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MAIN CHARACTERS OF THE MYCOFLORA IN FORESTS OF *PINUS PEUCE* GRISEB.

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In forests of *Pinus peuce*, mainly on Pelister Mt., 147 species of macromycetes have been determined up to now. They are presented here in two tables, separately lignicolous, separately terricolous ones, and their role in those forests is discussed. About twenty species are considered to be forming mycorrhiza with *P. peuce*, the most important among them also being typical partners of *Pinus cembra*, i.e. *Suillus sibiricus* and *Chroogomphus helveticus;* the last named forms mycorrhiza with *Picea abies* as well. Twenty lignicolous species, mostly belonging to corticia are here recorded for the first time on wood of *P. peuce*. Since the investigations were few and carried out mostly in autumn, many more taxa are expected to be found by future workers.

Introduction

Pinus peuce Griseb., molika pine, is one of two autochthonous five-needle pines in Europe. It occurs only in the Balkan Peninsula and occupies two rather separated disjunct areas: the western in Yugoslavia and Albania, and the eastern in Bulgaria and Greece. In some localities it forms large forests, pure or mixed with, for instance, fir or beech, in others it grows sporadically, mixed in other types of forests. The locus classicus of *Pinus peuce* is Pelister Mt. in southern Macedonia, at the border with Greece, between Lake Prespa and the town of Bitola; this area is included in Pelister National Park.

As a result of two collecting trips (in October 1966 and 1967) the present author has published three contributions to the mycoflora of larger fungi in molika forests on Pelister Mt., including an annotated list of 85

species (Tortić 1967, 1967a, 1968). Later, some lignicolous macromycetes from such forests on Pelister and from a locality (Gine vode) on northern slopes of Šar Planina Mt. were noted by other authors (Grujoska 1972, 1973, Grujoska and Papazov 1974, Papazov 1973, 1983).

Although the present author had the opportunity to visit Pelister in 1972 and the mentioned locality on Šar Planina in 1978, both visitts were very short, the first in unfavourable conditions (a sudden snowfall), so that only few collections and notes could be made. However, in 1983 she was able to spend a few days on Pelister. This time the attention was paid particularly to lignicolous *Aphyllophorales*, although more important terricolous fungi were studied too. All her visits were made at about the middle of October, except the last, which was at the end of September.

In all, 147 species of macromycetes in molika forests have been established up to now, which is of course far from the real number of taxa occurring there. It was not possible to collect and study all species observed during the visits owing to shortness of time and for other reasons; neither was there an opportunity to investigate the spring and summer mycoflora. Nevertheless, the data obtained are presented here now to give an idea not only of the variety and richness of mycoflora in those forests, but also of the importance of fungi in maintaining this particular ecosystem.

Materials and Methods

Most investigations were carried out on Pelister Mt., predominantly at Begova česma (1400 m). Earlier, the forest association at the locality was named *Pteridio-Pinetum peucis*, consisting either of pure molika stands or molika mixed with fir, and as such was shortly described in a published list (Tortić 1968). Now, these forest are recognised as two associations and are known as *Digitali viridiflorae-Pinetum peucis* Em 1962 with *Pinus peuce* as the only tree species, and *Gentiano luteae-Pinetum peucis abietetosum* Em 1962, where *P. peuce* is mixed with *Abies borissii regis*. In the locality Gine vode (1550—1600 m) on the northern slopes of Šar Planina Mt. another association is developed, *Ajugo pyramidalis-Pinetum peucis* Jank. 1962, which is not taken into account here since few fungi were found there, mostly the same as in Pelister.

The specimens collected by the author are deposited at the Department of Botany, Faculty of Science, University of Zagreb (ZA). Some very common species were only noted.

All the species established are arranged in two tables: lignicolous ones according to the substrate (host) and terricolous (on soil and litter) according to two associations at Pelister; among the latter, mycorrhizal ones are marked M. A few fungi growing on litter are occasionally found also on small bits of wood; they were placed among terricolous ones. The abundance is indicated by r (rarus) = one or few specimens or a small group, n (numerosus) = several groups or a greater number of specimens and a (abundans) = occurring in many places singly or in groups (after Jahn et al. 1967). To show that the abundance was not every time the same n-a or r-n is used; for a few species found only once it is also rated as r-n since it was difficult to estimate. The exponent gives the number of times the species was noted; only three main excursions are included. In the table presenting lignicolous fungi the quantity and

number of finds are not given, since most (mainly corticia) were studied only during the latest excursion in 1983. Species published by others but not observed by the present author are marked by*. Only three species out of those published from Šar Planina or noted there by the author were not found on Pelister and are marked by**.

Discussion and Conclusions

Lignicolous fungi, belonging mostly to *Aphyllophorales*, were collected predominantly on molika and fir; only few species were noted on some hardwoods which are rare at the localities investigated. In addition to those already published, 39 lignicolous species were established during the excursion of 1983, to which can be added two on Šar Planina in 1978. Twenty species, mostly corticia, have not been registered in print on wood of *Pinus peuce.*

Only a few polypores and one agaric are parasites, growing also occasionally on dead wood. The most frequent and important for *Pinus peuce* is *Phaeolus schweinitzii* (P a p a z o v 1983). In Yugoslavia it is found commonly in association with another five-needle pine, the cultivated *Pinus strobus,* rarely attacking other conifers.

Other parasites are *Heterobasidion annosus, Onnia tomentosa, Phellinus pini, Armillariella mellea, Phellinus hartigii.* Their fruitbodies were not observed in large quantities. The two last named were noted here also on fir; in fact, for *Ph. hartigii* the fir is the principal hast. *Fomitopsis pinicola* and *Ganoderma applanatum,* the former noted on molika, the latter on fir, occasionally also grow on living trees, but are more common on dead wood. *Phellinus igniarius* is a parasite mostly on *Salix* spp., on which it was found here. Other species recorded are saprophytes.

Most of the lignicolous fungi listed are more or less frequent in Yugoslavia (their distribution was published only for few), where they occur on other conifers, such as fir or spruce, even if a number of them was found here only on wood of *Pinus peuce.* Rather bound to the wood of *Abies* are *Panellus mitis, Peniophora piceae, Phlebia queletii.* Others, found here only on fir, may turn out later to grow on molika, too. *Phaeolus schweinitzii* and *Ramaria apiculata,* the latter rather frequent here on stumps, seem to prefer the wood of *P. peuce* or at least of five-needle pines.

Some species are apparently rare in Yugoslavia. Up to now *Ramaria apiculata* and *Trechispora microspora* have been observed only on Pelister. For some others, such as *Amylocorticium cebenense, Exidiopsis grisea, Leptosporomyces galzinii, Spongiporus fragilis* etc. only one or few other localities are known in our country.

Among the species on hardwoods the most interesting are *Inonotus hastifer,* bound to *Fagus,* and *Dichomitus campestris,* growing here on *Fagus* and also on *Corylus* which is apparently its preferred host.

Piloderma byssinum and *Amphinema byssoides,* both found on wood of molika (elsewhere in Yugoslavia on other conifers) are cited by most authors as lignicolous fungi, although they are in fact mycorrhizal according to the literature (M i l l e r 1982).

H i n k o v a (1958), in her paper about macromycetes on Rila Mt. in Bulgaria, lists 16 terricolous species occurring in spruce forest where, among other conifers and broadleaved trees, *Pinus peuce* is also admi-

xed. Ten of those fungi were found also on Pelister. They, however, belong to frequent species in Yugoslavia and Europe, occurring in various coniferous and deciduous forests.

Among saprophytic terricolous fungi on Pelister the most abundant (but not in similar quantities every time) were several species of *Mycenae* and also *Collybia butyracea,* predominantly as var. *asema. Cystoderma fallax* and *C. carcharias* were also regularly found. They all are known as decomposers of coniferous litter. Some other fungi on litter, such as *Collybia dryophila* and *Marasmius androsaceus* were found only in few specimens, although they are generally not rare. This may have been due to the season being perhaps too advanced or otherwise unfavourable for the development of their fruitbodies. *Mycenae* also grew sometimes in greater, sometimes in smaller numbers, depending on weather conditions. *Heyderia abietis* was found only once, probably because its small fruitbodies are hard to find and it ought to be searched for. According to Horak (1963), who lists it under the older name of *Mitrula cucullata,* it colonizes in the Alps and the Tatras in large numbers fallen needles of *Pinus cembra;* therefore it probably has the same role on needles of *P. peuce.* Some of the species recorded decompose the litter of both conifers and broadleaved trees and are distributed over various types of forests, as e. g. *Collybia dryophila, Mycena pura, Stropharia aeruginosa. Coprinus niveus* and *Stropharia semiglobata* grew here, typically, on animal dung.

Many terricolous fungi enter into mycorrhizal relation with various trees and are indispensable for healthy development of forests. In this case it was interesting and important to try and find out which species form mycorrhiza with *Pinus peuce.* Of course, the direct proof is the connection between fruitbodies and roots of trees, but searching for it is a difficult and time consuming task which only specialists can undertake. However, if fungi which are known to be obligatory mycorrhizal were observed in pure molika stands, it was reasonable to suppose their relation with this pine. The first fungi I met on coming to the forest of *P.peuce* for the first time were *Suillus sibiricus* and *Chroogomphus helveticus,* both known as mycorrhizal partners of *Pinus cembra,* the latter also of *Picea abies.* They are abundant on Pelister in pure molika forests as well as in those of molika and fir. I did not observe them on Šar Planina, which can be explained by the very short time spent there. If they did not grow in great quantities, they may have been missed. *Ch.helveticus* was found in mixed forest on Pelister also in places where only fir trees were observed, but this cannot be taken as evidence that it forms mycorrhiza also with *Abies,* since there were perhaps some living roots of molika in the soil, or maybe some standing trees of this pine were overlooked.

Other European partners of five-needle pines, *Suillus plorans* and *S.placidus* were not yet found in molika forests. Since the former fruits in summer, there is still a possibility left to find it sometime earlier in the year.

Other mycorrhizal fungi in pure molika stands are followers of several conifers, some also of broadleaved trees. Most abundant were *Lactarius mitissimus, Amanita muscaria, Laccaria laccata* and *Russula delica.*

Very interesting was the find of *Amanita caesarea,* which usually grows at low altitudes, mostly under *Quercus* spp. Here it was observed only once, in a pure molika forest, forming a half of a fairy ring. It has been recorded in North America under *Pinus strobus* and *P. vir-*

Table 1. Lignicolous fungi in *Pinus peuce* forests on Pelister and Šar Planina Mts.

Species	*Pinus peuce*	*Abies bor.r.*	*Fagus sylv.*	Others
Amphinema byssoides (Fr.) John Erikss.	+			
Athelia epiphylla Pers. s. l.**	+			
Botryobasidium botryosum (Bres.) John Erikss.	+			
B. subcoronatum (Höhn. et Litsch.) Donk	+			
Fomitopsis pinicola (Sw. ex Fr.) P. Karst.*	+			
Gloeophyllum sepiarium (Wulf. ex Fr.) P. Karst.*'**	+			
Heterobasidion annosus (Fr.) Bref.	+			
Hygrophoropsis aurantiaca (Wulf. ex Fr.) R. Mre	+			
Hypholoma fasciculare (Huds. ex Fr.) Kummer	+			
Hypochnicium punctulatum (Cooke) John Erikss.	+			
Lentinus lepideus (Fr. ex Fr.) Fr.	+			
Leptosporomyces galzinii (Bourd.) Jülich	+			
Mycena galericulata (Scop. ex Fr.) S. F. Gray	+			
Onnia tomentosa (Fr.) P. Karst.	+			
Phaeolus schweinitzii (Fr.) Pat.	+			
Phellinus pini (Thore ex Fr.) Pilát*	+			
Phlebiopsis gigantea (Fr.) Jülich	+			
Piloderma byssinum (P. Karst.) Jülich	+			
Pluteus atromarginatus (Konr.) Kühn.	+			
Ramaria apiculata (Fr.) Donk	+			
Resinicium bicolor (Alb. et Schw. ex Fr.) Parm.	+			
Spongiporus fragilis (Fr.) David	+			
Trechispora farinacea (Fr.) Liberta	+			
T. microspora (P. Karst.) Liberta	+			
T. vaga (Fr.) Liberta	+			
Tulasnella violea (Quél.) Bourd. et Galz.**	+			
Amylostereum chailletii (Pers. ex Fr.) Boid.	+	+		
Armillariella mellea (Vahl. ex Fr.) P. Karst. s. l.	+	+		
Calocera viscosa (Pers. ex Fr.) Fr.	+	+		
Gloeocystidiellum citrinum (Pers.) Donk	+	+		
Hirschioporus abietinus (Dicks. ex Fr.) Donk	+	+		
Hyphoderma setigerum (Fr.) Donk	+	+		
Phellinus hartigii (All. et Schn.) Bond.	+	+		
Sistotrema brinkmanii (Bres.) John Erikss.	+	+		
Skeletocutis amorpha (Fr.) Kotl. et Pouz.	+	+		
Stereum sanguinolentum (Alb. et Schw. ex Fr.) Fr.	+	+		
Phanerochaete sordida (P. Karst.) Erikss. et Ryv.	+	+	+	
Amylocorticium cebenense (Bourd.) Pouz.		+		
Athelopsis glaucina (Bourd. et Galz.) Parm.		+		
Dacrymyces stillatus Nees ex Fr.		+		
Dacryobolus sudans (Fr.) Fr.		+		
Exidiopsis grisea (Pers.) Bourd. et Maire		+		
Ganoderma applanatum (Pers.) Pat.*		+		
Gloeophyllum abietinum (Bull. ex Fr.) P. Karst.*		+		
Hapalopilus nidulans (Fr.) P. Karst.		+		
Panellus mitis (Pers. ex Fr.) Sing.		+		
Peniophora piceae (Pers.) John Erikss.		+		
Phlebia queletii (Bourd. et Galz.) M. P. Christ.		+		
Schizophyllum commune Fr.*		+		
Tubulicrinis glebulosus (Bres.) Donk		+		
Tyromyces caesius (Schrad. ex Fr.) Kummer		+		
Inonotus hastifer Pouz.			+	
Peniophora incarnata (Fr.) P. Karst.			+	
Plicaturopsis crispa (Pers. ex Fr.) Reid			+	
Stereum rugosum (Pers. ex Fr.) Fr.			+	
Dichomitus campestris (Quél.) Domań. et Orlicz			+	*Coryl. av.*
Stereum hirsutum (Willd.) Pers.			+	*Alnus* sp.
Trametes versicolor (L. ex Fr.) Quél.			+	*Alnus* sp.
Clavariadelphus fistulosus (Fr.) Corner				*Alnus* ?
Marasmius rotula (Scop. ex Fr.) Fr.				*Alnus* ?
Phellinus igniarius (L. ex Fr.) Quél.				*Salix* sp.
Stropharia squamosa (Pers. ex Fr.) Quél.				?

Species marked by * were not seen by the present author and are cited after publications
Species marked by ** were noted only on Šar Planina

Table 2. Terricolous fungi in *Pinus peuce* forests on Pelister Mt.

Species	*D.v.-P.p.*	*G.l.-P.p.a.*	*Mycorrhiza*
Mycena rosella (Fr.) Kummer	a^3	a^3	
Suillus sibiricus (Sing.) Sing.	$n - a^3$	n^3	M
Chroogomphus helveticus (Sing.) Mos.	n^3	$n - a^3$	M
Lactarius mitissimus Fr.	n^3	$n - a^2$	M
Laccaria laccata (Scop. ex Fr.) Bk. et Br.	n^3	n^2	M
Mycena capillaripes Peck	a^2	r^1	
M. viscosa (Secr.) R. Maire	n^3	n^1	
Amanita muscaria (L. ex Fr.) Kummer	n^2	n^3	M
Collybia butyracea (Bull. ex Fr.) Quél. v. *asema* Fr.	n^1	n^3	
Russula delica Fr.	n^3	n^1	M
Mycena pura (Pers. ex Fr.) Kummer	n^1	n^2	
Amanita umbrinolutea Secr.	n^2	r^1	M
Mycena epipterygia (Scop. ex Fr.) S. F. Gray	n^2	r^1	
Cystoderma fallax Smith et Sing.	$r - n^3$	$r - n^3$	
C. carcharias (Pers ex Secr.) Fayod	r^3	r^2	
Lycoperdon perlatum Pers.	n^1	n^2	
Inocybe geophylla (Sow. ex Fr.) Kummer	$r - n^1$	n^2	M
Tricholoma terreum (Schaeff. ex Fr.) Kummer	r^1	n^2	M
Clitocybe nebularis (Batsch ex Fr.) Kummer	r^2	$r - n^3$	
Collybia tuberosa (Bull. ex Fr.) Quél.	r^1	$r - n^3$	
Tricholoma sulphureum (Bull. ex Fr.) Kummer	r^1	$r - n^3$	M
Clitopilus prunulus (Scop. ex Fr.) Kummer	r^2	$r - n^2$	
Marasmius chordalis Fr.	n^1	r^1	
Stropharia aeruginosa (Curt. ex Fr.) Quél.	r^2	r^2	
Boletus edulis Bull. ex Fr. s. lato	r^2	r^2	M
Hydnum repandum L.	r^2	n^1	
Lactarius deliciosus (L. ex Fr.) S. F. Gray	r^2	r^1	M
Clitocybe trullaeformis (Fr.) P. Karst.	r^1	r^2	
Marasmius androsaceus (L. ex Fr.) Fr.	r^1	r^2	
Laccaria amethystina (Bolt. ex Hooker) Murr.	r^1	$r - n^1$	M
Boletus erythropus Fr.	r^1	r^1	M
Lepiota ventriosospora Reid	r^1	r^1	
Crucibulum laeve (Huds.) Rehl.) Kambly	r^1	r^1	
Macrolepiota procera (Scop. ex Fr.) Sing.	r^1	r^1	
Mycena aurantiomarginata (Fr.) Quél.	r^1	r^1	
Xeromphalina cornui (Quél.) Favre	r^1	r^1	
Xerocomus chrysenteron (Bull. ex St.-Am.) Quél.	n^2		M
Amanita caesarea (Scop. ex Fr.) Pers. ex Schw.	$r - n^1$		M
Albatrellus cristatus (Pers. ex Fr.) Kotl. et Pouz.	$r - n^1$		
Mycena clavicularis (Fr.) Gill.	$r - n^1$		
M. amicta (Fr.) Quél.	r^1		
Amanita pantherina (DC ex Fr.) Secr.	r^1		M
Collybia dryophila (Bull. ex Fr.) Kummer	r^1		
Conocybe tenera (Schff. ex Fr.) Kühn.	r^1		
Hydnum rufescens Fr.	r^1		
Inocybe pudica Kühn.	r^1		M
Leotia lubrica Pers.	r^1		
Melanoleuca graminicola (Vel.) Kühn. et Romagn.	r^1		M
Strobilurus stephanocystis (Hora) Sing.	r^1		
Suillus luteus (L. ex Fr.) S. F. Gray	r^1		M
Xeromphalina fellea R. Mre et Mal.	r^1		
Clitocybe odora (Bull. ex Fr.) Kummer		n^3	
Lactarius salmonicolor Heim et Leclaire		n^3	M
Tricholoma saponaceum (Fr.) Kummer		n^2	M
Cantharellus cibarius Fr.		$r - n^2$	M
Clitocybe inversa (Scop. ex Fr.) Quél.		r^2	
Collybia racemosa (Pers. ex Fr.) Quél.		r^2	
Hygrophorus chrysodon (Batsch) Fr.		r^2	M
Stropharia semiglobata (Batsch ex Fr.) Quél.		r^2	
Clavulina rugosa (Fr.) Schroeter		r^2	
Cantharellus tubaeformis Fr.		n^1	M
Micromphale perforans (Hoffm. ex Fr.) Sing.		n^1	
Agaricus silvicola (Vitt.) Sacc.		r^1	
Amanita rubescens (Pers. ex Fr.) S. F. Gray		r^1	M
Boletus fechtneri Vel.		r^1	M
Calocybe onychina (Fr.) Donk		r^1	
Camarophyllus russocoriaceus Bk. et Br.		r^1	
Chalciporus piperatus (Bull. ex Fr.) Bat.		r^1	M
Clitocybe costata Kühn. et Romagn.		r^1	
Coprinus niveus (Pers. ex Fr.) Fr.		r^1	
Entoloma byssisedum (Pers. ex Fr.) Donk		r^1	
Heyderia abietis (Fr.) Weinm. var. *abietis*		r^1	
Hygrocybe conica (Scop. ex Fr.) Kummer		r^1	
Hygrophorus calophyllus P. Karst.		r^1	M
H. camarophyllus (Alb. et Schw. ex Fr.) Fr.		r^1	M
Lepiota clypeolaria (Bull. ex Fr.) Kummer		r^1	
Leucocortinarius bulbiger (Alb. et Schw. ex Fr.) Sing.		r^1	M
Lycoperdon echinatum Pers.		r^1	
Macrocystidia cucumis (Pers. ex Fr.) Heim		r^1	
Mycena rosea (Bull.) Sacc. et Dalla Costa		r^1	
Otidea onotica (Pers.) Fuckel		r^1	
Phellodon melaleucus (Sw. ap. Fr. ex Fr.) P. Karst.		r^1	
Pseudoclitocybe cyathiformis (Bull. ex Fr.) Sing.		r^1	
Russula nigricans (Bull. ex Mérat) Fr.		r^1	M
Cyathus olla (Batsch) ex Pers.	in grass at the border of a road r^1		

D.v.—P.p. = *Digitali viridiflorae-Pinetum peucis*
G.l.—P.p.a. = *Gentiano luteae-Pinetum peucis abietetosum*
r = rarus (one or few specimens or a small group)
n = numerosus (several groups or a greater number of specimens)
a = abundans (occurring abundantly)

giniana (T r a p p e 1962). *Suillus luteus,* a common partner of two-needle pines, was found in two specimens under *P.peuce* at Pelister and two days later in large numbers in a tree plantation at Kruševo, both under *P. nigra* and *P. strobus.* According to T r a p p e (1962) it was noted under *P.strobus* by several authors.

Some mycorrhizal fungi were observed only in mixed forest of molika and fir and no conclusions can be made as to which tree they were in contact with, except for *Lactarius salmonicolor,* known to be the partner of *Abies* spp.

Consequently, about twenty species can be considered as proved to form mycorrhiza with *Pinus peuce.* There must be, however, many more, since quite a number of fungi belonging to mycorrhizal species and genera, and growing in pure molika stands were not collected and studied, e. g. several species of *Inocybe, Lactarius, Russula* (in addition to those determined), also various *Cortinarius* spp. and others. Therefore, *P.peuce* seems to be quite well provided with mycorrhizal partners.

Table 2 shows that there are some differences in mycoflora of terrestrial species between the two forest associations compared. Because of the small number of observations those differences are probably more accidental than real, and species found in only one association may be found later in another one. Moreover, as already stated, many fungi observed here in both or only one association are spread in Yugoslavia and elsewhere in various types of forests.

However, a few species seem to be characteristic of forests containing *Pinus peuce: Suillus sibiricus* and *Chroogomphus helveticus,* its mycorrhizal partners, *Ramaria apiculata,* on stumps, *Heyderia abietis,* on fallen needles, and *Phaeolus schweinitzii,* as a parasite of old trees.

In conclusion one can state that the mycoflora of large fungi in forests of *Pinus peuce* seems to be rich and varied and further investigations are needed to make at least a halfway adequate inventory of its species.

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SAŽETAK

OSNOVNE KARAKTERISTIKE MIKOFLORE U ŠUMAMA MOLIKE (*PINUS PEUCE* GRISEB.)

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U šumama molike u Jugoslaviji determinirano je dosad 147 vrsta makromiceta, od čega je nešto preko polovice objavljeno, kako je to navedeno u engleskom tekstu. Broj tamošnjih viših gljiva bez sumnje je mnogo veći, jer za ekskurzija nije bilo moguće sabrati, zbog kratkoće vremena i pomanjkanja mogućnosti za sušenje materijala, niti sve vrste koje su opažene; a nisu također ni proljetni ni ljetni aspekti bili proučavani. Ipak i dosadanji podaci mogu nam donekle predočiti sliku mikoflore tih šuma.

Pretežno je istraživano područje Pelistera, na lokalitetu Begova češma, 1400 m, gdje su razvijene asocijacije *Digitali viridiflorae — Pinetum peucis* (čista šuma molike) i *Gentiano luteae — Pinetum peucis abietetosum*, gdje je molika miješana s jelom. Iako su uočene neke razlike u sastavu mikoflore tih asocijacija, one su vjerojatno više slučajne nego karakteristične. Velik broj gljiva koje su ustanovljene samo u jednoj od tamošnjih šuma poznate su iz drugih krajeva Jugoslavije gdje se razvijaju u različitim četinarskim te u listopadnim šumama.

Ustanovljene su vrste prikazane na dvije tabele, posebno lignikolne, posebno terikolne. Lignikolne su poredane prema domaćinu (supstratu) i kako su najvećim dijelom istraživane samo za jedne (posljednje) ekskurzije nisu se mogli donijeti pouzdani zaključci o njihovoj abundanciji pa ona nije ni označena. Terikolne su raspoređene prema navedenim asocijacijama; označena je njihova učestalost a istaknuto je i koje su od njih mikorizne.

Od lignikolnih gljiva dio je nađen samo na drvu molike, dio samo na drvu jele, a neke i na oba domaćina. Radi se, međutim, pretežno o vrstama koje dolaze na različitim četinjačama; dvadeset još nije bilo objavljeno s *Pinus peuce*. Neke su od tih gljiva parasiti, kao *Phaeolus schweinitzii, Heterobasidion annosus, Armillariella mellea, Phellinus hartigii* itd. Od njih je prvi osobito važan kao izazivač smeđe truleži drva *P.peuce*, a čest je u nas i na sađenom *Pinus strobus*. Ostali rastu u drugim našim krajevima na različitim domaćinima. Ustanovljeni saprofiti također su najvećim dijelom poznati s drugih lokaliteta u našoj zemlji i uglavnom su česti. Za moliku je, čini se, karakteristična *Ramaria apiculata* koja je na Pelisteru prilično rasprostranjena na trulim panjevima. Na lišćarima, koji su na istraživanom lokalitetu rijetki, sabrano je samo nekoliko lignikolnih gljiva.

Među terikolnim gljivama osobito su česte bile *Mycena* spp., većinom na opalim iglicama molike i jele; neke su se vrste razvijale u golemim masama. Važni su razgrađivači stelje četinjača. *Collybia butyracea, Cystoderma* spp., *Stropharia aeruginosa* i dr. također razgrađuju stelju četinjača a neke i listača.

Najinteresantnije su u ovom slučaju bile mikorizne vrste, jer je trebalo zaključiti koje bi od njih mogle biti pratioci *Pinus peuce*. To se može ustanoviti tako da se u tlu potraži s kojim su korijenjem plodišta u izravnoj vezi, no to je težak i dugotrajan posao. Ako je međutim neka obligatno mikorizna vrsta nađena u čistoj šumi molike, moglo se sa sigurnošću pretpostaviti da je u vezi s *Pinus peuce*.

Već je za prve ekskurzije ustanovljeno da su u ovim šumama raširene dvije vrste, poznate kao karakteristični pratioci *Pinus cembra* u Alpama: *Suillus sibiricus* i *Chroogomphus helveticus* (posljednji čini mikorizu također s *Picea abies*). Ostale mikorizne gljive nađene u čistoj šumi molike rastu inače u vezi i s drugim četinjačama a neke i listačama, kao *Amanita muscaria, A.pantherina, Boletus edulis, Laccaria laccata, Lactarius mitissimus, Tricholoma terreum* i dr. Zanimljivo je da je jednom tamo nađena i *Amanita caesarea*, termofilna vrsta koja raste redovito pod hrastovima i kestenima. Prema tome se za dvadesetak vrsta može smatrati dokazanim da čine mikorizu s *Pinus peuce*.

Opaženi su i drugi predstavnici ovih a i još nekih mikoriznih rodova gljiva koji nisu zasad sabirani ni proučavani. Čini se dakle da molika ima prilično velik broj mikoriznih partnera.

Kao jače ili slabije vezane vrste za šume molike, mogu se zasad smatrati samo njezini mikorizni pratioci: *Suillus sibiricus* i *Chroogomphus helveticus*, zatim *Ramaria apiculata, Phaeolus schweinitzii*, te *Heyderia abietis* koja u Alpama naseljava specijalno opale iglice *Pinus cembra* a ovdje je nađena na opalim iglicama *Pinus peuce*.

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