Macromycetes of various habitats of the nature reserve “Łężczok” near Racibórz (SW Poland)

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In the paper the results of two years’ mycological studies carried out in the “Łężczok” reserve are presented. Due to specific habitat diversity an interesting distribution model of some fungal taxa was observed. The data on each taxon include: abundance, type of substrate, type of habitats and information on fruit-bodies occurrence.

Key words: macromycetes, Ascomycota, Basidiomycota, nature reserve Łężczok.

INTRODUCTION

First mycological data concerning the higher fungi of the “Łężczok” reserve one can find in the Eisenreich’s (1924) and Sendek’s (1966) works. They mention the following six species: Armillaria mellea (Vahl.: Fr.) Kumm., Laetiporus sulphureus (Bull.: Fr.) Murrill, Peniophora quercina (Fr.) Cooke, Daedalea quercina L.: Fr., Phellinus igniarius (L.: Fr.) Qué, and Lycoperdon perlatum Pers.: Pers. The data presented in the Badura’s paper (1964) concern the studies on soil micromycetes. Later data, which is included in notes, namely in those of Wojewoda (1981), Szczerbka (1985) and Sokół, Szczerbka and Trząski (1986), present preliminary observations on macromycetes. At last, in the Trząski’s work (1994) a detailed analysis of mainly lignicolous fungi occurring within the “Polish Hussars Alley” and the side alleys is presented.

This paper is the first attempt to present the results of comprehensive study on macromycetes in the “Łężczok” reserve.
"ŁĘŻCZOK"
NATURE RESERVE

Fig. 1. Map of the investigated area
STUDY AREA

The reserve was established in 1957 in order to preserve a fragment of almost primeval nature remnants within significantly changed landscape of the upper Oder Valley. Preservation of natural standings of protected animal and plant species and conservation of a small part of riverside forest are the main purposes of the reserve existence.

The Łęczok reserve (Fig. 1) lies about 5 km to the northeast from Racibórz and is situated on the right bank of the Oder River. The reserve is situated within the boundaries of the “Cysterskie Kompozycje Krajobrazowe” Landscape Park. The territory of the Landscape Park is situated within the Racibórz Basin. With regard to the administrative aspect, the Łęczok reserve is situated within the boundaries of the present Silesia Province and within the Nędza commune. It covers 244.59 ha of ponds, 136.25 ha of forests, 7.35 ha of meadows and 23.69 ha of roads and dykes; the total area amounts to 408.88 ha (Sendek 1986).

The woodland and pond reserve shows great variety of habitats and plant communities. The west part of the reserve is covered by deciduous forest identified as the Tilio-Carpinetum association with a rich undergrowth and tree stand containing various species, predominantly Carpinus betulus, Quercus robur and Tilia cordata. In the eastern part with relatively high ground humidity, Carici elongatae-Alnetum as well as Circaeo-Alnetum phytocoenoses are preserved. Moreover, in the southwestern and southeastern parts of the forest complexes small pieces of coniferous monocultures are present. On the edge of the forests, pieces of the Pruno-Crataegetum association and thin communities of trees and shrubs occur. Communities of the alliance Molinion, Calthion, Arrhenatherion, Cynosurion and Filipendulo-Petasition, occupy a large part of the meadow area. The area surrounding the Łęczok reserve is a potential habitat of oak-lime-hornbeam forests and ash-alder flood plain forests (Krawiecowa and Kuczyńska 1964; Berdowski 1973; Sendek 1986; Wika 1994).

METHODS AND DESCRIPTION OF THE STUDIED HABITATS

Macromycetes were studied during the period of two years (1997 – 1998). Less intense mycological observations were also carried out during the vegetative season of 1999. Observations were made once or twice a month. Due to the flooding in 1997 the area of the reserve was partly inaccessible and observations were difficult. The studied area included various types of habitats situated within the boundaries of the reserve and its nearest surroundings. During the observations plant communities were not defined. The hitherto existing phytosociological data were accepted (Krawiecowa and Kuczyńska 1964; Berdowski 1973; Sendek 1986; Wika 1994) to analyse the occurrence of fungal taxa on the background of various habitats. The following types of habitat were selected (Fig. 1):
high forest (HF): well developed forest complexes mostly representing oak-lime-hornbeam forest (*Tilio-Carpinetum*), bog-alder forest (*Carici elongatae-Alnetum*) and ash-alder flood plain forest (*Circaeo-Alnetum*) as well as forest communities with distortions and disturbances in their structure (mostly with the presence of coniferous trees);

open forest (OF): thin communities of trees and shrubs, phytoocoenoses of *Salici-Franguletum*, thicket communities of *Pruno-Crataegetum* that grow in the form of forest fringes as well as within the high forest complexes in the over-lighted places;

meadows (MS): various meadow communities mostly of the alliances *Molinion, Calthion, Arrhenatherion, Cynosurion* and *Filipendulo-Petasion*;

roads (RS): mostly forest roads, forest paths and roadsides;


The analysis of substrates and growth forms of fruit-bodies is a basis for the classification of fungi into eight main ecological groups (*Faliska* 1997; *Friedrich* 1997). These are: t — terrestrial fungi (mycorrhizal, and humicolous saprotrophes); l — fungi on litter; m — fungi among bryophytes; g — fungi among grasses and on their remains; w₁ — fungi on fallen twigs and bits of wood; w₂ — fungi on rotten roots, on fallen branches, on logs, stumps and trunks; w₃ — fungi on roots, branches, logs and trunks of living trees and shrubs; p — fungi on fruit-bodies of other macrofungetes.

Distribution of the ecological groups in particular habitats is presented in Fig. 2.

![Graph showing the number of taxa in different habitats](image)

**Fig. 2.** The participation of ecological groups (T, L, M, G, W₁, W₂, W₃, P) in particular type of habitats
Abundance of fructification of individual taxa were noted and designed after modifying the scale given by Nespiak (1959). The number of fruit-bodies which were recorded in the site during the observation was presented in the following way: + 1 fruit-body, I 2 - 5 fruit-bodies, II 6 - 20 fruit-bodies, III 21 - 100 fruit-bodies, IV 101 - 500 fruit-bodies, V > 500 fruit-bodies.

The sygname maping and cartogram method were applied to illustrate the sites of recorded taxa. The investigated area was divided into the net of 100 x 100 m squares. One square was considered as one site (Fig. 1.). This enabled precise location of species and also will be helpful in the future.

For better illustrating, distribution of some recorded taxa in the studied area have been shown using sygname method. The grid of squares was omitted and the presence of at least one site of a taxon was marked by a sign in the shape of circle. The circle is equivalent with one square where the taxon was recorded (Fig. 3).

Colour pictures of the selected are also presented (Figs. 4 - 15).

Dry collection of gathered fungi was deposited in the herbarium of the Natural Museum of the Wroclaw University (WRSL).

ANALYSIS OF THE MACROMYCETES

Taxonomic spectrum. According to the accessible data until 1994 about 69 taxa in the rank of species or variety had been known from the reserve.

During the years 1997 - 1999, 222 macromycetes taxa were recorded, among them 180 were new for the investigated area. Twenty-seven taxa reported earlier from the reserve were not found. Among the 222-recorded taxa, 212 were identified to species, 9 to genus and 2 to variety.

Basidiomycota dominate in the mycosora of the area, constituting over 92% of the total number of taxa. Within this phylum 9 orders are represented, and Agaricales are the most numerous (147 taxa) (Table 1). The collected specimens belong to 105 genera, among which the richest are: Russula - 12 species, Boletus - 10, Mycena - 10 and Lactarius - 9.

The observed fungi occupied a variety of habitats and that is a reflection of their life forms (Table 1). The most numerous ecological group in the investigated area are overground fungi. Ninety-nine taxa of the collected macromycetes belong to terrestrial fungi (t), represented by 68 mycorrhizal taxa and 31 taxa of humicolous saprotrophes. Less numerous are fungi growing on litter (l), which include 21 taxa. Arboreal fungi (91 taxa) grow on dead or living wood. Although most are saprobic (75 taxa), some are parasitic or pathogenic on trees and shrubs (16 taxa).
Fig. 3. Example sygnature maps of taxa distribution
The macromycetes of explored area contain 4 species protected by law and 31 species listed in the Red list of threatened macrofungi in Poland (Wojewoda and Ławrynówicz 1992). The protected species are Boletus parasiticus (Fig. 4), Grifola frondosa, Meripilus giganteus and Phallus impudicus.

Four species that belong to the Endangered (E) category were found: Boletus radicans (Fig. 5), Bovista colorata, Ganoderma resinaceum (Fig. 9) and Phellinus torulosus. The category Vulnerable (V) is represented by seven species: Boletus edulis, Fistulina hepatica, Grifola frondosa, Hypholoma myosotis, Inonotus dryadeus, Leccinum melanenum and Xerula pudens. The categories: Rare (R) and Indeterminate (I) are represented by ten species each. The following rare species were found: Boletus parasiticus, Choriozymes meandriformis, Entoloma pleopodium, Ganoderma lucidum, Geastrum jimbriatum, Macrothyphula fistulosa (Fig. 12), Micromphale foetidum, Paxillus filamentosus, Pleurotus dryinus and Russula violeipes. Indeterminate species are represented by: Cantharellus cibarius, Lactarius lacunarum, Lycoperdon echinatum,
Macrolepiota procera, Macrolepiota rhacodes, Pluteus hispidulus, Pluteus pseudorobertii, Psathyrella corrugis (Fig. 13), Psilocybe squamosa and Volvariella bombycina (Fig. 15).

Distribution of macromycetes within the reserve. An interesting diversity of habitats within the Łęczczok reserve makes possible to perceive several essential relationships between fungi and accessible ecological conditions that they are depending on.

Habitat diversity as a result of an effect of various factors is the cause of an interesting distribution model of particular fungal taxa.

Large group of macromycetes is clearly connected to the following types of habitats: high forest, open forest, meadows, forest road and dykes. During the observations 89 taxa were noted exclusively within the high forest, 8 in the areas of open forest, 3 in meadows, 2 on forest roads and 66 only on dykes.

In general the majority of taxa were recorded within the high forest (135) and on dykes (117). Considerably fewer numbers of taxa were noted in the other types of habitats: 13 — within the open forest, 5 — on meadows and 8 — on forest roads.

The high forest habitats occupy the greatest part of Łęczczok land area and provide macromycetes with necessary developmental conditions. These areas are abundant with woody and plant remains. Usually their taxonomic diversification in respect of higher plants is also high. Trees and shrubs function as a mycorrhizal hosts or refuge for wood-inhabiting fungi (including pathogens).

The most numerous ecological groups in the investigated forests are overground fungi and saprotrophes inhabiting decaying dead wood and bark; fungi growing on litter were also recorded frequently (Fig. 2).

A large number of recorded macromycetes occurred in the habitats of oak-hornbeam forests. Many of them were also noted in patches of various subassociations of Tilio-Carpinetum (Lawrynowicz 1973; Lisiewska 1979; Gumińska 1992; Flisińska 1997; Skirgiello 1998; Wojewoda, Heinrich and Komorowska 1999) and Galio-Carpinetum (Lisiewska and Polczyńska 1998) in other regions in Poland. The fructifications of the following species were observed most frequently: Collybia dryophila, Cyathus striatus, Daedalea quercina, Ganoderma applanatum (Fig. 3 G), Inocybe geophylla, I. geophylla var. lilacina, Marasmius quercophilus, M. rotula, Mycena galericulata, M. inclinata, M. vitilis, Russula cyanoxantha. Worth of mentioning are also some species rarely found in Poland, such as: Choiromyces meandriornis, Ganoderma lucidum and Psilocybe thrausta.

Within the habitats referred to ash-alder flood plain forest and bog-alder forest common taxa that have been also noted by others in various types of flood-plain forests (Bujakiewicz 1992, 1999; Bujakiewicz and Fiebich 1992) occurred. These were: Daedaleopsis confagosa, Hirneola auricula-judae, Naucoria submelinoides, Paxillus involutus, Pholiota alnicola,
Scutellinia scutellata. Also several rare or interesting species, namely: Clavico-
rona pyxidata, Hypholoma myosotis, Laccaria proxima, Lactarius lacunarum,
Leccinum melanenum, Otidea alutacea, Peziza saccardiana, Pluteus hispidulus
and Russula luteotacta were recorded.

Moreover, it should be emphasized that Hirneola auricula-judae is most
frequently associated in the studied area with Sambucus nigra. Common elder
is one of the components of the unnatural vegetation occupying sides of
dykes and alleys. Thus the fungus occurs mainly within the phytocoenoses
that arisen as a result of human activity (Fig. 3 G). The fact confirms
W o j e w o d a’s (1977) opinion that nowadays the species is not found in
natural plant communities.

Dykes compared to forest complexes occupy considerably smaller area.
The presence of a great number of aged trees, especially oaks and accompa-
nying plant communities as well as abiotical factors having specific effect
(elevation above the surface of ponds, vicinity of ponds, exposure to the sun,
temperature, humidity, winds) and human activity, determine excellent con-
ditions and refuge for terrestrial fungi and arboreal parasites. Among the
distinguished habitats just on the dykes the fungi were observed most
frequently and were most numerous (Fig. 2).

Pathogenic species thrive mainly on aged trees, especially on the specimens
weak as a result of shortage of water, limiting amount of light, extensive
mechanical harm of roots, trunks and treetops. Such trees are most numerous on
the dykes. That explains frequent and numerous occurring on alley trees of the
following fungi: Fomes fomentarius, Laetiporus sulphureus, Phellinus igniarius
(Fig. 3 E), P. robustus (Fig. 3 D), Schizophyllum commune and Trametes sp. div.
The species are specialized to enter wounds in living trees and to make their way
to the heartwood. This happens in many specimens of trees when the lower
branches become shaded and die. After falling off, the heartwood is exposed
allowing the fungi to entry. According to T r z a s k i (1994) heart rot fungi
are the most important parasites causing extensive breaks of oak branches.

On the dykes several rare and very rare as well as interesting taxa of
lignicolous fungi occurred. The species were recorded mostly on oaks. Here
is the only locality of Phellinus torulosus in Poland (T r z a s k i 1994).
The fruit-bodies of this mycological curiosity were twice noted on living
and dead trees. Also, the fruit-bodies of Ganoderma resinaceum (Fig. 9) and
Grifola frondosa were rarely observed. Fistulina hepatica was observed more
frequently. Moreover, on oak log fruit-bodies of Hohenbuehelia mastrucata
(Fig. 10), a very interesting fungus because of its morphological and anatomical
characters, were recorded. Finally, a few fruit-bodies of Meripilus giganteus
were recorded at bases of Fagus sylvatica.

The occurrence of many specimens of robust trees is probably one of
various factors determining the occurrence of many species of mycorrhizal fungi.
Evidently due to the local extremely favourable developmental conditions the
occurrence of these fungi is limited just to dykes. These are, among other fungi,
various species of Amanita, Boletus, Inocybe, Cortinarius, Laccaria, Leccinum, Russula, Scleroderma, Tricholoma as well as Gyroporus castaneus and Paxillus filamentosus (Fig. 3 A, B, C). It is worth mentioning that many Boletus species were recorded, especially thermophilous Boletus aereus as well as B. radicans (Fig. 3 C, Fig. 5) and also B. rubellus (Fig. 3 A). The observed fungi display multiple, often difficult to trace relationships and connections with local dendroflora. The largest number of taxa is associated with the following tree species: Quercus robur, Qu. petraea, Betula pendula, Alnus glutinosa and Populus tremula.

The fungi appearing within the areas of open forest belong to various ecological groups and two different categories. The first includes the taxa connected with various plant communities referred to flood-plain forests and preceding succession stage (Salici-Franguletum), with relatively high ground humidity. These are: Clavulina cristata, Otidea alutacea, Peziza saccardiana, Galerina sp. and Pluteus sp. The second category is mostly connected with thicket communities of various dynamic aspects of Pruno-Crataegetum, where Calocera cornea, Daecrymyces stillatus, Leccinum scabrum and Volvariella bombycina (Fig. 15) were noted.

The forest roads, roadsites and meadows studied within the forest and brushwood complexes were characterized with fewer numbers of species. These are, first of all, the fungi of grassy areas or fungi growing on grass remnants. Various grass communities occur within the meadows, forest roads as well as partially within dykes. Exclusively among grasses the fruit-bodies of Psilocybe semilanceata (Fig. 14), Stropharia coronilla, Calvatia excipuliformis, Coprinus comatus, C. xanthothrix and C. plicatilis were found. The first two were noted only in meadow areas (Fig. 3 H). Bolbitius titubans fructifications that grew on decaying grass remnants also were recorded there (Fig. 3 I). Within the discussed area several species not connected with grass vegetation were observed, too. Most of them are humicolous saprotrophes that occur on the forest roads, such as Clitocybe nebularis, Helvella crispa and Macrolopiota procera. Moreover, exclusively on roadside Macrolopiota fistulosa was noted. The fruit-bodies of this species appeared on various remnants of deciduous wood as well as on litter (Fig. 12).

The list of collected taxa is not complete; at least five years long, systematic investigations on permanent plots are necessary.

LIST OF TAXA

Taxonomy and nomenclature of the taxa mentioned in the paper follow well-known publications: Alexopoulos, Mims and Blackwell (1996); Domański (1974—1992), Hansen and Knudsen (1992); Moser (1968, 1983), Rudnicka-Jeziorska (1991), and is supplemented by the works of other authors, included in the references.

Explanations: t, l, w1, w2, w3, g, m, p — ecological groups; 1, 2, 7 — number of sites; +, I, II, III, IV, V — degrees of abundance; HF, OF, MS, RS, DS — types of habitats
Ascomycota

Hypocreales

Nectria cinnabarina (Tode.: Fr.) Fr. – T raz ski (1994)

Xylariales


Ustulina deusta (Fr.) Petrak – W o j e w o d a (1981)

Xylaria hypoxylon (L.) Grev. – stromata on moss-overgrown stumps of deciduous trees; Sept. 1998; w2, 2: I – HF, I – OF

Xylaria polymorpha (Pers.) Grev. – stromata on moss-overgrown log of Quercus sp., on stumps; July 1998; w2, 2: III, II – HF

Helotiales

Bisporella citrina (Batsch) Carpent. et Korf – on bits of wood of Quercus sp., C. betulus; Aug. 1998; w1, 3: III, II, II – HF

Bulgaria inquinans Fr. – on log of Quercus sp.; Aug. 1998; w2, 1: II – HF

Pezizales

Aeuria aurantia (Fr.) Fuckel – on clay ground; Sept. 1998; t, 1: + – DS

Choeromyces meandriformis Vitt. – fruit-bodies partly buried in the soil; July 1998; t, 1: I – HF

Cyathipodia macropus (Pers.: Fr.) Dennis – on deciduous litter; Aug. 1998; l, 1: + – HF

Helvella crispa (Scop.) Fr. – on ground, among grasses and litter; Sept. 1998; t, 2: I – RS, I – DS


Leptopodia koltzchiana (Corda) Boud. – on ground; Aug. 1998; t, 1: + – DS

Otidea alutacea (Pers.) Mass. – on ground; Aug. 1998; t, 1: + – OF

Otidea onotica (Pers.) Fuckel – on ground; Aug. 1998; t, 1: I – HF

Peziza saccardiana Cke. – on muddy ground, on bits of wood; Aug. 1998; t, 1: I – OF

Peziza varia (Hedw.) Fr. – on ground, on rotten and wet bits of deciduous wood; May 1998; w1, 1: II – HF

Scutellinia scutellata (L.: St. Amans) Moser – on muddy ground, on wet bits of wood; July 1998; w1, 2: IV, II – HF
Basidiomycota

Tremellales

Exidia glandulosa (Bull.: St. Am.) Fr. – W o j e w o d a (1981); on log of F. sylvestrica; on fallen twigs; Feb., July-Sept. 1998; w₁; 2: II, III – HF
Exidia pithya (Alb.: Schw.) Fr. – W o j e w o d a (1981)
Exidia truncata Fr. – W o j e w o d a (1981)
Tremella foliacea (Pers.) Pers. – T r z ą s k i (1994)
Tremella mesenterica Retz.: Fr. – on dead branches of deciduous trees; July 1998; w₂; 2: +, + – HF

Auriculariales


Dacrymycetales

Calocera cornea (Batsch: Fr.) Fr. – on log of Populus sp.; July-Aug. 1998; w₂; 1: I – OF
Calocera viscosa (Pers.: Fr.) Fr. – on moss-overgrown stumps of P. abies; July-Aug. 1998; w₂; 1: II – HF
Dacrymyces stillatus Nees: Fr. – W o j e w o d a (1981), T r z ą s k i (1994); on bits of deciduous wood; Feb. 1998; w₁; 1: IV – OF

Tulasnellales

Tulasnella pruinosa Bourd. et Galaz: W o j e w o d a (1981)

Agaricales

Agaricus altipes (Moell.) Pilát – on ground – among deciduous litter; Sept. 1998; t; 1: I – HF
Agaricus silvaticus Schaeff.: Secr. – on ground – among deciduous litter; Aug. 1998; t; 1: II – HF
Amanita citrina (Schaeff.) Pers. – on ground – among deciduous litter; July-Aug. 1998; t; 1: II – DS
Amanita fulva (Schaeff.) Pers. – on ground – among deciduous litter; July 1998; t; 2: +, + – HF
Amanita muscaria (L.: Fr.) Hooker – on ground – among deciduous litter; Sept. 1998; t; 2: II, I – DS
Amanita phalloides (Vaill.: Fr.) Link. — Trzaska (1994); on ground — among deciduous litter; July-Sept. 1998; t: 9: II — DS, 3: II — HF
Amanita rubescens (Pers.: Fr.) S.F. Gray — on ground — among deciduous litter; July 1998; t: 3: I, I, II — DS
Amanita vaginata (Bull.: Fr.) Vitt. — on ground — among deciduous litter; July 1998; t: 2: + — RS, + — DS
Boletius titubans (Bull.: Fr.) Fr. — on moist remains of mowed grass; Sept. 1999; g: 1: II — MS
Boletus aerius Bull.: Fr. — Trzaska (1994); on ground, in neighbourhood of Qu. robur; July 1998; t: 1: I — DS
Boletus radialis (Fr.) Fr. — on ground — among grasses and deciduous litter, in neighbourhood of Qu. robur; July-Aug. 1998; t: 3: + — DS, +, I — HF
Boletus bicolor Peck var. reticulatus Smith et Thiers — taxon recorded by Sokół et al. (1986)
Boletus edulis Bull.: Fr. — on ground, in neighbourhood of Qu. robur; Sept. 1998; t: 2: I, I — DS
Boletus erythropus (Fr.) Krombh. — Sokół et al. (1986); on ground, in neighbourhood of Qu. robur; Aug. 1998; t: 1: I — HF, I — DS
Boletus luridus Schaeff.: Fr. — on ground, in neighbourhood of Qu. robur; Aug. 1998; t: 1: I — DS
Boletus pascuus (Pers.) Krombh. — on ground — among deciduous litters, in neighbourhood of Qu. robur; July-Aug. 1998; t: 3I, II, I — DS
Boletus radicans Pers.: Fr. — Trzaska (1994); on ground in neighbourhood of Qu. robur; Aug. 1998; t: 4: II, II, I — DS
Boletus suspectus Krombh. — Sokół et al. (1986) as B. impolitus Fr.
Clitocybe clavipes (Pers.: Fr.) Kumm. — on ground, among deciduous litter; Sept. 1998; t: 3II, II — HF, I — DS
Clitocybe gigantea (Pers.: Fr.) Pat. — on ground — among deciduous litter; Sept. 1998; t: 2: II — HF, I — DS
Clitocybe hydrogramma (Bull.: Fr.) Kumm. — on deciduous litter; Aug. 1998; I: 1: I — HF
Clitocybe nebularis (Batsch: Fr.) Kumm. — on ground — among deciduous litter and grasses; Sept. 1998; t: 2: I — OF, I — RS
Clitocybe odora (Bull.: Fr.) Kumm. — on deciduous litter; July-Aug. 1998; I: 1: I — HF
Clitocybe sp. [sekcja Candicantes Quél.] — on deciduous litter; Sept. 1998; I: 1: I — HF
Clitocybe vibecina (Fr.) Quél. — on deciduous litter; Aug. 1998; I: 2: II, II — HF
Collybia fusipes (Bull.: Fr.) Quél. — on ground — at the base of stump of Qu. robur; July-Aug. 1997, 1998; w3: 1: II — HF
Collybia peronata (Bolt.: Fr.) Kumm. — on deciduous litter; July-Aug. 1998; I: 3; I, III, II — HF
Coprinus atramentarius (Bull.: Fr.) Fr. — on ground — near rotten log of Quercus sp.; July 1998; w2: 1: I — HF
Coprinus comatus (Müll.: Fr.) Pers. — on ground, among grasses; July-Aug. 1998; t: 3: I — MS, I — RS, II — DS
Coprinus micaceus (Bull.: Fr.) Fr. — on rotten bits of deciduous wood; July 1998; w1: 1: I — HF
Coprinus plicatilis (Curt.: Fr.) Fr. — on ground (on plant remains) — among grasses; Aug. 1998; g: 1: I — DS
Coprinus xanthothrix Romagn. — on clay ground (on plant remains ?) — among grasses; Sept. 1998; g: 1: + — DS
Cortinarius sp. [subgen. Telamonia] — on ground; Sept.: 1998; t: 2: IV, III — DS
Cortinarius sp. [subgen. Telamonia] — on ground; Sept. 1998; t: 2: III, II — DS
Cortinarius sp. [subgen. Phlegmacium] — on ground; Sept. 1998; t: 1: + — HF
Crepidotus mollis (Bull.: Fr.) Staude — on rotten trunk of A. glutinosa; June, Sept. 1998; w2: 1: II — HF
Crepidotus variabilis (Pers.: Fr.) Kumm. — on fallen twigs of deciduous trees; Sept. 1998; w1: 2: II, II — HF
Delicatula integrella (Pers.: Fr.) Fayod — on a damp bit of wood (stump of deciduous tree); July 1998; w2: 1: I — HF
Entoloma pleopodium (DC.: Fr.) Noordel. — among deciduous litter; Aug. 1998; t: 1: I — HF
Entoloma rhodopolium (Fr.) Kumm. — among grasses, in neighbourhood of Salix sp., among deciduous litter; Sept. 1998; t: 2: I — MS, I — DS
Galerina sp. — on rotten stump — among mosses; Aug. 1998; m: 1: I — OF
Gymnopilus junonius (Fr.: Fr.) Orton — on rotten stump of Quercus sp.; Sept. 1998; w2: 1: I — DS
Gyroporus castaneus (Bull.: Fr.) Quél. — on ground, among deciduous litter, in neighbourhood of Qu. robur; Aug. 1998; t: 1: I — DS
Macromycetes of various habitats


Hohenbuehelia mastrucata (Fr.: Fr.) Sing. – on rotted log of Quercus sp.; Sept. 1998; w₂; 1: I – DS

Hygrophoropsis aurantiaca (Wulf.: Fr.) Schroet. – on ground, on bits of coniferous wood, among mosses; Sept. 1998; m; 1: I – HF

Hypholoma capnoides (Fr.) Kumm. – near rotten stump of P. abies; Aug. 1998; w₂; 1: II – HF

Hypholoma fasciculare (Huds.: Fr.) Kumm. – W o j e w o d a (1981), T r z a s k i (1994); on rotten stumps and bits of wood; Sept. 1998; w₂; 3: II – HF, III, II – DS

Hypholoma lateritium (Schaeff.: Fr.) Schroet. – T r z a s k i (1994); at the bases of rotten stumps of deciduous trees; July-Aug. 1998; w₁, 1: II – DS

Hypholoma myosotis (Fr.) Moser – among mosses (humid place), on ground – among Carex bryoides; July-Aug. 1998; m; 1: III – HF

Hypholoma subviride (Berk. et Curt.) Dennis – S o k ó l et al. (1986)

Inocybe asterospora Quél. – on ground; Sept. 1998; t; 1: I – DS

Inocybe geophylla (Sow.: Fr.) Kumm. – on ground – among deciduous litter; Sept. 1998; t; 3: IV, III, III – HF

Inocybe geophylla (Sow.: Fr.) Kumm. var. lilacina (Peck) Gill. – on ground – among deciduous litter; Sept. 1998, 1999; t; 3: III, II, II – HF

Inocybe griseolilacina J. Lange – on ground; July 1998; t; 1: I – DS


Kuehneromyces mutabilis (Schaeff.: Fr.) Sing. et Smith – T r z a s k i (1994); on trunk of T. cordata, on a bit of deciduous wood; Sept. 1998; w₂; 2: III – HF, II – DS


Laccaria proxima (Boud.) Pat. – on ground – among mosses (humid place); Sept. 1998; t; 1: IV – HF

Laccaria tortilis (Bolt.) Cooke – on muddy ground; July 1998; t; 1: I – DS

Lactarius aurantiacus (Pers.: Fr.) S.F. Gray – among deciduous litter; Sept. 1998; t; 1: II – HF

Lactarius lacunarum Romagn. ex Hora – on muddy ground, among mosses; Aug. 1998; t; 1: V – HF

Lactarius mitissimus (Fr.) Fr. – among deciduous litter; Aug., Sept. 1998; t; 2: II – HF, II – DS


Lactarius quietus (Fr.) Fr. – among deciduous litter; Aug., Sept. 1998; t; 2: II – HF, I – DS
Lactarius rufus (Scop.: Fr.) Fr. – on ground, among deciduous litter; Sept. 1998; t; 1: II – HF

Lactarius terminosus (Schaeff.: Fr.) Pers. – on ground – among grasses; July 1998; t; 1: I – DS

Lactarius vellereus (Fr.) Fr. – among deciduous litter; Aug. 1998; t; 2: I, + – DS

Lactarius vietus (Fr.) Fr. – among deciduous litter, in neighbourhood of B. pendula; Oct. 1998; t; 1: I – DS

Leccinium aurantiacum (Bull.) S.F. Gray – among deciduous litter, in neighbourhood of P. tremula; Aug. 1998; t; 1: II – DS

Leccinium melaneum (Smol.) Pilát et Dermek – on ground, among mosses, in neighbourhood of B. pendula; Sept. 1999; t; 1: I – HF

Leccinium quercinum (Pilát) Green et Watl. – on ground, in neighbourhood of Qu. robur; Aug. 1998; t; 1: I – DS


Leccinium versipelle (Fr.) Snell – on ground, in neighbourhood of B. pendula; Aug. 1998; t; 1: I – DS

Leptota castanea Quéel. – on ground, in neighbourhood of Qu. robur; Aug. 1998; t; 2: I, I – DS

Leptota cristata (Bolt.: Fr.) Kumm. – on ground, among deciduous litter, in neighbourhood of Qu. robur; Aug. 1998; t; 2: I, + – DS

Leptota pseudohelvела Hora – on ground, among deciduous litter – in neighbourhood of Qu. robur; Aug. 1998; t; 1: I – DS

Lepista flaccida (Sow.: Fr.) Pat. – on deciduous litter; Aug. 1998; l; 1: II – HF

Lepista nuda (Bull.: Fr.) Cooke – in deciduous litter; Aug. 1998; t; 2: I – DS, III – HF

Lyophyllum decastes (Fr.: Fr.) Sing. – on ground – among grasses; Sept. 1998; t; 1: II – DS

Macropleiota procera (Scop.: Fr.) Sing. – on ground – among deciduous litter, among grasses; Aug.-Sept. 1998; t; 4: I, +, + – DS, I – RS

Macropleiota rhacodes (Vitt.) Sing. – in deciduous litter; Sept. 1998; t; 1: II – HF

Marasmiellus ramealis (Bull.: Fr.) Sing. – on fallen twigs of deciduous trees; June, Aug. 1998; w₁; 2: I – HF, I – DS

Marasmius quercophillus Pouz. – on deciduous litter; July 1998; l; 2: V, IV – HF

Marasmius rotula (Scop.: Fr.) Fr. – on deciduous litter, on fallen twigs and bits of deciduous wood; July-Aug. 1998; w₁; 7: III – HF; 2: III – DS

Macromycetes of various habitats

Micromphale foetidum (Sow.: Fr.) Sing. — on trunk of Qu. robur; July-1998; W₂, 1: + — DS

Mycena acicula (Schff.: Fr.) Kumm. — on moss-overgrown log of Quercus sp., among mosses; June 1998; m; 1: I — HF

Mycena epityergia (Scop.: Fr.) S.F. Gray var. viscosa (Maire) Ricken — on fallen twigs and on needles of P. abies; Aug. 1998; l; 1: III — HF

Mycena galericulata (Scop.: Fr.) S.F. Gray — mostly on rotten stumps of deciduous trees; July-Aug. 1998; w₂, 7: III — HF; 2: III — DS


Mycena inclinata (Fr.) Quél. — on rotten stumps of deciduous trees, on bits of deciduous wood; July-Aug. 1998; w₂, 5: V, IV, IV — HF, IV, III — DS

Mycena pura (Pers.: Fr.) Kumm. — on ground — among deciduous litter; Aug. 1998; l; 4: II — HF; 3I — DS

Mycena rosea (Bull.) Gramberg — in deciduous litter; Aug. 1998; t; 2: I, II — DS


Mycena stylobates (Pers.: Fr.) Kumm. — on deciduous litter (fallen leaves); July 1998; l; 2: IV, III — HF

Mycena vitilis (Fr.) Quél. — on deciduous litter; July 1998; l; 5: II — HF, 2: II — DS

Naucoria submelinoides (Kühn.) Maire — on ground, in neighbourhood of A. glutinosa; Sept. 1998; t; 1: I — HF

Omphalina fibula (Bull.: Fr.) Quél. — on moss-overgrown log of Quercus sp.; June 1998; m; 1: I — HF

Paxillus filamentosus (Scop.) Fr. — on ground, among litter, in neighbourhood of A. glutinosa; Sept. 1997, 1998; t; 3: II, II, I — DS

Paxillus involutus (Batsch: Fr.) Fr. — on ground, in neighbourhood of deciduous trees; Sept. 1997, 1998; t; 2: I — DS, II — HF

Pholiota alnicola (Fr.: Fr.) Sing. — at the base of rotten stump of deciduous tree; Sept. 1998; w₂, 1: II — HF

Pholiota aurivella (Batsch: Fr.) Kumm. — T r z ą s k i (1994); on logs of Qu. robur; Sept. 1998; w₂, 2: I — HF, I — DS

Pholiota squarrosa (Weig.: Fr.) Kumm. — T r z ą s k i (1994); on rotten stump; Aug. 1998; w₂, 1: II — HF

Pleurotus dryinus (Pers.: Fr.) Kumm. — on rotten log of Quercus sp.; Sept. 1998; w₂, 1: I — HF

Pleurotus ostreatus (Jacq.: Fr.) Kumm. — T r z ą s k i (1994); on branch of T. cordata; Sept. 1998; w₂, 1: I — DS

Pluteus atricapillus (Batsch) Fayod — T r z ą s k i (1994); mostly on rotten stumps and logs of deciduous trees; Jan., July-Sept. 1998; w₂, 5: I — HF; 2: I — DS
Pluteus hispidulus (Fr.: Fr.) Gill. — on moss-overgrown stumps of deciduous
trees (humid places); July-Aug. 1998; w₂; 2: I, + – HF

Pluteus pseudoroberti Moser et Stangl — on log of Qu. robur; Aug. 1998; w₂;
1: + – HF

Pluteus sp. — on log of F. silvatica; June, Aug. 1998; w₂; 1: I – DS

Pluteus sp. — on twig of (Salix sp.?); Sept. 1998; w₂; 1: + – OF

Psathyrella candolleaena (Fr.: Fr.) Maire — Wojewoda (1981); on
ground, on bits of deciduous wood; May-Sept. 1997, Aug. 1998; w₁; 4:
II – HF; 3: II – DS

Psathyrella conopilus (Fr.: Fr.) Pears et Dennis — on ground — among
deciduous litter; Sept. 1998; t; 1: III – DS

Psathyrella corrugis (Pers.: Fr.) Konr. et Maubl. — on twigs and rotten bits
of deciduous wood; Sept. 1998; w₁; 1: III – HF

Psathyrella lacrymabunda (Bull.: Fr.) Moser — on ground — among grasses;
July 1998; t; 2: I, I – DS

Psathyrella piluliformis (Bull.: Fr.) Orton — on rotten bits of deciduous wood,
on stumps; Sept. 1998; w₂; 2: III, III – DS

Psathyrella sp.: among grasses; Sept. 1998; g; 1: II – DS

Psilocybe semilanceata (Fr.) Kumm. — among grasses (on grass remains); Sept.
1998; g; 1: II – MS

Psilocybe squamosa (Pers.: Fr.) Orton — on rotten twigs — among deciduous
litter; July 1998; w₁; 1: I HF

Psilocybe thrusta (Schulz.) Bon — on bits of deciduous wood — among litter;
Aug. 1998; w₁; 1: + – HF

Russula aeruginea Lindbl. — in deciduous litter, in neighbourhood of
B. pendula; July, Aug. 1998; t; 2: I, II – DS

Russula cyanoxantha (Schaeff.) Fr. — in deciduous litter, in neighbourhood
of Qu. robur; July, Aug. 1998; t; 2: II, I – HF

Russula delica Fr.: in deciduous litter, in neighbourhood of Qu. robur; Aug.
1998; t; 1: + – DS

Russula fellea (Fr.) Fr. — on ground — among grasses, in neighbourhood of
Qu. robur; Aug. 1998; t; 1: I – DS

Russula lutea (Huds.: Fr.) S.F. Gray — on ground, in neighbourhood of
Qu. robur; July 1998; t; 1: I – DS

Russula luteotacta Rea. — on muddy ground; Aug. 1998; t; 1: I – HF

Russula maculata Quél. — on ground — among grasses; July, Sept. 1998; t;

Russula nigricans Fr.: on ground — among deciduous litter; July 1998; t, 1:
I – DS

Russula ochroleuca Pers. — on ground, in neighbourhood of B. pendula; Sept.
1998; t; 1: II – HF

Russula violeipes Quél. — on ground — among deciduous litter, in neighbour-
hood of Qu. robur; July, Aug. 1998; t; 2: I – HF, I – DS
Russula virescens (Schaeff.) Fr. – on ground – among deciduous litter, in neighbourhood of Qu. robur; July, Aug. 1998; t; 4: I, I, I, I – DS
Russula xerampelina (Schaeff.) Fr. – on ground – among grasses; July 1998; t; 1: II – HF
Stropharia coronilla (Bull.: Fr.) Quél. – among grasses; Sept. 1998; g, 1: II – MS
Tricholoma sulphureum (Bull.: Fr.) Kumm. – on ground – among deciduous litter; Sept.-Oct. 1998; t; 2: II, II – DS
Tricholomopsis rutilans (Schaeff.: Fr.) Sing. – at the bases of coniferous stumps; Aug. 1998; w₂; 3: I, I, I – HF
Tylopilus felleus (Bull.: Fr.) Karst. – on ground; Aug. 1998; t; 1: I – DS
Volvariella bombycina (Schaeff.: Fr.) Sing. – at the base of Populus sp. trunk; Aug. 1998; w₃; 1: I – OF
Xerula pudens (Pers.) Sing. – on ground, in neighbourhood of Qu. robur; June, Aug. 1998; w₂; 2: +, + – HF
Xerula radicata (Relhan: Fr.) Dörfelt – on ground – at the bases of T. cordata trunks; July 1998; w₂; 2: I – HF, I – DS

Aphyllorales

Bjerkandera adusta (Willd.: Fr.) P. Karst. – W o j e w o d a (1981), T r z a- s k i (1994); on log of F. silvatica, on rotten stump; Jan.-Dec. 1998; w₂; 2: III, I – HF
Cantharellus cibarius Fr. – on ground; July 1998; t; 1: + – DS
Chondrostereum purpureum (Pers.: Fr.) Pouz. – T r z a s k i (1994)
Clavicipita pyxidata (Fr.) Doty – on a bit of deciduous wood; Dec. 1999; w₁; 1: I – HF
Clavulina cristata (Fr.) Schroet. – on muddy ground – among deciduous litter; Aug.-Sept. 1998; t; 1: II – OF
Daedaleopsis confragosa (Bolt.: Fr.) Schroet. – W o j e w o d a (1981), T r z a s k i (1994); on logs and stumps of deciduous trees; June-Sept. 1997, 1998; w₂; 7: I – HF; 2: I – DS
Dattronia mollis (Sommers.) Donk. – W o j e w o d a (1981)
Fistulina hepatica (Schaeff.: Fr.) – S k ó t et al. (1986), T r z a s k i (1994); at the bases of trunks of Quercus sp.; July-Sept. 1998; w₃; 1: + – HF; 6: + – DS

Fomitopsis pinicola (Sw.: Fr.) P. Karst. — Trzaska (1994); on stumps and trunks of P. abies; July-Sept. 1997, 1998; w₂; 2: +, II — HF

Fomitopsis rosea (Alb. et Schw.: Fr.) P. Karst. — Sokol et al. (1986)


Ganoderma lucidum (W. Curt.: Fr.) P. Karst. — Eisenreich (1924), Sendek (1964), Sokol et al. (1981); on root of Quercus sp.; Aug. 1998; w₃; 1: + — HF

Ganoderma resinaceum (Boud.) Pat. — Sokol et al. (1986), Trzaska (1994); at the bases of trunks of Quercus sp.; Aug. 1997, 1998; w₃; 2: +, I — DS

Gloeophyllum odoratum (Wulf.: Fr.) Imazeki — Wojewoda (1981); on stump of P. abies; July 1998; w₂; 1: + — HF

Gloeophyllum sepiarium (Wulf.: Fr.) P. Karst. — Wojewoda (1981)

Grifola frondosa (Dicks.: Fr.) S.F. Gray — on ground — at the base of trunk of Qu. robur; Sept. 1997, 1998; w₃; 3: +, +, + — DS

Hapalopilus nidulans (Fr.) P. Karst. — on rotten logs of B. pendula; July, Aug. 1998; w₂; 1: II — DS

Heterobasidion annosus (Fr.) Bref. — at the base of rotten stump of P. abies; Aug. 1998; w₂; 1: I — HF

Hymenochaete rubiginosa (Dicks.: Fr.) Lév. — Wojewoda (1981); on stumps of Quercus sp.; July 1997; w₂; 3: II, II, II — HF


Inonotus dryadeus (Pers.: Fr.) Murrill — Szechska (1985); Sokol et al. (1986), Trzaska (1994); at the bases of trunks of Quercus sp.; Aug. 1998; w₃; 3: 1, I, + — HF

Inonotus radiatus (Sow.: Fr.) P. Karst — Wojewoda (1981), Trzaska (1994); on rotten stump of A. glutinosa; Feb. 1998; w₂; 1: III — HF

Ischnoderma benzoinum (Wahlenb.: Fr.) P. Karst. — Sokol et al. (1981)


Lenzites betulina (L.: Fr.) Fr. — on logs of B. pendula; July-Sept. 1998; w₂; 1: I — HF

Macrotryphula fistulosa (Fr.) Petersen — on deciduous litter, on fallen twigs of deciduous trees; Aug. 1998; w₁; 1: III — RS

Meripilus giganteus (Pers.: Fr.) P. Karst. — Sokol et al. (1986), Trzaska (1994); on ground — at the base of F. silvatica; Sept. 1997, 1998; w₃; 1: I — DS

Peniophora cinerea (Fr.) Cooke — Wojewoda (1981)
Macromycetes of various habitats

Peniophora incarnata (Fr.) Karst. – Wójewoda (1981), Trzaska (1994); on branch of A. glutinosa; March 1998; w3; 1: II – DS

Peniophora quercina (Fr.) Cooke – Eisenreich (1924), Sendek (1966), Trzaska (1994)


Phellinus torulosus (Pers.) Bourd. et Galz. – Sokół et al. (1986), Trzaska (1994); on trunks of Qu. robur; May-June 1999; w3; 2: +, + – DS

Phlebia radiata Fr. – on log of Qu. robur; Aug. 1998; w2; 1: I – DS

Phlebia tremellosa (Schrad.: Fr.) Nakas. et Burds. – Trzaska (1994); on trunk of F. silvatica; Aug. 1998; w2; 1: I – DS

Piptoporus betulinus (Bull.: Fr.) P. Karst. – on trunks and branches of B. pendula; Apr.-Dec. 1998; w2; 3: III, II, I – HF

Polyporus radius (Pers.) Schw. – on fallen branch of Salix sp.; July 1998; w2; 1: I – HF

Polyporus varius (Pers.) Fr. – on ground (on burried rotten bits of deciduous wood); Aug. 1998; w1; 1: I – HF

Radulomyces confluens (Fr.) M.P. Christ. – Wójewoda (1981)

Ramaria sp.: on ground – among deciduous litter; Sept. 1998; t; 1: I – HF

Schizophyllum commune Fr.: Fr. – Trzaska (1994); on fallen twigs and rotten logs of deciduous trees; Apr.-Dec. 1998; w2; 1: III – HF; 9: III – DS

Schizopora carneolutea (Rodew. et Clel.) Kotl. et Pouz. – Sokół et al. (1986), Trzaska (1994)

Schizopora paradoxa (Fr.) Donk – Wójewoda (1981), Sokół et al. (1986), Trzaska (1994)

Schizopora radula (Pers.: Fr.) Hallenb. – Sokół et al. (1986)


Stereum gausapatum (Fr.) Fr. – Wójewoda (1981), Trzaska (1994); on log of Qu. robur; Sept. 1997; w2; 1: II – DS

Stereum hirsutum (Willd.: Fr.) S.F. Gray – Wójewoda (1981), Trzaska (1994); mostly on logs of F. silvatica, Qu. robur; Jan.-Dec. 1998; w2; 2: IV, II – HF,


Stereum sanguinolentum (Alb. et Schw.: Fr.) Fr. – Wójewoda (1981)

Subulicystidium longisporum (Pat.) Parm. – Wójewoda (1981)

Thelephora terrestris Pers.: Fr. – on bits of deciduous wood; July 1997, 1998; w1; 2: II – HF, + – DS
*Trametes hirsuta* (Wulf.: Fr.) Pilát — on log of *Qu. robur*; June 1998; w₂; 1: II — HF

*Trametes versicolor* (L.: Fr.) Quél. — *Trzaska* (1994); on rotten stumps of deciduous trees; July 1998; w₂; 2: I, I — DS

*Tyromyces caesius* (Schrad.: Fr.) Murrill — on rotten stumps of coniferous trees; Aug. 1998; w₂; 3: I, I, + — HF


**Lycoperdales**

*Bovista colorata* (Peck) Kreisel — on ground; Sept. 1998; t; 1: I — DS

*Calvatia excipuliformis* (Schaeff.: Pers.) Perdeck — on ground — among grasses; Aug. 1998; t; 1: I — RS

*Geastrum fimbriatum* Fr. — among deciduous litter; Sept. 1998; l; 1: I — HF

*Lycoperdon echinatum* Pers.: Pers. — on ground — among deciduous litter; Aug. 1998; t; 1: + — HF


*Lycoperdon umbrinum* Pers.: Pers. — on ground — among deciduous litter; Aug. 1998; t; 1: + — HF

**Sclerodermatales**


**Phallales**


**Nidulariales**


*Sphaerobolus stellatus* Tode: Pers. — on deciduous litter, on bits of deciduous wood; Aug. 1998; w₁; 1: III — HF
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Grzyby wielkoowocnikowe różnych siedlisk rezerwatu Łężczok koło Raciborza

S t r e s z c z e n i e

Obserwacje mikologiczne przeprowadzone w latach 1997–1999 obejmowały teren rezerwatu „Łężczok” oraz najbliższe jego otoczenie. W celu dokładnej lokalizacji obserwowanych grzybów zastosowano metodę kartowania wszystkich taksonów w sieci jednakowych pól podstawowych, tj. kwadratów o boku 100 m. Każdy taki kwadrat traktowano jako pojedyncze stanowisko (Fig. 1). Uzyskane dane dotyczące poszczególnych taksonów dotyczą w szczególności: rodzaju zasiedlanego substratu i siedliska, przynależności do określonej grupy ekologicznej, ilościowości oraz daty notowania.

Analiza taksonomiczna pozwoliła na wyróżnienie 222 taksonów grzybów wielkoowocnikowych reprezentujących 105 rodzajów. Nie odnaleziono 27 taksonów podawanych wcześniej z tego terenu. Wśród stwierdzonych przedstawicieli macromycetes dominują grzyby z rzędu Agaricales (147 taksonów) (Tabela 1).

Analiza ekologiczna wykazała dominację grzybów naziemnych (120 taksonów), a wśród nich symbiotycznych ryzbiontów i zasiedlających próchnicę grzybów saprofitycznych (Tabela 1).

Stwierdzono wiele interesujących i rzadkich przedstawicieli macromycetes. Zanotowano m.in. 4 gatunki grzybów będących pod całkowitą ochroną (Boletus parasiticus (Fig. 4), Meripilus giganteus, Grifola frondosa i Phallus impudicus) oraz 31 gatunków zamieszczonych na „czerwonej liście”.

Ciekawe zróżnicowanie siedliskowe w obrębie rezerwatu Łężczok pozwoliło na dostrzeżenie kilku interesujących interakcji, którym podlegają grzyby wyższe w zależności od dostępnych warunków ekologicznych. Różnorodność siedliskowa będące efektem działania wielu różnych czynników stała się przyczyną interesującego schematu rozmieszczenia określonych taksonów grzybów na badanym terenie (Fig. 2, Fig. 3).