

## FUNGAL MICROBIOME OF FOREST SOIL: A HIDDEN MICROCOSMOS UNDER BLUEBERRY ROOTS

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### ABSTRACT

Soil fungi play an irreplaceable role in energy streaming, nutrient cycling, organic matter mineralization and degradation, and the establishment of symbiotic and pathogenic interactions with plants. They build a micro basis for plant growth, development, functioning, and productivity of the whole ecosystem. Natural forest ecosystems provide a unique perspective for the study of the soil microbiota. A great microbial diversity observed in them is a key to improve soil health and biogeochemical cycles.

### MATERIAL AND METHOD

The ZymoBIOMICS® Targeted Sequencing Service was used for Microbiome Analysis (Zymo Research, Irvine, CA). DNA samples preparation: Quick-16S™ NGS Library Prep Kit. Primer set: ZymoBIOMICS® Services ITS2 Primer Set. The sequencing was performed with 10% PhiX spike-in. Zymo Research 16S Database was used for taxonomy assignment.

### AIM

The screening of fungal diversity of natural forest soil sampled from area settled in Nature Park Golija (Ivanjica, Serbia) covered with mixed beech-fir-spruce forests (*Piceo-Fago-abietetum*) and blueberry shrubs (*Vaccinium myrtillus* L.).

### CONCLUSION

- The presence of various ericoid mycorrhizal fungi is confirmed in the analyzed rhizosphere;
- The detected organisms are N, P, K, Zn suppliers;
- *Trichoglossum walteri*, *Hygrocybe cantharellus* and *Neohygrocybe ingrata* are at The IUCN Red List;
- A big share of unassigned/unidentified DNA confirms how much is unknown regarding micro-world and how big potential is hidden under blueberry roots.

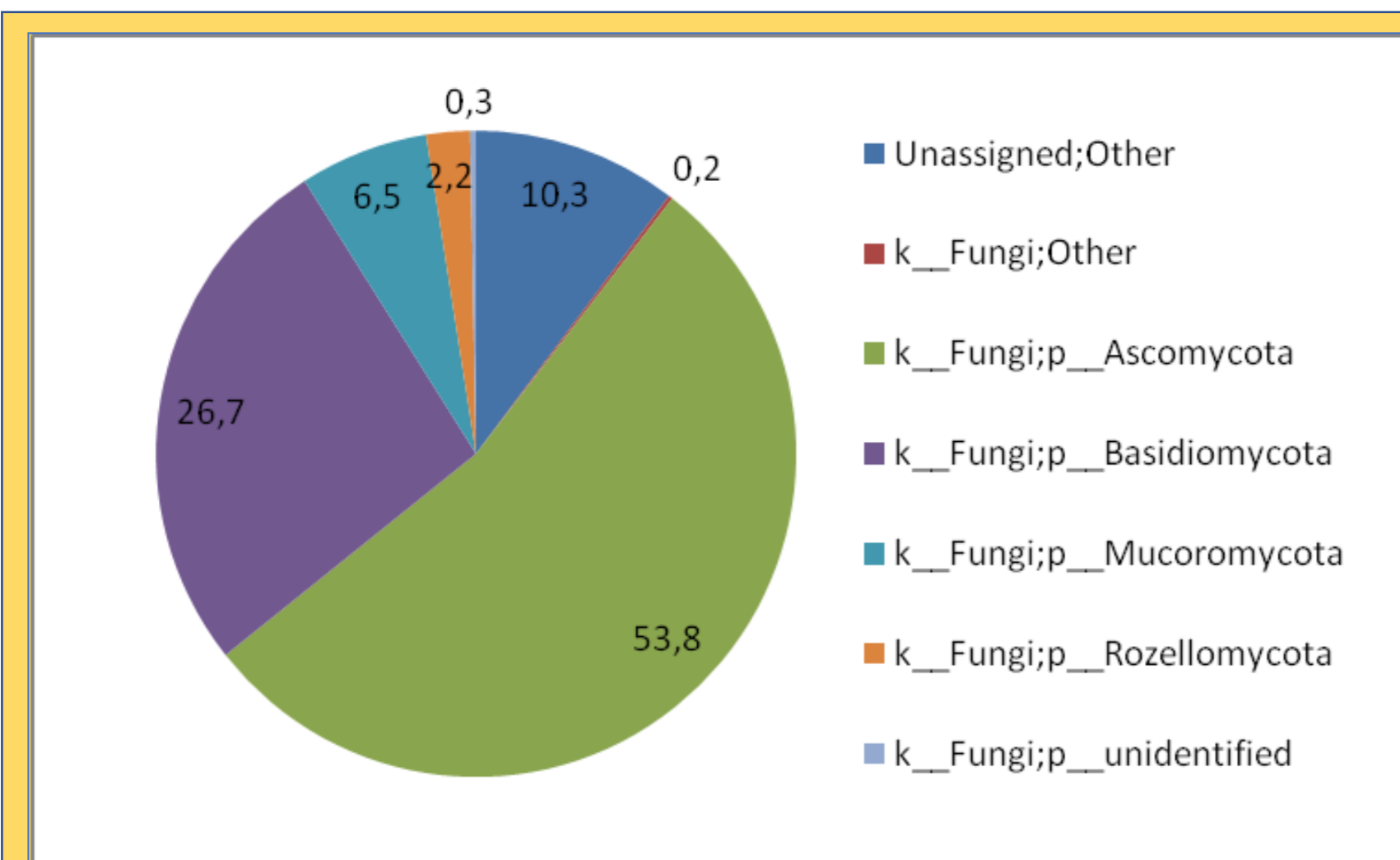


Figure 1. Fungal community composition at phylum level

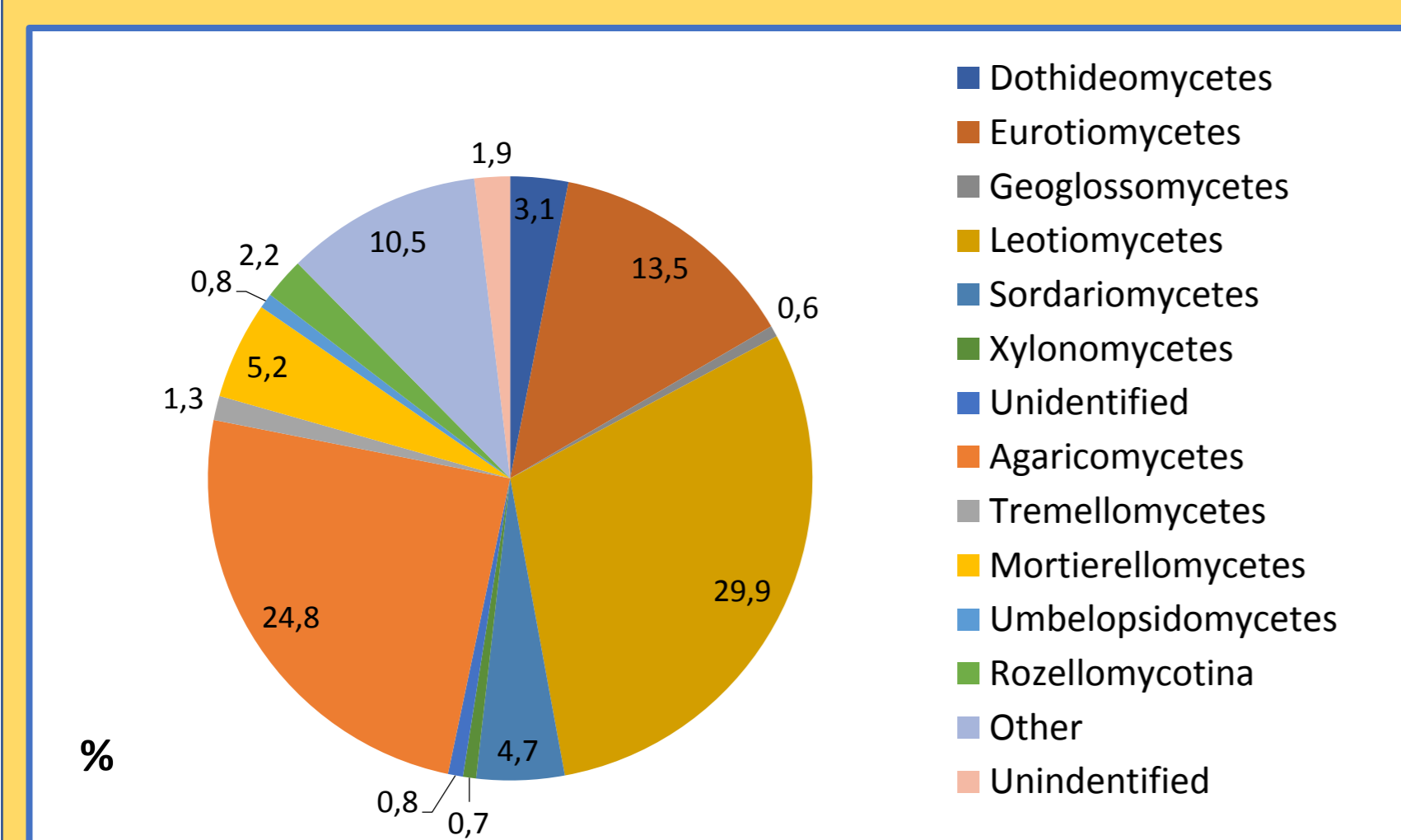


Figure 2. Classes-level of fungi in blueberry soil (RA > 0.5%)



*Trichoglossum walteri*



*Neohygrocybe ingrata*



*Hygrocybe cantharellus*

### RESULTS

*Ascomycota* are well-known ericoid mycorrhizae fungi. The *Basidiomycota* improve plant growth by mineralization of lignin-rich residues. *Mucoromycota* are involved in mineralization of very complex organic matter (pectin, hemicellulose, lipids, proteins). Order *Helotiales* mainly consists of fungi that form ericoid mycorrhiza and its relative abundance is 12.8%. The targeted sequencing of obtained DNA sample revealed the presence of several genera of ericoid mycorrhizal fungi, *Clavaria* sp., *Hyaloscypha* sp., *Oidiodendron* sp., *Lachnum* sp. and *Pezoloma* sp.

Table 1. Genders of fungi in blueberry soil with ra > 0.5%

Family	Gender	RA (%)
Cladosporiaceae	Cladosporium	0.90
Melanommataceae	Other	1.10
Herpotrichiellaceae	unidentified	5.10
Aspergillaceae	Penicillium	2.00
Geoglossaceae	Trichoglossum	0.50
Hyaloscyphaceae	Other	1.40
	Hyaloscypha	1.50
	Lachnum	0.60
Leotiaceae	Pezoloma	0.50
Myxotrichaceae	Oidiodendron	1.20
Pseudeurotiaceae	Other	3.30
Hypocreaceae	Trichoderma	0.90
Clavariaceae	Camarophylloopsis	3.50
	Clavaria	18.40
Tricholomataceae	Pseudotracheloma	0.80
Mortierellaceae	Mortierella	5.20
Umbelopsidaceae	Umbelopsis	0.80
Unidentified	Chalara	1.10
Unidentified	Leohumicola	4.50