

WDCM Training Course for Developing Countries on Microbial Resources Information Management and Utilization

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Ioanna Pyrri was born in Athens, Greece. She has a degree in Biology and a Ph.D. in Mycology from the National and Kapodistrian University of Athens. She speaks English (Proficiency of Cambridge) and French (Delf). She has received the Young Aerobiologist Award (2006) from the International Association on Aerobiology for her contribution to Aerobiology during her Ph.D. thesis. She studies airborne fungi in outdoor and indoor environments with an emphasis to the systematics of Eurotiales with morphological and molecular tools. She is employed at the Biology Department of the NKUA as a Laboratory Teaching Staff and she is curator of microfungi in the ATHUM Culture Collection of Fungi.



ATHUM Culture Collection of Fungi

MYCETOTHECA

National and Kapodistrian University of Athens

ABSTRACT

The ATHUM Culture Collection of Fungi was established in 1973, along with a mycological herbarium. It constitutes an essential infrastructure for supporting teaching and research activities at the Biology Department of the NKUA. Its main purpose is to promote the study of the underexplored biodiversity of fungi in Greece and to secure the ex situ conservation and sustainable use of indigenous fungi. The participation in WDCM training course is an opportunity for CCs to benefit by training on microbial resource management and on the development of CCs to MRCs functioning under international guidelines. The training course could involve both theoretical and practical training for the people working in CCs. The practical experience on innovative technologies used to authenticate and characterize the microbial resources is of great importance.

Key words: WDCM, Training Course, Fungal Collection, Athens, Greece

1. Brief introduction of the ATHUM Culture Collection.

The Culture Collection of Fungi and the mycological herbarium were established in 1973 by the late Professor Maria Pantidou in the Department of Biology at the National and Kapodistrian University of Athens. She organized mycological courses for the first time in a Greek University. The aim of the Culture Collection and the mycological herbarium was to support teaching and research activities. Professor Maria Pantidou was a pioneer in founding mycological research in Greece.

The ATHUM Culture Collection of Fungi was expanded and upgraded through European Union funding in order to participate in the Microbial Information Network Europe (1989-1994). Also the ATHUM Culture Collection of Fungi has participated as a collaborating party in the preparatory phase of the project Microbial Resource Research Infrastructure (MIRRI) in the ESFRI roadmap.

The ATHUM Culture Collection of Fungi is a member of the European Culture Collection Organization (ECCO), the World Data Center of Microorganisms (WDCM) and is registered in the WFCC Global Catalogue of Microorganisms (GCM).

The Collection sustains two separate modalities. The public open collection includes more than 300 strains of fungi belonging to 224

species in printed and electronic catalogue. The restricted collection includes more than 1500 strains of fungi that are under research.

The fungal strains have been isolated from a wide variety of substrates during the long-term investigation on fungi of Greece occurring in natural and man-made ecosystems. Today, several taxonomic and functional groups of fungi are represented in the Collection. Macromycetes have been collected and isolated in pure culture since the establishment of the Culture Collection. As a result Basidiomycota strains consist an important part of the Collection. There are novel strains of species not previously known to be available in pure culture, or not known to produce the anamorphic state in culture. Airborne fungi isolated from ambient air as well as indoor environments such museums, schools and industries constitute another significant part of the Collection. Many hundreds of isolates are maintained in the Collection and several species have not previously reported as airborne or they are not included in any other Collection. Among the holdings of the ATHUM Collection there are also several interesting strains of foodborne, soilborne, phytopathogenic and mycophilic fungi but the emphasis is on Basidiomycota and on airborne fungi. The research of ATHUM Culture Collection focuses on the study of the diversity, phylogeny and ecology of fungi in Greece. In addition, the Collection has an active role to promote the characterization of fungal strains, concerning their enzymatic potential and the production

of bioactive molecules, which may be potentially useful in biotechnology.

Today the Mycetotheca of the National and Kapodistrian University of Athens with its Culture Collection of Fungi and the dried specimen collection of fungi constitutes an essential infrastructure for supporting teaching and research activities of the Biology Department at the NKUA and most importantly for promoting the study of the underexplored biodiversity of fungi in Greece and for securing their ex situ conservation and sustainable use.

A polyphasic approach is employed for the taxonomy of fungi maintained in the Collection. The morphological characters of the fungi are studied in detail along with two to five genetic markers (ITS, *tef1a*, *rpb2*, *benA*, *CMD*, *rns*) according to the group of fungi studied. The evaluation of the enzymatic potential and the production of bioactive compounds is conducted by screening the Collections strains on solid and liquid media with suitable reagents. The most promising fungi are studied in detailed in collaboration with specialized laboratories. This investigation revealed the ability of numerous strains originating from Greece to produce extracellular endo-b-1,4-glucanase, endo-b-1,4-xylanase, laccase and chitinase.

Currently the fungal strains are maintained in slants at 4°C and in glycerol (35%) at -20°C. The data are kept in lab notebooks and electronically. A relational database in MySQL environment is being

developed at the time being for the in-house management of the information associated with the Collections holdings.

The ATHUM Culture Collection has established services that involve the identification of fungi with morphological and molecular tools, the deposition of fungi, the distribution of fungi to academia and in private sector for research and biotechnological applications, the quality control of indoor environments as well as the quality control of food commodities. Also it offers consultancy and training courses.

The Microbial Resource Collections Network MRCN – NKUA was established in 2015 as a consortium of public Culture Collections. The aim of this consortium is the Culture Collections of the National and Kapodistrian University of Athens to synchronize their standard operating procedures and to provide a uniform interface for the scientific and industrial communities in Greece in order to facilitate access to microbial resources important for innovative applications.

2. Benefit from the training courses.

The ATHUM Culture Collection of Fungi maintains more than 1500 indigenous strains of filamentous fungi stemming from the research activities of the mycological group. For their identification morphological and molecular tools are employed by the group and biochemical tools in association with specialized laboratories.

A relational database for in-house management has been developed that includes information for each strain according to the recommended dataset included in MINE guidelines. A unique ATHUM number is assigned to each identified fungal strain and all related information is registered in the database including macro and micro morphological data, sequences of genetic loci analyzed, phylogenetic trees produced, photographs, metabolites etc.

The WDCM has a long standing experience in microbial resources information management and utilization. The participation in the WDCM Training Course will benefit the Collection in several aspects.

The ATHUM Culture Collection of Fungi, as any other MRC, accumulates diverse data on the microbial resources that maintains and studies. It is necessary for MRCs to standardize the organization, the documentation and presentation of the biological material datasets. It is expected that the WDCM training course will contribute towards this

purpose.

The ATHUM Culture Collection of Fungi also anticipates to information concerning the in-house organization and management of the accumulated data on its microbial resources into a relational database. Furthermore, the Collection is interested to disseminate microbial resources information to the scientific and industrial community worldwide by interacting with GCM.

3. Suggestion on WDCM work.

The WDCM has contributed in the dissemination and accessibility to information and microbial resources that are included in Culture Collections with no listings of their holdings. It is important WDCM to continue to provide integrated information services and to work towards more Culture Collections register with GCM.

4. Comments or suggestion on the training courses.

During this 14 day training course the Culture Collections participants had the opportunity to attend several interesting presentations involving the update about Nagoya Protocol, the Biolomics software for in-house data management, the WDCM achievements and the GCM. Furthermore,

we were informed about the possibilities for collaboration with CAS for research, for postgraduate studies or for postdoctoral fellowships. The presentation of the GCM webpage was very detailed, precise and informative. The practice on the platform for GCM gave the opportunity to solve any question raised during data uploading and management.

Although all presentations were very informative and interesting they may be balanced with the addition of some sessions with practical training. The infrastructure of the Institute of Microbiology for the molecular analysis of microbial resources is very impressive and the possibility for the participants to have a demonstration of its contribution to microbial identification and characterization would be of great value.

Several Culture Collections that have established services usually do not have a Material Transfer Agreement. It would be very useful the WDCM training course to include sessions with information about the key points a core template MTA should include and be expanded according to each CC's needs and country's law.

5. Suggestion on further cooperation between WDCM and your collections.

The ATHUM Culture Collection of Fungi is interested in a dynamic cooperation with WDCM for the data management of the biological

resources included in the Mycetotheca but also foresees to a fruitful collaboration on the exploration of the properties of its holdings on the bases of genomics and metabolomics.

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