	–	–	–	–	–
Russula adusta Fr.	–	n	–	–	–	n	–	–	–
Russula aeruginea Lindbl.	n	–	n	–	n	n	–	–	–
Russula albonigra Krbh.	–	–	–	–	–	n	–	–	–
Russula alutacea (Pers.: Fr.) Fr.	r	–	–	–	–	–	–	–	I
Russula atropurpurea Krbh.	–	–	r	–	n	–	–	–	–
Russula badia Quél.	–	–	r	–	n	–	–	–	–
Russula cyanoxantha Schaeff.: Fr.	n	a	a	–	a	a	–	–	–
Russula decolorans Fr.	–	a	a	–	a	–	–	–	–
Russula emetica Fr.	a	a	a	a	a	a	a	1	–
Russula erythropoda Pelt.	–	–	n	–	–	–	–	–	–
Russula fellea Fr.	–	–	–	–	n	–	–	–	–
Russula flava (Rom.) Rom. ap. Lindbl.	–	n	r	–	–	n	–	–	–

Tab. 1 cont.

1	2	3	4	5	6	7	8	9	10
Russula foetens Fr.	–	–	–	–	n	–	–	–	–
Russula fragilis (Pers. Fr.) Fr.	–	–	n	–	–	–	–	–	–
Russula integra L.: Fr. ss. R. Mre.	n	–	r	–	–	n	–	–	–
Russula laurocerasi Melzer	–	–	r	–	–	–	–	–	–
Russula lutea (Huds.: Fr.) ss. F. Gray	–	–	r	–	–	–	–	–	–
Russula nigricans (Bull.) Fr.	–	–	n	–	n	–	–	–	–
Russula ochroleuca (Pers.) Fr.	n	a	n	n	a	n	n	–	–
Russula olivacea (Schaeff. ex Secr.) Fr.	–	r	–	–	–	–	–	–	R
Russula pectinatoides Peck	–	–	r	–	–	–	–	–	–
Russula puellaris Fr.	–	–	r	–	–	–	–	–	–
Russula rhodopoda Zv.	–	–	r	–	–	–	–	–	R
Russula sardonia Fr.	–	–	–	r	–	r	–	–	–
Russula vesca Fr.	n	a	a	–	a	–	–	–	–
Russula virescens (Schaeff. ex Zant.) Fr.	–	–	n	n	–	n	–	–	–
15 *GASTEROMYCETES***	**6**	**5**	**6**	**4**	**8**	**9**	**11**	**3**	**0**
Bovista nigrescens Pers.: Pers.	n	–	–	–	–	–	–	–	–
Bovista plumbea Pers.: Pers.	–	–	–	–	–	–	n	–	–
Calvatia excipuliformis (Pers.) Perd.	–	n	r	–	a	–	n	1	–
Calvatia utriformis (Bull.: Pers.) Jaap	–	–	–	–	–	n	n	–	–
Crucibulum laeve (Huds. ex Relh.) Kambly	–	–	n	–	n	n	a	–	–
Cyathus striatus (Huds.): Pers.	a	a	a	a	–	a	a	–	–
Lycoperdon foetidum Bonord.	–	–	–	–	–	–	n	–	–
Lycoperdon perlatum Pers.: Pers.	a	a	a	–	a	a	a	1	–
Lycoperdon pyriforme Schaeff.: Pers.	n	a	a	a	a	a	–	–	–
Lycoperdon umbrinum Pers.: Pers.	–	–	–	r	n	n	n	–	–
Phallus impudicus L.: Pers.	–	–	–	–	–	–	r	–	–
Scleroderma bovista Fr.	–	–	–	–	–	–	–	3	–
Scleroderma citrinum Pers.	a	a	a	a	a	a	a	–	–
Scleroderma verrucosum (Bull.): Pers.	n	–	–	–	a	n	–	–	–
Sphaerobolus stellatus Tode: Pers.	–	–	–	–	n	n	n	–	–
357 TOTAL 15	**110**	**147**	**167**	**66**	**177**	**176**	**136**	**43**	**64**

Explanations: a – *species abundans*, n – *species numerous*, r – *species rarus*; *1 – Kalenne, 2 – Szewce, 3 – Momoty (Błoński 1896), 4 – Forest Insp. Janów (Gordziałowski 1899); ** orders: *Sclerodermatales, Nidulariales, Lycoperdales, Phallales.*

RESULTS

The material gathered in the research comprises 357 macromycetes species – 19 *Ascomycota* and 338 *Basidiomycota* (Table 1). The following orders have the most numerous representation: *Agaricales* (169 species), *Aphyllophorales* (70 species), *Russulales* (44 species) and *Boletales* (30 species). The richest in macromycetes were the reserves: Lasy Janowskie (177 species), Łęka (176 species), and Jastkowice (167 species); a little less numerous fungi were recorded in the reserves of Imielty Ług (147 species) and Szklarnia (136 species). In the area of ecological interest Bagno Rakowskie 110 species were found, and 66 species were identified in the Kacze Błota reserve.

Forty-three species were found in localities mentioned in old literature and in those where collections were made only occasionally.

In each studied area a number of interesting species were identified. Many of them (64 species) are included in the Red List (W o j e w o d a and Ł a w r y n o w i c z 1992) and are classified within four categories of threat (Table 1 and 2).

The Park area comprises localities of 7 species protected by law. These are: *Hericium clathroides*, *H. flagellum*, *Meripilus giganteus*, *Morchella esculenta*, *Phallus impudicus*, *Sparassis crispa* and *Xerocomus parasiticus*.

Table 2
Number of species in categories of threat

Order	E	V	R	I	Total
Pezizales	–	2	–	–	2
Helotiales	–	–	1	–	1
Tremellales	–	–	–	1	1
Aphyllophorales	–	5	11	5	21
Boletales	–	3	2	2	7
Agaricales	1	3	12	12	28
Russulales	–	1	2	1	4
Total	1	14	28	21	64

Explanations: E – endangered, V – vulnerable, R – rare, I – indeterminate

Moreover, a number of species that are rare in Poland and in Europe, as well as those that appear rather only in mountainous regions, were recorded, such as: *Agaricus dulcidulus*, *Amanita eliae*, *Boletus erythropus*, *Calocera cornea*, *Clitocybe flaccida*, *Collybia cookei*, *Cortinarius bolaris*, *C. hinnuleus*, *Crinipellis stipitaria*, *Cudoniella aciculare*, *Gyroporus cyanescens*, *Hygrophorus nemoreus*, *Hypholoma myosotis*, *Hypocrea citrina*, *Inocybe scabra*, *Inonotus radiatus*, *Lentinellus cochleatus*, *Lentinus suavissimus*, *Leucopaxillus gentianeus*, *Macrolepiota mastoidea*, *Marasmius wynnei*, *Mycena aetites*, *M. erubescens*, *M. sanquinolenta*, *Otidea abietina*, *Paxillus panuoides*, *Postia subcaesia*, *Rhodocybe parilis*, *Russula puellaris*, *Suillus grevillei*, *Thelephora palmata*, *Xerocomus rubellus*, *Xeromphalina cornui* and *Russula pectinatoides* that has been reported in Poland only in this particular locality.

CONCLUSIONS

Results obtained so far from individual study areas may constitute a basis for a preliminary assessment of the Park natural values (Table 3). The analysis excluded 7 species from localities that were not covered by systematic research.

Six of them (*Agaricus campester, Climacocystis borealis, Coriolellus vaporarius, Laetiporus sulphureus, Phellinus conchatus, Scleroderma bovista*) that had been reported by Błoński (1896) and Gordziałowski (1899) ca 100 years ago were not found. Two of the above mentioned species (*Agaricus campester, Laetiporus sulphureus*) appear in the sites that were not covered by research, and that is the reason why they were not confirmed. The other species are rare and, apart from *Scleroderma bovista*, included in the Red List. They require further research. Or they may be extinct forever.

Only 21 species (6%) are common for all the seven areas covered by the research (Table 3). Therefore they can be assessed as common in the examined region. The most numerous and most frequently appearing in the Park are: *Amanita fulva, Armillariella mellea, Bjerkandera adusta, Dermocybe cinnamomea, Hygrophoropsis aurantiaca, Hypholoma fasciculare, Laccaria laccata, Lactarius helvus, L. necator, L. rufus, Leccinum scabrum, Paxillus involutus, Russula emetica, R. ochroleuca, Scleroderma citrinum, Stereum hirsutum, Suillus bovinus, Thelephora terrestris, Trametes versicolor, Tremella mesenterica* and *Xerocomus chrysenteron.*

Table 3
Evaluation of macrofungi

Localities	Numbers and percentages of species recorded in 7–1 localities							Total in localities		100%
	7	6	5	4	3	2	1	7–4	3–1	
Bagno Rakowskie	21	21	12	11	18	12	15	65	45	110
	19.1%	19.1%	11%	10%	16.3%	11%	13.5%	59%	41%	
Imielty Ług	21	31	21	20	25	13	16	93	54	147
	14.3%	21.1%	14.3%	13.6%	17.1%	8.8%	10.8%	63.3%	36.7%	
Jastkowice	21	28	21	18	28	22	29	88	79	167
	12.6%	16.8%	12.6%	10.7%	16.8%	13.2%	17.3%	52.7%	47.3%	
Kacze Błota	21	20	11	2	6	5	1	54	12	66
	31.8%	30.3%	16.6%	3%	9.1%	7.6%	1.6%	82%	18%	
Lasy Janowskie	21	30	22	22	28	21	33	95	82	177
	11.9%	16.9%	124%	124%	158%	119%	187%	53.7%	46.3%	
Łęka	21	30	27	19	34	20	25	97	79	176
	11.9%	17%	15.4%	10.8%	19.3%	11.4%	14.2%	55%	45%	
Szklarnia	21	27	20	17	20	11	20	85	51	136
	15.4%	19.9%	14.7%	12.5%	14.7%	8.1%	14.7%	62.5%	37.5%	
Total in Park	21 6%	32 8.9%	26 7.7%	28 8%	53 15.1%	49 14%	141 40.3%	107 30.6%	243 69.4%	350

More and more species can be found in a decreasing number of localities, which is characteristic of the Park's flora. Most of the species – as many as 141 (40.3%) – were found only in individual localities (Table 1 and 3).

Common and frequent species (7–4 localities) constitute only 30.6% (107 species) of all fungi. Not too common, rare and very rare species (3–1 localities) contribute significantly to the Park's macromycetes. This group constitutes 69.4% (243 species) and shows diverse abundances of fruit-bodies (Table 3).

An analogous assessment related to individual localities in the Park shows that participation of species that are not too common, rare or very rare in natural or almost natural plant communities is significant (36.7%–47.3%), and clearly drops (e.g. in Kacze Błota to 18%) when the natural character of communities has been disturbed (Table 3).

In each site a large group of exclusive species (10.8%–18.7%) appearing only in particular reserve can be distinguished. The species may prove that specific and favourable conditions are present in individual reserves. Many of these fungi are included in the Polish list of threatened species or are legally protected. They contribute to the natural values of the Park and confirm that protection of the Park's biocenoses is crucial for their preservation and saving from extinction.

Bearing it in mind that changes in significance of plant communities in natural and primeval (climax) forests may become apparent even after 100 years (Fijałkowski 1991) and that the number of such forests is decreasing all the time, studying their microflora appears to be and important and urgent task.

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Studia nad grzybami wielkoowocnikowymi Parku Krajobrazowego Lasy Janowskie

Streszczenie

W pracy uwzględniono 357 gatunków macromycetes stwierdzonych dotychczas w Parku Krajobrazowym Lasy Janowskie.

Na terenie Parku znajdują się stanowiska 7 gatunków prawnie chronionych: *Hericium clathroides*, *H. flagellum*, *Meripilus giganteus*, *Phallus impudicus*, *Sparassis crispa*, *Xerocomus parasiticus* oraz 64 umieszczonych na czerwonej liście grzybów zagrożonych w Polsce.

Stwierdzono występowanie wielu gatunków rzadko spotykanych w kraju i Europie oraz takie, które występują częściej tylko w obszarze górskim, jak np.: *Agaricus dulcidulus*, *Amanita eliae*, *Boletus erythropus*, *Calocera cornea*, *Clitocybe flaccida*, *Collybia cookei*, *Cortinarius bolaris*, *C. hinnuleus*, *Crinipellis stipitaria*, *Cudoniella aciculare*, *Gyroporus cyanescens*, *Hygrophorus nemoreus*, *Hypholoma myosotis*, *Hypocrea citrina*, *Inocybe scabra*, *Inonotus radiatus*, *Lentinellus cochleatus*, *Lentinus suavissimus*, *Leucopaxillus gentianeus*, *Macrolepiota mastoidea*, *Marasmius wynnei*, *Mycena aetites*, *M. erubescens*, *M. sanquinolenta*, *Otidea abietina*, *Paxillus panuoides*, *Postia subcaesia*, *Rhodocybe parilis*, *Russula puellaris*, *Suillus grevillei*, *Thelephora palmata*, *Xerocomus rubellus*, *Xeromphalina cornui* i *Russula pectinatoides* znana dotychczas w Polsce tylko z tego stanowiska.

Uzyskane dotychczas wyniki z poszczególnych obiektów badań mogą być podstawą dla wstępnej oceny walorów przyrodniczych Parku.

Tylko 21 gatunków (6%) zanotowano we wszystkich (7) objętych systematycznymi badaniami obiektach. Najczęściej i najobficiej wyetępują w Parku: *Amanita fulva, Armillariella mellea, Bjerkandera adusta, Dermocybe cinnamomea, Hygrophoropsis aurantiaca, Hypholoma fasciculare, Laccaria laccata, Lactarius helvus, L. necator, L. rufus, Leccinum scabrum, Paxillus involutus, Russula emetica, R. emetica, R. ochroleuca, Scleroderma citrinum, Stereum hirsutum, Suillus bovinus, Thelephora terrestris, Trametes versicolor, Tremella mesenterica* i *Xerocomus chrysenteron.*

Gatunki pospolite i częste (7–4 stanowisk występowania) stanowią jedynie 30.6% (107 gatunków), natomiast znaczący udział w mikoflorze Parku mają gatunki niezbyt częste, rzadkie i bardzo rzadkie (3–1 stanowisk występowania). Grupa ta stanowi 69.4% (243 gatunki) i wykazuje różny stopień obfitości owocowania. Najwięcej, bo aż 141 gatunków (40.3%) znaleziono tylko na pojedynczych stanowiskach (w jednym obiekcie). W tabeli 1 zaznaczono je drukiem pogrubionym.

W obrębie poszczególnych obiektów badań zaobserwowano, iż udział grzybów niezbyt częstych, rzadkich i bardzo rzadkich jest znaczny (36.7%–47.3%) gdy panują w nich naturalne lub prawie naturalne warunki, a wyraźnie maleje (np. w rez. Kacze Błota – 18%), gdy ich naturalny charakter został zaburzony.

W każdym obiekcie (rezerwacie) zaznacza się dość liczna grupa gatunków wyłącznych (10.8%–18.7%). Gatunki te świadczyć mogą o specyficznych, dogodnych dla ich rozwoju warunkach panujących w danym obiekcie (rezerwacie). Fakt ten potwierdza, iż dla przetrwania wielu zagrożonych gatunków grzybów konieczna jest ochrona ich siedlisk (biocenoz).