

## Mushrooms associated with alder trees (*Alnus glutinosa*) in the priority habitat 91E0\*

November 2018 forays

## By Elias Polemis & Georgios I. Zervakis

Agricultural University of Athens, Laboratory of General and Agricultural Microbiology

Some of the most important alder stands of Andros Island were recently visited (November 2018) in a series of forays specifically devoted at collecting mushrooms (i.e. fruit-bodies of particular fungi) associated with alder trees.



Being either saprotrophs that decompose dead wood and leaf-litter, or mutualistic partners forming symbiotic relationships with alders, such fungi are important for the equilibrium of natural ecosystems, while they constitute a unique part of the biodiversity of this endangered habitat. In addition, the mushrooms produced may be exploited by us humans because of their culinary value and/or medicinal properties.

The central mountainous part of Andros hosts some of the most healthy and beautiful alder stands. At first sight, no sign of a single mushroom! However, after a more thorough search they became visible, and yes, the alder-mushrooms were there! Some hidden in the cavities of trunks, others covered by a thick layer of fallen leaves, others growing as peculiar Zenio in Kouvara summit, 800 m a.s.l., a typical pure alder stand in the highlands of Andros, close to the springs of the river that flows along the village of Vourkoti into the valley of Achla.

November 2018 mushroom forays - E. Polemis & G. I. Zervakis



The LIFE16 NAT/GR/000606 project is implemented with the financial support of the European Union.



crusts on the underside of fallen branches, mushrooms of every type, shape and color were found all-over the place, thanks to the presence of alder trees.

Among the most diverse mushrooms that decompose dead wood are these of the genus *Mycena*. During November's forays, four species of Mycena were collected on and by the alder trees. However, the identification of these species is not an easy task. Thorough investigation of their microscopic features is needed, while DNA sequencing is often required to accurately determine the organism under investigation.

Going downhill from Zenio along the river, another site of interest is found near the village of Vourkoti, next to the old stone-built bridge by the trail path no. 2.

Just a few meters away from the trail path's sign, a hiker can see the old picturesque bridge, and just next to it a beautiful stand of alders above the plane trees. At this particular locality a whole mushroom world was waiting to be discovered. Being one of the most mushroom-rich regions of Andros, Vourkoti hosts a large number of



A bundle of tiny mushrooms of the genus *Mycena* growing within a cavity of an alder tree trunk

2

alder associated species as well. Several of them were recorded again last November and have been added to the pertinent catalogue.



Among the symbiotic ("ectomycorrhizal") mushrooms appearing in alder stands, at least two species of *Naucoria*, (an important alder-specific genus, previously known as "*Alnicola*" which means "alder loving") were recorded there, together with the widespread *Paxillus* cf. *rubicundulus*, a tiny *Cortinarius* which awaits determination, some *Lactarius* species and a small but beautiful *Russula* specimen. Finding them was not the easiest task since they were hidden under the alder leaves or in the dark moist cavities of rocks.

November 2018 mushroom forays - E. Polemis & G. I. Zervakis







With pileus hardly exceeding one centimeter in diameter and a dark brown color (as the moist soil around) these minute Cortinarii are a real challenge to see!

Definitely those symbiotic mushrooms of the alder trees are not the most impressive when compared to other species of the aforementioned genera. In most cases they are so tiny that can hardly be spotted. Nevertheless, for a mycologist or a mushroom enthusiast they are a real treasure to discover, since they are rarely reported and probably most of them have never been recorded in Greece before. Microscopy and DNA analysis will prove it.



A beautiful *Lactarius* species, shown next to alder leaves and cones, which are indicative of its tiny size.



A still unnamed *Russula* specimen representing one of the smallest sized species of the genus

3



s it has been already mentioned the genus *Naucoria* is the most important among the alder-associated ymbiotic fungi. They all look almost the same with naked eye but under microscope they prove to be quite ifferent. And the question is how many *Naucoria* species exist in the alder stands of Andros? Let's find out!

November 2018 mushroom forays - E. Polemis & G. I. Zervakis



The LIFE16 NAT/GR/000606 project is implemented with the financial support of the European Union.



## But where are the little Naucorias hiding?



And one and two and three, chase Naucorias trick! After removing the alder-leaves the hidden world of Naucorias is revealed, not one or two but hundreds of tiny mushrooms within an area of few square meters! And all these mushrooms are just the visible part of the fungal world, whose underground network interconnects the roots of alder trees, helping them to absorb minerals and in reciprocity they are fed organic compounds by the trees in a well-balanced mutualistic symbiosis evolved millions years ago. If one considers that, then maybe those humble creatures of Mother Nature would become a true subject of interest.

November 2018 mushroom forays - E. Polemis & G. I. Zervakis



The LIFE16 NAT/GR/000606 project is implemented with the financial support of the European Union.

www.life-androspark.gr

4



## From the highlands to the lowlands and the alder forest of Vori beach



From the beginning of the project LIFE Andros Park it was known that the most important land area for the priority habitat was the alluvial forest by the estuaries of the stream at Vori beach. This forest consists only of alder trees and remains the biggest alder-stand existing in Andros. Unfortunately the floods of 2011-12 had a deleterious effect on the health of many trees. Nowadays the forest is declining and large parts of it are covered by dead trees.

However, elsewhere in the alder stand the trees are still alive and healthy, and lots of alder-specific mushrooms are thriving. Although November 2017 was a good season for mushrooms in Vori's alder forest, this year's conditions were not favourable. Limited rainfalls and relatively high temperatures didn't help the appearance of mushrooms; therefore, pertinent findings from Vori were rather few and in absolute contrast to those from the highlands.



The "bad" and the "good" view of the alder forest in Vori, photographed during the summer of 2018

Due to the large amounts of plant residues, the alder forest of

ΝΣΤΙΤΟΥΤΟ ΑΓΡΟΤΙΚΗΣ

ΟΙΚΟΝΟΜΙΑΣ ΚΑΙ ΚΟΙΝΩΝΙΟΛΟΓΙΑΣ (ΙΝΑΓΡΟΚ)

November 2018 mushroom forays - E. Polemis & G. I. Zervakis

×B



The LIFE16 NAT/GR/000606 project is implemented with the financial support of the European Union.



Vori hosts a large number of saprotrophic fungi as well, growing on the wood of dead trunks. In this way, such wood-rotting ("saproxylic") fungi are decomposing and recycling carbon compounds in plants, and thus retain the fertility of soil. Moreover, they often produce impressive mushrooms; some of them are good edibles while others are known to possess valuable medicinal properties. During November's forays, several interesting saproxylic species of mushrooms were detected in Vori.

Surely the best-known and easier to recognize was the "oyster-mushroom" (genus *Pleurotus*), which is widely consumed since it is a cultivated species. *Gymnopilus junonius* was known to grow on alder trees from previous investigations in Andros; it produces large-sized mushrooms impressively coloured in shades of bright orange and yellow. <u>Warning</u>: this is not an edible mushroom due to its extremely bitter taste!



A cluster of semi-dried *Pleurotus* mushrooms on a dead, still standing trunk of alder.





*Gymnopus junonius* previously known as *G. spectabilis*, a more fitting name for this spectacular, inedible mushroom species appearing by a dead, still standing trunk of alder.

Among the world's most famous mushrooms for their medicinal properties are those belonging to the genus Ganoderma. In particular, G. adspersum was repeatedly found on several trunks of dead alder trees during the last few years. This species produces perennial mushrooms, meaning that they can survive for more than one year, and sometimes they can persist for several years and become very big in size. They are not so common in Andros and removing them from the trees is not

6

considered appropriate (not nature-friendly). These mushroom species are not usually harmful to the trees since they colonize dead parts and hence contribute to the faster deterioration of aged or injured wood.

Last but not least, *Trameter versicolor* is another well-known wood-rot mushroom species found this season in Vori's alder forest. It is also known by the common name "turkey tale", the reason being its beautiful multi coloured caps resembling the tale of this bird. Moreover, it is among the

November 2018 mushroom forays - E. Polemis & G. I. Zervakis







Ganoderma adspersum; a twothree years old mushroom growing on the trunk base of a living alder tree

most important medicinal mushrooms with clinically confirmed anti-tumor, anti-viral and antibacterial properties.



Trametes versicolor covering a large portion of the trunk of a dead, but still standing, alder tree in Vori's forest.

Acknowledgments: This work is funded by the project titled "LIFE Andros Park" (LIFE16 NAT/GR/000606). E. Polemis was supported through an IKY scholarship programme for post-doctorate studies, which is co-financed by the European Union (European Social Fund - ESF) and Greek national funds through the action entitled "Reinforcement of Postdoctoral Researchers", in the framework of the Operational Programme "Human

November 2018 mushroom forays - E. Polemis & G. I. Zervakis 7 ΙΝΣΤΙΤΟΥΤΟ ΑΓΡΟΤΙΚΗΣ ΟΙΚΟΝΟΜΙΑΣ ΚΑΙ ΚΟΙΝΟΙΟΛΟΓΙΑΣ (ΙΝΑΓΡΟΚ) ΝΙΚΟ ΠΑΝΕΠΙΣΤΗΜΙΟ ΑΘΗΝΩΝ 產καϊρειος Βιβλιοθήκη

Resources Development Program, Education and Lifelong Learning" of the National Strategic Reference

The LIFE16 NAT/GR/000606 project is implemented with the financial support of the European Union.

Framework (NSRF) 2014 - 2020.