

MUSHROOMS LIVING AMONG US: MUSHROOMS–WORLD OF BÁTORLIGET

István, LENTI

College of Nyíregyháza, Department of Plant Production Nyíregyháza

Abstract:

On the East border of Hungary in Szabolcs-Szatmár-Bereg County has been found Bátorliget which has made an international name for itself in the scientific world due to its highly protected glacial swamp and pasture. At the far end of the village reaches the Fényi-forest as far as the county-frontier. These three, with all their historical pasts and improvements carry the formation and the structural changes of the Hungarian-plain. The highly protected nature-reserve consist of the glacial Bátorligeti virgin-bog the Bátorligeti or Nyomási herbage and the Fényi forest that we name altogether the Bátorligeti Nature Reserve.

Keywords: *Bátorliget, mushroom, Fényi-forest*

Introduction

The academican JANOS TUZSON called the attention of the scientific world especially to the reservation in 1914. The exploring botanical and zoological researches began in 1928. The results late served as a basis of the three territory to become a nature reserve by law.

BARTHA (1993) outlined the brief history of mushroom studies in the Nyírség area, listing some internationally recognized scientists like Frigyes Hazslinszky (1818-1896), László Hollós (1859-1940) and Raymund Rapaics involved in the work though in their studies they never referred to this area. The first mycology-related facts are found in the work of BOROS (1923). Academist GÁBOR UBRIZSY started a significant work on mycology studies around that time from 1937 which he extended over the whole Nyírség area (UBRIZSY 1941, 1942, 1943, 1947). He recorded 86 big-fungus species and 56 microscopic size fungi (UBRIZSY 1953) in this area. ÖTVÖS (1971) carried out mycology survey researches in the Fényi-forest listing 122 big-fungus species presented the scientific field whilst I with my colleagues surveyed the Bátorligeti „Nyomási” herbage recording 139 big-fungus species describing this biotop (LENTI et al. 2004). This number have been increased to 512 species due to the mycology studies of RIMÓCZI (2002) and his colleagues on the big-fungus species living in reservation (LENTI - MÁTÉ 1995, 1996, LENTI -RIMÓCZI - MÁTÉ 1997, 1998, LENTI - MÁTÉ - RIMÓCZI 2000).

Material and method

Our data were gained during occasional field visits. We started our survey at the Bátorligeti virgin bog (1995-2000) followed by the mycology opening researches of the Bátorligeti herbage (2000-2005) while simultaneously we began to record the fungi species in the Fényi-forest (1998-2001 and 2003-2006). We did not have regular sample areas set, we plan to do this later during our planned myco-sociological field work. For identifying the big-fungus species and to deal with the classifying questions, we used the national, international literature and a so called identifier-key available (KREIGLSTEINER 1991-1993, KUYPER 1986, MOSER – JÜLICH 1985-1996, NOORDELOOS 1992, RIMÓCZI – VETTER 1990, IGMÁNDY 1991).

Species were identified either in the field or in laboratory and then they were preserved. Location, conditons and microhizza partners were reguralry noted. Pictures were taken of the species bonited on the spot. Data is stored, processed and evaluated on computer by the German Mycological Society „Pilzkartierung 2000” PC programme (SEILT 1991, RIMÓCZI 1994). Classification is based on the categories set by FRADE–ALFONSO (2005).

Results and conclusions

We have bonited 712 big-fungus species from the Bátorligeti virgin bog so far out of which 692 have been precisely determined. The clarification of the rest of the 20 is in progress. This species list is rather diverse concerning that 34 species belong to the 12 genus of the *Phragmobasidiomycetidae*, 28 to the 8 genus of the *Gasteromycetes*, 110 species to the 53 genus of the *Aphylophorales*, and the most 520 to the *Boletales-Agaricales-Russulales* order. Our data shows diverse taxon-richness of big-fungus species in this area in a way that of all the genus rich in species several (eg. the *Entoloma*, *Cortinarius*, *Coprinus*, *Clitocybe*, *Lepiota*, etc.) are not on our list. Species of the *Melanoleuca*, *Cystolepiota*, *Gymnopilus* and the *Lyophyllum* are very few in the reservation. It is certain that these genuses and the damp *Naucoria* genus have been found in large numbers in the Bátorligeti virgin bog.

We were not able to study the big-fungus famillies of the *Ascomycotina* genus like the *Helvellace*, *Humariaceae*, *Pezizaceae*, *Geoglossaceae*, *Helotiaceae* or the *Sphaeriaceae* on the whole though their species were seen quite often on the field. This will be the task for the years to come which as a result could be a significant addition to the list.

There are 478 so called „saprobionta” species among the fungi. We separated the so called “saprobionta” fungi by the work of KRIEGLSTEINER (1993) into decayed and/or

mouldering bottom living species in where we recorded 272 species. The other group is the association of the deeply moulded bottom living species of fungi counting 232 fungus species. Various species (eg. the *Coprinus disseminatus*, *Marasmius rotula*, etc.) have been found in both groups. It is very common that the same species (*Marasminellus ramealis* or the *Tubaria furfuracea*, etc.) can be found on leaves just as much as on bigger-smaller branches or twigs. We found that the fungi we explored, bonited and described are „saprobionta” in large proportion.

In these leafy woods beside the regular species (eg. the *Hirneola mesenterica*, the *Cerrena unicolor*, the *Clitocybe inornata*, etc.) we can find fungi which are characteristic of the hardwood-groves among the „saprobionta” like the *Ramicola haustellaris*, the *Pluteus phlebophorus*, the rarely occurring *Squamanita schreieri*, etc. These species were also recorded by ARNOLDS et al. (1995) and KREISEL (1987) as *Alno-Padion* species. This maybe was not a coincidence because the hardwood-groves show same characteristic feature as the willow-groves (*Salicetalia*) or rather as the vegetation of the oak-hornbeam (*Fagetalia*) mixed groves. This mentioned above have been classified into like one of the association of the ULMION Simon 1954 or rather recently called ALNION (BORHIDI–KEVEY 1996).

The listed fungi are character of hardwood groves at the Bátorligeti virgin bog and they indeed describe these leafy forest here. Not surprisingly we can find big-fungus species as a characteristic aspect of oak-groves like the *Marasmius cohaerens*, the *Antrodiella hoehnerri*, the *Microphale foetidum* and the *M. brassicalens* species. According to KREISEL (1987) these are also the character species of the *Carici-Fagetum*. Both of these *Micromphale* species were present in large numbers in reservation almost forming an aspect not just in green-woods but in the bleak oak-forest as well. Similarly to these species the *Macrotypophula filiformis* presented record-production in the mid September of 1996.

Interestingly that because of the cold climat of the swamp „saprobionta” species of *Fagion* or *Carpinion* associations like *Megacollyba plathyphylla* or otherwise only on the oak-tree trunks appearing *Oudemansiella mucida* here appears on the mulch of *Quercus robur* or rather on its tree-trunk. Also belong here the *Agaricus dulcidulus* which is an oak fungus species. On the other hand KLACHBENNER (1873) bonited these species from the oak-woods over Nagyvárád.

The parasites of the living trees like *Ganoderma adpersum* and the *G. resinaceum* are also the character species of the *Fraxino pannonicae-Ulmetum* and the hill-side associations called *Fagetalia*.

The *Squamanita schreieri* have been present as a character species of groves in the reservation. (RIMÓCZI 2002). The Bátorligeti virgin bog is the second listed propagation area in Hungary like the *Psathyrella silvestris* species recorded here which was found first by BABOS (1989) in willow-alder swamp. The *Psathyrella melanthia* recorded by us is also a typical species of the groves, characteristicly these are *Salicetalia* fungus species. We also listed the *Cytidia salicina* the *Exidia repanda* and the *Phellinus conchatus*.

We observed 30 so called obligat parasits fungus species in the reservation area which means a relatively small number. This show a good condition of the present shape of the tree-clusters in the reservation area. Unfortunately these parasites tindere have a wide host-spectrum in majority like the *Ganoderma lucidum* and the *Phellinus contiguus*. Most of these species belong to the *Quercus* genus like the *Inonotus dryadeus* and the *Phellinus robustus*. Not a surprize at all that the appearance of *Fagus*-living tindere (eg. the *Inonotus obligus*) in this region exist on the *Alnus* or the *Salix* (eg. the *Phellinus ferrus*).

The mycohizza fungus species (204 items) take up one-third of the listed species. The 23 genus includes wide scale of the big fungus species and 80 percent of the mycohizza species belong to the *Quercus robur*. Generally out of the pine-mycohizza fungus species these are more tolerate under the *Quercus robur* (eg. the *Xerocomus badius*) or the *Betula pendula* (eg. the *Amanita muscaria*) in terms of wood-partner.

According to EINHELLINGER (1985) the *Russula faginea* which refers to the oakwood in its name is typically a *Carici-Fagetum* species. On the other hand KREISEL (1987) is of the opinion that these species are also show a character in hornbeam-oak mixed green woods. ARNOLDS et al. (1995) and GALLI (1996) recorded these species from oak-woods. We found them under the *Quercus robur* here in the Bátorligeti virgin bog. We listed the *Hygrophorus crysodon* species likewise from here which is also the fungus of the *Fagetalia*.

We found 22 birch mycohizza fungus species and big-fungus species associated with alder and popler. Birch associated fungus we found them in the patches of *Calamagrosito-Salicetum cinereae* and also under the birch populations along the edges. Each of the mycohizza-fungi living under the *Betula pendula* and the *B. pubescens* is highly protected! Out of these fungi species the *Cortinarius betulorum* is worth to emphasize species which has been found first in Hungary here in this area. In the Fényi-forest 628 big-fungus species have been proved to exist. Out of the 14 habitat types 356 species could be classified into the so called „Red-list” categories accepted by professionals but not settled by law.

The big fungus species exist in the oak-ash-elm groves of the Hungarian-plains in majority (41,6%), in the lowlands hornbeam-oak groves (19,0%) and also the lily of the valley oak

green-woods (19,0%). Besides the open water surfaces (2,1%) in the planted poplar woods (2,1%) and the acacia groves (3, 2%) the fungus-population is very scarce.

We have researched the fungi of the Bátorligeti herbage or as it called here of the „Nyomási” herbage for six years. The results of the fungus surveys is 139 big fungus species. These can be classified into 3 fungus classes and 10 order. The most *Populus* species of the 24 families are the *Tricholomataceae* (14 species) the *Polyporaceae* (7 species), the *Lycoperdaceae* (5 species), while the *Agaricaceae* and *Auriculariaceae* families consist of 4-4 species.

The *Coprinus* (10), *Lepiota*, *Clitocybe* (7-7), *Mycena* and the *Entoloma* (6-6), furthermore the *Agaricus* and the *Helvella* (5-5) have been listed among the most populous families in species.

These recorded species are part of the locally planned so called „Red-list” in 45,3% (63 species). The number of the highly endangered species is 5 (3,6%), the endangered is 51 (36,7%) and the potentially becoming endangered species can come to as much as 7 species (5,0%) in the future.

Superdispersion is a typical quantitative ratio of big-fungus species in this pasture since the appearance of certain species is rare. Normal dispersion is typical only for some certain species (for example the *Lepista nuda*, *Marasimus oreades*, *M. scorodonius*, *Lycoperdon foetidum* and the *Scleroderma bovista*). There are no steady big-fungus myco-associations formed in this biotop yet a small so called stadium-aspects still exist at the skirts of gallery forests and also at certain parts of open sand pastures.

The big fungus species recorded in forest habitats can be found in 20,0 % (RIMÓCZI et al. 1999) the pasture existing species in 45,3 % (LENTI et al. 2004) on the big fungus list of Hungary the so called „Red-list”. On the contrary, only 4 protected fungus species exist in this land protected by law KvVM 23/2005. (III. 30).

The purpose of this work was to summarize all the mycological studies carried out ever by fungi researchers in Bátorliget and the surrounding furthermore to complete their work with our survey results. We hope that our work will contribute to the preservation and development of this region of virgin state and can help to maintain its richness. And besides this is not are hidden purpose to inspire further fungus researches in this biotop.

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