



ΔΗΜΟΚΡΙΤΕΙΟ
ΠΑΝΕΠΙΣΤΗΜΙΟ
ΘΡΑΚΗΣ

DEMOCRITUS
UNIVERSITY
OF THRACE

Democritus University of Thrace, Department of Forestry and Management Environment and Natural Resources

Forest Soil Science.

Forest Soil Science Laboratory

Studies upon the relationships between bedrock, soil and forest stands, the biology of forest soil, humus and forest soils, the evolution of forest soils, the physicochemical properties of forest soils, the relationships between forest soil and forest vegetation, soil and forest nurseries, the relationships between soil and artificially established stands, methods of improving non-productive forest soils and soil and methods of harvesting and classifying forest soils.



**Associate Professor
Orfanoudakis Michael.**

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**Director of the Forest Soil
Laboratory**

COURSES (Undergraduate):

**SOIL SCIENCE,
FOREST SOILS,
FOREST SOIL FERTILITY,
SOIL MICROBIOLOGY,
PRINCIPLES OF UTILIZATION OF
EDIBLE FUNGI.**





Research Qualifications

Cultivation and treatment of fungi that form **Mycorrhiza** (Arbuscular Mycorrhizal Fungi **AMF**).

Analysis, treatment of fungi that form **erectoid mycorrhiza**.

Cultivation and processing of ectomycorrh-forming fungi .

Cultivation and processing of the actinomycete **Frankia**.

Chemical analysis of soils.

Analysis of natural properties of soils.

Description of soil planning.

Plant development seedling management and data analysis from them.

Root system analysis (Root growth, root hairs).

Knowledge of **Rizotron**.

Knowledge **of molecular techniques**.

Techniques with **Antibodies**.

Microbial respiration .

Use of image processing systems (Measurement of surfaces, lengths, etc).

Short CV.

UNIVERSITY EDUCATION

DEPARTMENT OF FORESTRY AND NATURAL ENVIRONMENT,
ARISTOTLE UNIVERSITY OF THESSALONIKI

DOCTORAL DIPLOMA PHD

Univ.Of S.W.

Thesis: "Symbiotic relationships of *Alnus glutinosa* with Arbuscular Mycorrhizal Fungi and with *Frankia*."

"Symbiotic relationships of *Alnus glutinosa* with Arbuscular Mycorrhizal Fungi Thysanoid mycorrhizal fungi and with *Frankia*"

Research interest.

Physico-chemical properties of soils.

The effect of mycorrhizae on **soil properties**,

Effect of Mycorrhiza and other soil microorganisms on plant growth.

Isolation, identification and growth in a host plant

culture of native mycorrhizal **fungi (AMF) native fungi species**.

The study and **role of mycorrhizae** in **plant growth** under stress conditions.

The study, role and isolation of native *Frankia* actinomycetes.

Circulation of **nutrients** in forest settlements.

Restoration of soils.

The role of **soil** in controlling **greenhouse gas emissions** into the atmosphere.

Development and **architecture of the root** system of plants under various soil conditions.

Development and architecture of the plant root system





COST ACTIONS

I. COST **ACTION 870** (2007-2011): **From production to application of arbuscular mycorrhizal fungi in agricultural systems: a multidisciplinary approach.** Participation in the Management Committee and oral presentations in the context of the action .

II. COST Action **FP0803** (2008-2012): **Belowground carbon turnover in European forests.** Participation in the Management Committee and poster announcement in the context of the action.

III. Action COST **FA1206** (2013-2017): **Strigolactones: Biological Roles and Applications.** Participation in the Management Committee.

IV. Action **COST FP1305** (2014-2018): **BioLink: Linking belowground biodiversity and ecosystem function in European forests.** Participation in the Management Committee.

Active COST action

V.COST Action **CA22144** (2023-) : **Sustainable use of salt-affected lands (SUSTAIN).** Working group: **Soil and water salinity: physical and biochemical characteristics at different scales,** Participation in the Management Committee

Participation in research *projects.*

A. research *projects that have been completed.*

2017-2020 Life LIFE IP4 NATURA Program - **Integrated actions for the conservation and management of NATURA 2000 network areas. species of habitats and ecosystems in Greece.** In this research project I participate in a project on the recording of soil conditions – Biological soil conditions.

2015-2018 Life FoResMit Project - "**Recovery of degraded coniferous Forests for environmental sustainability Restoration and climate change Mitigation**" In this research project I participate in the analysis of soil properties.

5/2011-2016 **Utilization of the by-products of the electrolytic treatment of MnO₂.** The research program is carried out by the Laboratory of Forest Soil Science of the Aristotle University of Thessaloniki.





MS COURSES

Director of the MsC since: 9/2022

Conservation and restoration of terrestrial ecosystems.

Course Coordinator :

Replacement of Soils and
Resettlement of Vegetation in
Disturbed Areas.

Participation in the teaching of the
course : Forest Handling and
Restoration of Forest Ecosystems

Participation as a lecturer in the
programme:

Recording and Monitoring of Forests and Wooded Areas and Protected Areas.

Participation in the teaching of the
course Basic principles of the
recording and monitoring of
forests, wooded areas and
protected areas

5/2011-7/2012 **Restoration of disturbed soils from soil mining activity in the wider area of the mines of Kassandra, Halkidiki.** The research program is carried out by the Laboratory of Forest Soil Science of the Aristotle University of Thessaloniki.

1/2005-8/2005 IKY: Postdoctoral fellowship from the State Scholarship Foundation, in the research program " **The role of mycorrhiza in plant resistance in degraded and disturbed soils: Research on the effectiveness of mycorrhiza in plant drought resistance**".

2005-2008 Pythagoras II: Active participation in the research team as a postdoctoral researcher of the research project: "**Role of mycorrhizal AMFs in the natural structure of natural herbaceous plant communities**" (Project Code: 80880). Scientific coordinator Alifragis D., Associate Professor, School of Forestry and Natural Environment. Aristotle University of Thessaloniki.

5/2005-9/2005 Archimedes: Active participation in the project entitled "**Climatic-environmental changes and sensitivity of the annual rings of the Aleppo pine in the Attica basin**". I carried out analyses of soils, needles and wood" Scientific coordinator Papadopoulos A., Professor TEI of Lamia, Forestry Branch.

1/2004- 2007 Pythagoras I: Active participation in the research team of the research project: " **Role of mycorrhizals in natural and agricultural ecosystems**". (Project Code: 21890). Scientific coordinator D. Veresoglou, Professor of Ecology, Faculty of Agriculture. AUTH.

7/2018-2023 Research innovate program: MYCCORN **The ability of maize genotypes to exploit available inputs at the individual level and the search for appropriate mycorrhizal vaccines to improve productivity.** Participation in 5 work packages, for the purpose of characterization, and evaluation of indigenous Glomeromycota, preparation of a specialized vaccine.





1/2019-2022 Research and innovate program: CONFORMIT **"Contribution of the Tree-planted areas of the Lignite Center of Western Macedonia to the protection of the environment and the mitigation of climate change"**. Participation in the analysis of substrate properties, and calculation of underground biomass.

05/2023 **Implementation of Interventions with Own Resources**. Participation in the work packages: "Forest nursery modernization policies", "Parameters for the development of forest nurseries and reforestation".

02/2023 **Dynamic inventory of CO2 sequestration in deciduous oak forests and broadleaf evergreen woodlands, contribution to the improvement of the National Greenhouse Gas Inventory in Forestry (ForOaks)** Participation in the work package: Review of Chapter 6, "Land Use, Land Use Changes and Forestry (LULUCF) of the 2021 National Greenhouse Gas Inventory". Data collection for the survey area

1/2019-2022 Research and innovate program: CONFORMIT **"Contribution of the Tree-planted areas of the Lignite Center of Western Macedonia to the protection of the environment and the mitigation of climate change"**. Participation in the analysis of substrate properties, and calculation of underground biomass.

09/2022-2025 **Enhancing functional biodiversity to maximize ecosystem services in Mediterranean crops (ECOBOOST - Prima)** Participation in the work package: Coating seeds with beneficial soil fungi to enhance the resistance of tomato, eggplant and pepper plants to pests.

06/2022-2025 **Agro-ecological strategies and tools to enhance sustainability and ecosystem services in tomato cultivation (ASTER)**. Participation in the work package: Underground functional biodiversity, application of microorganisms.





B. ongoing research programmes.

2/2021 **Strategic Environmental management of Athos in the light of climate change** . Participation in soil analyses.

05/2023 **Implementation of Interventions with Own Resources**. Participation in the work packages: "Forest nursery modernization policies", "Parameters for the development of forest nurseries and reforestation".

2/2023 **Digital transformation and green transition of the agri-food chain -digiagrifood**.

02/2025 **Exploring policiesto mitigate climate change problems**. Feasibility studyand technical description of the necessary implementation projects in the area of Alexandros polis – Consultancyservices.

1/2026 **Mass Insect Breeding By-products for Sustainable Pest Management (INSECTFRASS)**. Chemical analysis of FRASS and its evaluation as a nutrient substrate.



Selected Research Papers

1. **Orfanoudakis M. Z.**, Hooker J. E and. Wheeler C. T (2004):“ Early interactions between Arbuscular mycorrhizal fungi and Frankia during colonisation and root nodulation of *Alnus glutinosa*”. *Symbiosis*, 36p 69-82 (2004).
2. **Orfanoudakis M.**, Mamolos A. P.,Karanika F and.Veresoglou D. S (2005). “Benomyl effects on plant productivity through arbuscular mycorrhizas restriction in a Greek upland grassland”. *Optimisation of Nutrient Cycling and Soil Quality for Sustainable Grasslands: Proceedings of a satellite workshop of the XXth International Grassland Congress*, July 2005, Oxford, England2005, Pages 1-116.
3. Anastasia Pantera, Andreas M. Papadopoulos, and **Michail Orfanoudakis (2007)** “ Trace Element Accumulation in tree rings of *pinus halepensis* during the last 140 years”. *Global NEST Journal* 9 (3) : 286-292 (Nov 2007).
4. **Orfanoudakis M**, Wheeler CT, Hooker JE (2010) Both the arbuscular mycorrhizal fungus *Gigaspora rosea* and Frankia increase root system branching and reduce root hair frequency in *Alnus glutinosa*. *Mycorrhiza* 20: 117-126.
5. Theocharis Chatzistathis,; **Michail Orfanoudakis**; Dimitrios Alifragis; Ioannis Theriosl (2013). “Colonization of Greek olive cultivars' root system by arbuscular mycorrhiza fungus: root morphology, growth, and mineral nutrition of olive plants” *Scientia Agricola* 70 (3) , pp. 185-194.
6. Aimilia Lempesi, Apostolos P. Kyriazopoulos , **Michail Oorfanoudakis**, Giorgos Korakis. (2013). “ Soil properties and plant community changes along a goat grazing intensity gradient in an open canopy oak forest” *Notulae Botanicae Horti Agrobotanici Cluj-Napoca* 2013; 41(2):567-575., I.
7. Janusz Błaszowski, Przemysław Ryszka ,**Michail Orfanoudakis (2014)** *Septoglomus jasnowskae* and *Septoglomus turnaum*, two new species of arbuscular mycorrhizal fungi (Glomeromycota).*Mycol Progress* (2014) 13: 985.
8. Gakis S, **Orfanoudakis M**, Papaioannou A, Mantzanas K, Papanastasis V, Seilopoulos D, Kostakis S (2014). Long term evolution of tree growth, understorey vegetation and soil properties in a silvopastoral system of northern Greece. *.Ann. For. Res.* 57(2): 247-265, 2014.
9. Apostolos P. Kyriazopoulos, **Michail Orfanoudakis**, Eleni M. Abraham2, Zoi M. Parissi2, Nikoleta Serafidou (2014)“ Effects of arbuscular mycorrhiza fungi on growth characteristics of *Dactylis glomerata* L. under drought stress conditions”*Not Bot Horti Agrobo*, 2014, 42(1):132-137 .
10. George P Stamou, Sotiris Konstadinou, Nikolaos Monokrousos, Anna Mastrogianni, **Michailis Orfanoudakis**, Christos Hassiotis, Urania Menkissoglou-Spirodi, Despoina Vokou, Efimia M Papatheodorou (2017):“ The effects of arbuscular mycorrhizal fungi and essential oil on soil microbial community and N-related enzymes during the fungal early colonization phase”; *AIMS Microbiology*, 3(4): 938-959.,DOI:10.3934/microbiol.2017.4.938
11. Christos N. Hassiotis, **Michail Orfanoudakis (2018):** *The impact of Lavandula stoechas L. degradation on arbuscular mycorrhizal fungi, in a Mediterranean ecosystem*. *Applied Soil Ecology* 2018; 126., DOI:10.1016/j.apsoil.2018.02.025
12. Maria G. Alifragki, Athina K. Pavlatou-Ve, **Michail Z. Orfanoudakis (2018):** Phytoremediation affects microbial development on a limestone quarry.*International Journal of Phytoremediation* 2018;20(9). DOI:10.1080/15226514.2018.1452183
13. Gianluigi Mazza, Alessandro E. Agnelli, Paolo Cantiani, Ugo Chiavetta, Foteini Doukalianou, Kyriaki Kitikidou, Elias Milios, **Michail Orfanoudakis**, Kalliopi Radoglou, Alessandra Lagomarsino: (2018) *Short-term effects of thinning on soil CO₂, N₂O and CH₄ fluxes in Mediterranean forest ecosystems*. *Science of The Total Environment* 09/2018; 651(Pt 1), DOI:10.1016/j.scitotenv.2018.09.241
14. F Doukalianou, K Radoglou, A E Agnelli, K Kitikidou, E Milios, **M Orfanoudakis**, A Lagomarsino (2019): Annual Greenhouse-Gas Emissions from Forest Soil of a Peri-Urban Conifer Forest in Greece under Different Thinning Intensities and Their Climate-Change MitigationPotential.*Forest Science* 2019;DOI:10.1093/forsci/fxy069.

15. BŁASZKOWSKI, J., NIEZGODA, P., DE PAIVA, J.N., DA SILVA, K.J.G., THEODORO, R.C., JOBIM, K., **ORFANOUDAKIS, M.** and GOTO, B.T., (2019). *Sieverdingia* gen. nov., *S. tortuosa* comb. nov., and *Diversispora peloponnesiaca* sp. nov. in the Diversisporaceae (Glomeromycota). *Mycological Progress*, 18(11), pp. 1363-1382.
16. Monokrousos, N., Papatheodorou, E. M., **Orfanoudakis, M.**, Jones, D. -, Scullion, J., & Stamou, G. P. (2020). The effects of plant type, AMF inoculation and water regime on rhizosphere microbial communities. *European Journal of Soil Science*, 71(2), 265-278. doi:10.1111/ejss.12882.
17. Foteini Doukalianou, Gavriil Spyroglou, **Michail Orfanoudakis**, Kalliopi Radoglou, 18. Stefanos Stefanou, Kyriaki Kitikidou, Elias Milios and Alessandra Lagomarsino (2022) Effects of Forest Thinning on Soil Litter Input Nutrients in Relation to Soil CO₂, CH₄, and N₂O fluxes in Greece. *Atmosphere* 13, 376.
19. Hristozkova, Marieta, and **Michail Orfanoudakis**. (2023). "Arbuscular Mycorrhiza and Its Influence on Crop Production" *Agriculture* 13, no. 5: 925. <https://doi.org/10.3390/agriculture13050925> IF= 3.6



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