Arab Society for Fungal Conservation

Suez Canal University

ICFC-2016

The First International Conference on Fungal Conservation in the Middle East and North of Africa

Bioprospecting vs. Conservation

Ismailia, Egypt

18-20 October 2016

ABSTRACT BOOKLET

الجمعية العربية للحفاظ على الفطريات
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Decreed by No. 699/2013
Arab Society for Fungal Conservation

The First International Conference of Arab Society for Fungal Conservation
&
Suez Canal University

"Fungal Conservation in the Middle East and North of Africa"

Under the auspices of;

- President of Suez Canal University

  Prof. Mamdouh M. Ghorab

- Dean of the Faculty of Science

  Prof. Al-Araby H. Shendy

- Conference Chairman

  Prof. Moustafa M. Fouda

- ASFC President

  Ass. Prof. Ahmed M. Abdel-Azeem

Notes

ASFC

ICFC-2016
EGYPT

The First International Conference on Fungal Conservation in the Middle East and North of Africa

Theme of Conference:
Bioprospecting vs. Conservation

Conference Booklet
18-20 October 2016
Ismailia, Egypt

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Design **Fatma Salem**

Table of Contents

Organizing Committee;

Prof. Moustafa M. Fouda [Chairman]

Prof. Atef M. Diab [Head of Organizing Committee]

Ass. Prof. Ahmed M. Abdel-Azeem [Conference General Secretary]

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Ms. Fatma M. Sayed [Suez Canal University]

Mr. Mohamed A. Abdel-Azeem [Sinai University]

Mrs. Hala A. Hatem [Egyptian Radio and Television Union]

Welcome,

On behalf of the University of Suez Canal, I'm greatly honored and pleased to welcome you all to the 1st international conference on fungal conservation in Middle East and Northern Africa: "Bioprospecting vs. Conservation" which is held at the Suez Canal University, Ismailia, Egypt on 18-20 October, 2016. The conference is organized by Arab Society for Fungal Conservation (ASFC) and Suez Canal University and includes plenary lectures, specialized workshop, poster and oral sessions. It is our great pleasure and privilege to have Professor David Minter from the United Kingdom, Professor Jean Mouchacca from France, Professor Gerhard Kost & Professor Michael Weiss from Germany and Professor Azza AlMusallam from Kuwait to join us for this conference.

I encourage everyone to take the opportunity to participate actively in this event and I hope you enjoy staying with us and have fruitful time.

Prof. Mamdouh M. Ghorab

President of
Suez Canal University

Welcome,

Dear Participants,

Welcome to the 1st International Conference on Fungal Conservation in MENA which will be held in Ismailia, Egypt (October 18-20, 2016) as the first conference in this series to be organized by our new born society. I believe that the theme of Bioprospecting vs. Conservation is an apt topic at this time for a number of reasons. Firstly, there is a need to address long term issues of conservation of fungi & control bioprospecting in the fragile ecosystems e.g. MENA. Secondly, there is a need to discuss and share lessons learned with advanced techniques applied by fungal conservationists world-wide. Finally, and most importantly, it will provide the first interdisciplinary forum for researchers, practitioners and educators to present and discuss the most recent innovations, trends, and concerns, practical challenges encountered and the solutions adopted in the field of fungal conservation in MENA. This conference provides a venue to discuss a range to conservation related issues related to these and other areas of interest to the fungi in MENA. It provides opportunities to discuss and entertain topics that stretch into the future and will be vital to secure the future of fungal conservation in the Arab world. In addition, there will be many opportunities to meet and network with colleagues from this field and to share your experiences as well as to learn from others. The Arab Society for fungal Conservation is profoundly grateful to the various bodies which have been supported this conference, particularly our host *Suez Canal University*.

Best wishes for an effective, successful and productive conference.

Ass. Prof. Ahmed M. Abdel-Azeem

President of
Arab Society for Fungal Conservation

Welcome,

Distinguished participants,
Ladies and gentlemen,

While often overlooked, fungi play a pivotal role in the food web, nutrient and energy cycling, and long-term carbon sequestration in soil. They are essential to the health of ecosystems and need to be given more attention in both research and conservation efforts. In this light I would like to congratulate the Arab Society for Fungal Conservation and its partners for taking the initiative of organizing this first international conference on fungal conservation in the Middle East and North of Africa. Initiatives such as these are crucial for raising awareness about the importance of conserving fungi and their contribution to the integrity and proper functioning of ecosystems and human well-being.

In 2010, the Parties to the Convention on Biological Diversity adopted the Strategic Plan for Biodiversity 2011-2020 and twenty Aichi Biodiversity Targets. This plan aims to address the underlying causes of biodiversity loss, reduce the direct pressures on biodiversity and promote sustainable use, improve the status of biodiversity by safeguarding ecosystems, species and genetic diversity, enhance the benefits to all from biodiversity and ecosystem services and enhance implementation through participatory planning, knowledge management and capacity building. The consideration of all of these elements is necessary to ensure that fungi are valued and protected.

Under the Convention on Biological Diversity, a range of tools and guidance has been developed which is relevant to research and conservation efforts related to fungi. This includes the Global Strategy for Plant Conservation, which focuses on the plant kingdom but also invites countries and other stakeholders to develop conservation strategies for other groups such as fungi. The Global Strategy for Plant Conservation, and the toolkit to support its implementation, provides a

framework, which could be applied to the conservation of fungi as integral part of healthy ecosystems.

A further initiative under to the Convention on Biological Diversity relevant to fungi is the Global Taxonomy Initiative, which was established to address the lack of taxonomic information and infrastructure and declining taxonomic expertise. There is currently a lack of taxonomists globally. This lack is particularly true for fungal taxonomists. This taxonomic impediment hinders our ability to make informed decisions about conservation and management of biodiversity. Conferences like this one are crucial in reinvigorating this field of study by increasing awareness, interest and support for research and conservation of fungi at the national and regional level.

Your discussions over the coming days represent a valuable opportunity for sharing, learning and advancing the field of fungal conservation and I hope that this conference can be the meaningful start of an ongoing initiative. With this, I wish all of you a successful and productive conference.

Thank you for your kind attention,

Dr. Braulio F. Dias

CBD Executive Secretary
The Convention on Biological Diversity

Welcome,

The International Union for the Conservation of Nature (IUCN) is the world's largest and diverse environmental network. It works to protect species, reverse habitat loss, restore ecosystems, and improve people's well-being. IUCN recognizes the critically import roles that fungi play in ecosystem and human health, as food resources, and for the fermentation and pharmaceutical industries. The five IUCN SSC Fungal Specialist Groups (Chytrid, Zygomycete, Downy Mildew, and Slime Mold; Cup -fungus, Truffle, and Ally; Lichen; Mushroom, Bracket, and Puffball; and Rust and Smut) work to build capacity, raise awareness, and conserve the fungi covered by their group. Mycologists from the MENA region are important members of these Specialist Groups. Conservation work on desert truffles and other fungi in the region is ongoing. But much more needs to be done before fungi are fully integrated into regional and global conservation initiatives. This first Mid Eastern and North African Congress on Fungal Conservation is an important milestone in efforts to build recognition of the need to conserve fungi, and it will provide both an update on the current situation and a road map for further action. The IUCN Global Species Program and Species Survival Commission commends the MENA fungal conservation community for organizing this Congress and is confident that the Congress will significantly move fungal conservation in the region forward. We wish you the best of luck with the Congress and the initiatives that result from it.

Prof. Gregory M. Mueller

SSC Steering Committee
Chair SSC Mushroom, Bracket, and Puffball Specialist Group

Programme;

The Registration Desk will be open on **Tuesday 18 October 2016** from 8.30 to 10.00 at ***Student Activities Theater, Chinese Institute (CONFUCIUS) the new university***. If you arrive at the Conference later than that time, please find **Ms. Fatma M. Salem**, the member of Conference Organizing Committee, and she will organize your registration.

Tuesday 18th

8:30 - 10:00	**Registration**
	Opening Ceremony **Plenary Session** Moderator: **Prof. Atef M. Diab** (Head of Organizing Committee)
10:00 - 11:00	**Welcome Speeches** - **Prof. Atef M. Diab** Chairman of Organizing Committee - **Ass. Prof. Ahmed M. Abdel-Azeem** Conference's General Secretary and President of ASFC - **Prof. Mustafa M. Fouda** Conference's Chairman - **Dr. Braulio Ferreira de Souza Dias** CBD Executive Secretary - **Prof. Mamdouh M. Ghorab** President of Suez Canal University
11:00 - 11:30	***Morning Refreshments***
	Fungal Conservation in MENA region Moderator: **Prof. Atef M. Diab** (Head of Organizing Committee)
11:30 – 13:00	**Opening Keynote Speeches**
11:30-12:00	- **Dr. David W. Minter** President of international Society for Fungal Conservation, UK.
12:00-12:30	- **Dr. Jean Mouchacca** Natural History Museum, France.
12:30-13:00	- **Dr. Ahmed M. Abdel-Azeem** President of Arab Society for Fungal Conservation, Egypt.
13:00 - 14:00	***Break***

Conservation and Bioprospecting

Session I

Moderators: **Prof. Zakaria A. Baka , Dr. Mohamed A. Abdel-Rahman** and **Prof. Gerhard W. Kost**

14:00 - 14:15	**- Kavileveettil V. Sankaran** Kerala Forest Research Institute, India.	Fungal Conservation in India- Scopes and challenges
14:15 - 14:30	**- Nivien A. Nafady** Botany and Microbiology Department, Faculty of Science, Assiut University, Egypt.	Biodiversity and Strategic Perspectives for Glomeromycota Conservation in Four Egyptian protected Areas
14:30 - 14:45	**-Randa A. Mohamed** Central Laboratory, Chemistry Department, Faculty of Science, Suez Canal University, Egypt.	Bioprospecting and Conservation of Egyptian Endophytic Mycobiota: Taxa Producing Antioxidant, Antimicrobial and Hepatoprotective Metabolites and their Biochemical Effects on Experimental Animals
14:45 - 15:00	**- Bassem A. Balbool** Microbiology Department, Faculty of Dentistry, October University for Modern Sciences and Arts, Egypt.	Bioprospecting and Conservation of Egyptian Endophytic Mycobiota: Taxa Producing L-Asparaginase Enzyme
15:00 - 15:15	**- Fatma M. Salem** Botany Department, Faculty of Science, Suez Canal University, Egypt.	Species Diversity and Conservation of *Chaetomium* in Egypt
15:15 - 15:30	**- Waleed F. Khalil** Pharmacology Department, Faculty of Veterinary Medicine, Suez Canal University, Egypt.	Bioprospecting and Conservation of Egyptian Endophytic Mycobiota: Taxa Producing Anti-Inflammatory Metabolites and Their effects on Rheumatoid Arthritis' Rat Model
15:30 - 15:45	**- Ahmed M. Younis** Botany and Microbiology Department, Faculty of Science, Al-Azhar University, Egypt.	Anticancer Potential of *Hericium erinacus* Extracts Against Particular Human Cancer cell Line

16:00 - 16:30 ***Networking Coffee Break***

Plant Microbial Interactions

Session II

Moderators: **Prof. Samira R. Mansour, Prof. Khaled I. Zaki** and **Prof. Michael A. Weiss**

16:30 - 16:45	**- Zeinab A. Abdel-Salam** Soil Fertility and Microbiology Department, Desert Research Center, Egypt.	Induction of Salt Tolerance for Olive Trees Using Effective Microbial Consortia Under Salt Stress
16:45 - 17:00	**- Amany A. Hassan** Botany and Microbiology Department, Faculty of Science, Assiut University, Egypt.	Estimation of the Biotechnological Prospects of *Rhizobium* Species from Root Nodules of *Cicer arietinum* and *Vigna unguiculata* for Exopolysaccharide Production

17:00 - 17: 15	- Merhan M. Tawfik Plant Protection Department, Desert Research Center, Egypt.	Alfalfa Autotoxicity and its Allelopathic Activity Against Some Plants, Soil Bacteria and Microfungi

Wednesday 19th

Macrofungi as Ecosystem Resources: Conservation versus Exploitation

Moderator: **Prof. Ishrak K. Khafagi**

09:00 – 11:00 Opening Keynote Speeches

09:00-09:30 - **Prof. Gerhard W. Kost**
Philipps University of Marburg, Germany.

09:30-10:00 - **Dr. Azza A. AlMusallam**
Department of Biological Sciences, Kuwait University, Kuwait.

10:00-10:30 - **Prof. Michael A. Weiss**
Steinbeis Innovation Center, Germany.

10:30-11:00 - **Prof. Mona F. Kaiser**
Faculty of Science, Suez Canal University, Egypt.

11:00 - 11:30 *Networking Coffee Break*

Clean Up the Environment

Session I

Moderators: **Prof. Gamal-Eldin A. Hilal** and **Prof. Mamdouh S. Serag**

11:30 - 11:45	- Nilly A. Kawady Nuclear Materials Authority, Egypt.	Effect of Radionucleides on Native Fungal Species with Emphasis on Biosorption
11:45 - 12:00	- Fatma A. Allam Alexandria water company, Egypt.	Statistical Optimization of Bioethanol Production using Endophytic *Aspergillus* Isolated from Water Hyacinth
12:00 - 12:15	- Marwa T. Mohesien Botany Department, Faculty of Science, Damietta University, Egypt.	Assessment of Diesel Degrading Potential of Fungal and Bacterial Isolates from Egypt

Animal Microbial Interactions

Session II

Moderators: **Prof. Atef M. Diab** and **Prof. Shereen M. El Banna**

12:30 - 12:45	- Metwally R. Kottb Botany Department, Faculty of Science, Suez Canal University, Ismailia 41522, Egypt.	Bioactivity of *Trichoderma*'s 6-Pentyl α-pyrone against Phytopathogenic mite, *Tetranychus urticae* Koch (Acari: Tetranychidae)
12:45 - 13:00	- Essam A. Ali Plant Protection Department, Desert Research Center, Egypt.	Insecticidal Potency of Native Bacterial Isolates against *Phenacoccus parvus* Morrison (Hemiptera: Pseudococcidae)

13:00 - 14:00 *Break*

Human-Microbial Interactions and Microbial Nanoparticles

Session III

Moderators: **Prof. Mohamed A. Mohamed** and **Prof. Mohamed A. Omran**

14:00 - 14:15	- Sherif M. Zaki Microbiology Department, Faculty of Science, Ain Shams University, Egypt.	Conservation of Human Pathogenic Fungi: Invasive Pulmonary Infections by Basidiomycetes in Egypt
14:15 - 14:30	- Eman A. Helmy The Regional Center for Mycology and Biotechnology (RCMB), Al-Azhar University, Egypt.	Nano-biotechnology Breakthrough and Food-Packaging Industry
14:30 - 14:45	- Ferial M. Imam Botany Department, Faculty of Science, Suez Canal University, Egypt.	Evaluation of Antifungal Activity of Biogenic Silver Nanoparticles (AgNPs) and Medicinal Plants Extracts on Human and Plant Pathogenic Fungi
14:45 - 15:15	*Networking Coffee Break*	

Poster Session

15:15 - 17:00 Assessment of Posters form 1 to 11

Thursday 20th

Microbes and World Heritage and Industrial Applications

Session I

Moderators: **Dr. Jean S. Mouchacca**, **Prof. Mona F. Kaiser** and **Prof. Ishrak K. Khafagi**

09:00 - 09:15	- Ahmed M. Abdel-Azeem Botany Department, Faculty of Science, Suez Canal University, Egypt.	Wood-Destroying Fungi in Abydos Middle Cemetery Project, Egypt
09:15 - 09:30	- Yousra A. kamal Botany Department, Faculty of Science, Suez Canal University, Egypt.	Diversity of Rock-Inhabiting Fungi in Saint Katherine, Egypt
09:30 - 09:45	- Eman A. Attia Botany Department, Faculty of Science, Suez Canal University, Egypt.	Revealing the Antimicrobial and Enzymatic Potentials of Two Endophytic Fungi from Medicinal Plants in Egypt
09:45 - 10:00	- Samah F. Boghdady Plant Pathology Department, Agriculture Faculty, Cairo University, Egypt.	Endophytic Fungus or Some Effective Material for Ornamental Plant Fruits is Responsible for the Mummification Process?
10:00 – 10:30	Dr. Jean Mouchacca Natural History Museum, France.	**RAMSES II Fungi – A Film About Examination of Ramses II Mummy in France**
10:30 - 11:00	*Networking Coffee Break*	

Continued Poster Session

11:00 - 13:00	Assessment of Posters form 12 to 23
13:00 - 13:30	*Break*
	Conference's Workshop
09:00 - 13:00	Workshop on Fungal Conservation: Data Bases for Fungal Conservation: **Desert truffles an example of how to use information sources for red-listing.** At **Botany Department;** By: **David W. Minter**
13:30 - 14:30	**Closing Ceremony** **Honors Best Poster, Applied Research and Dr. Soad Hussein Prizes** Moderators: **Prof. Atef M. Diab** and **Dr. Ahmed M. Abdel-Azeem**
14:30	End of Conference

KEYNOTE SPEAKERS

Biographies and Abstracts

- Ahmed M. Abdel-Azeem
- Azza A. AlMusallam
- David W. Minter
- Gerhard W. Kost
- Jean S. Mouchacca
- Michael A. Weiss
- Mona F. Kaiser

Ahmed Abdel-Azeem

Conference General Secretary, Associate Professor at Suez Canal University, Founder and President of Arab Society for Fungal Conservation (ASFC), Egypt.
zemo3000@yahoo.com

Abdel-Azeem is currently working as academic staff member and mycologist with particular interest in the ecology, taxonomy, biology, and conservation of fungi and his specialist interest is members of the phylum Ascomycota. His research includes isolation, identification and taxonomic assessments of these fungi with particular emphasis on those which produce bioactive materials from different ecological habitats. Most recently he has become interested in the effect of climate change on fungi. This in turn has led him to become involved in fungal conservation. He is a member of the IUCN Species Survival Commission Specialist Group for Cup Fungi, Truffles & their Allies, and also the Founder of the Arab Society for Fungal Conservation. He got different grants and fellowships e.g. EOL fellow in 2011, Mohamed Bin Zayed Species Conservation fund in 2014, National Geographic Society Fund in 2016. He hired for his experience in taxonomy, ecology, biology, and conservation of fungi to study the fungi in ancient air of unveiled Cheops Solar Boat Project and fungi degraded ancient wood in Abydos Middle Cemetery Project. He studied the biodiversity of fungi in Romania, UK, US, Finland, Sweden, Italy and Greece. He is the editor in chief of Microbial Biosystems Journal (MBJ) and a reviewer in more than 7 international journals.

Session Title

Plenary Session: Fungal Conservation in MENA region

Abstract

The Orphans of Rio in Northern Africa - Egypt a Case Study

Ecologically and economically, the Fungi kingdom is of immense value and necessary for sustainable life on planet earth. There are six kingdom classifications of life, with Fungi classified as a kingdom of their own. Taxa of Kingdom Fungi are diverse and as the second largest group of organisms after insects are distributed among numerous groups of living organisms. Technological advances in molecular research have enabled mycologists to discover and identify fungal taxa. It is estimated that as many as 1.5 million fungal species exist. Fungi are ubiquitous, undertaking many roles both independently and in association with other organisms. The International Union for Conservation of Nature in the last decade has recognized that fungal conservation is important as plant and animal conservation, and has asked governments worldwide to pay much more attention to conserve fungi.

The biodiversity and conservation of fungi and public perceptions in NA especially in Egypt remains very low, and a lot of education is urgently needed. This work has to be considered as an important contribution to the nature conservation program in Egypt. One important theme is the sustainable use of fungal resources, enforcement of legislations and conventions concerning the fungal diversity in different habitats in Egypt. Environmental education is an important point in the activity concerning fungi conservation and application of appropriate protected area management systems. There is a need to separate fungi from plant kingdom in educational courses in Egypt and to integrate mycodiversity and conservation into the science and environmental curricula and extra-curricular activities. Egyptian mycologists have a responsibility to communicate and discuss these issues to public and politicians. This is a very difficult task, as even the scientific communities deny the true importance of fungi and their fundamental role in the conservation, recycling and protection of ecosystems. Obtaining the attention of Egyptian politicians is even more difficult as Egyptian legislation is strongly focused on protecting habitats of animals and plants and ignoring fungi.

Governments, communities and individuals all have stewardship responsibilities for protecting biodiversity including fungi. While the state of legislative fungal protection in Egypt remains largely unchanged, there is at least slow progress in the areas of recognition and knowledge of fungi. In Egypt, fungi are ignored due to their treatment as a part of flora. The number of the Egyptian fungi recorded is 2420 taxa, more than Egyptian plants, after an exhaustive revision of all the available literature and sources mentioned since 1813. Some threats for Egyptian fungi can already clearly be identified: loss of habitat due to overgrazing, medicinal plant collection practices, climate change, human population growth, the vulnerability of Nile's river to pollution, bioprospecting and the fragility of desert ecosystems.

In most cases in Egypt, however, the scarcity of information about fungal populations makes conservation status evaluations beyond "data deficient" difficult or impossible. The Egyptian strategy right now should consider the vast importance of fungal species in biodiversity. I recommended the following objectives to be included in the National Strategy and Action Plan for Biodiversity Conservation in Egypt:
1- Understanding and documentation of fungal diversity.
2- Conserving fungal diversity.
3- Using fungal diversity sustainability.
4- Promoting education and awareness about fungal diversity.
5- Building capacity.

In 2016, Abdel-Azeem decreed the Egypt's National Fungus Day with the unlimited support of CBD, IUCN and mycologists and he founded the Egypt's Mycologists Network (EMN) (http://fungiofegypt.com/Network/) as a structured network of Egyptian mycologists and with a steering committee to guide and promote best practice and to solve such problems through collaboration between mycologists, amateur fungal groups, fungal conservation societies, regional natural parks and environmental agencies.

Azza A. AlMusallam

Professor at Department of Biological Sciences, Faculty of Science, Kuwait University, Kuwait.

azza.almusallam@ku.edu.kw

Azza is a professor and mycologist in Kuwait University with a great experience on taxonomy, biology and ecology of fungi. Her research interests include keratinophilic fungi and their enzymes, molecular cloning of keratinase gene(s), halophilic and keratin degrading fungi and the seasonal changes of dominance and physiological applications of salt tolerant fungi.

Session Title

Macrofungi as Ecosystem Resources: Conservation versus Exploitation

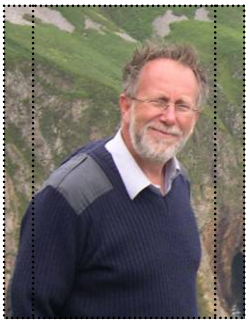
Abstract

The Truffle Genera: Threatened Edible Macrofungi in the GCC Peninsula

An Overview of Taxonomy and Phylogenetic Relationships

The hypogenous desert truffles in the Arabian Peninsula belong to the Terfeziaceae family of the Pezizomycotina. Their diversity and taxonomic treatments are poorly known. Despite their significant importance as seasonally collected and consumed deliquescent foods, only few outdated published taxonomic papers are available by local researchers reporting few species of *Terfezia* and *Tirmania* that greatly relied on morphological features of the fruiting bodies and spores. These truffles are locally described by colour of the edible ascocarp as Zubaidi for the white truffles and khalasi for the black-coloured truffles, and their habitat is often traced with the presence of a host plant belongs to the Cistaceae family and identified as *Helianthemum* spp.

Recently, the past few decades, few new species of *Terfezia* have been described outside the Arabian Peninsula and North Africa, included Iran, Mediterranean region, South Africa and Spain. Their type specimens and names are acknowledged in the mycobank as legitimate, others are considered synonyms of existing species.
The harsh and hostile desert ecosystems and industrialization of vast areas of these deserts are imposing threats on these delicate edible macro-fungi. Therefore, a critical collection and analysis of generic and specific diversities, as well as establishing barcode systems are becoming urgently needed specially that these fungi appear to have significant antibacterial, antioxidants and medicinal properties as well as valued nutritional values.



David W. Minter

President of the European Mycological Association, President of international Society for Fungal Conservation and Chairman of the IUCN Species Survival Commission Specialist Group on Non-lichen-forming Ascomycetes and their Anamorphs, United Kingdom.
d.minter@cabi.org

Dave is the godfather of fungal Conservation and no one can write one paragraph about him. His experience in mycology and conservation is invaluable. He is the Corresponding Member of the Academia de Ciencias de Cuba; Fellow of the Royal Geographical Society; Fellow of the Linnean Society; member of various scientific societies including the European Mycological Association (founder member), British Mycological Society, Mycological Society of America, Asociación Latinoamericana de Micología (founder member), Asociación Argentina de Micología (honorary member) and Sociedad Cubana de Botánica (honorary member); medals for scientific work (1986, 1996); first winner of the Royal Geographical Society's Ralph Brown Prize (1998); much experience of organizing expeditions, conferences and other meetings world wide.

Session Title

Fungal Conservation in MENA region

Abstract

Fungal Conservation in the Middle East and North Africa:

A Big Challenge for a New Society

We all know that nature needs protecting from the destructive activities of humans, but most people think of nature in terms of animals and plants. That is a big problem, because it overlooks the fungi. Fungi form their own, separate and huge biological kingdom, and they need conservation just as much as animals and plants. They have no special magical protection from habitat destruction, climate change, pollution, persecution, exploitation and all the other threats which nature faces. Happily, there is now a very active movement to address that problem.

Fungal conservation started with pioneering efforts by isolated scientists and various informal groups, particularly among lichenologists. In an attempt to draw together their work, a global-level congress on fungal conservation was held in the UK in 2009 with support from the Mohamed bin Zayed fund and the UK Darwin Initiative. There were two main successes from that congress. The first success was that the International Union for Conservation of Nature [IUCN] recognized fungi were

distinct from plants. As a result, it increased the number of fungal specialist groups in its Species Survival Commission from two to five, and declared an explicit policy that conservation of fungi is just as important as conservation of animals and plants. The second success was that the International Society for Fungal Conservation [ISFC, www.fungal-conservation.org] was established in 2010. That was a huge advance. Previously there was no society anywhere in the world explicitly and exclusively devoted to protecting fungi.

The ISFC operates at a global level, but societies are also needed at regional and national levels. The Arab Society for Fungal Conservation was the first such regional society. The present meeting is its first congress, and it must be congratulated for this achievement: the world is still waiting for the establishment of regional societies for fungal conservation in Asia, Australasia, Europe, North America, South America and Sub-saharan Africa. The Arab world can be proud of its leading role in fungal conservation.

It nevertheless has a huge, difficult and urgent task ahead. The semi-arid, arid and desert ecosystems so typical of the region are often perceived as worthless with nothing to destroy, making them vulnerable to inappropriate exploitation and unregulated use (for safari tourism 4-wheel-drive vehicles, for example, or as farms for solar energy). The animals and plants living there are generally specialized to survive under the most marginal conditions, and many of them only achieve this through their very special fungal symbionts, the desert truffles. These are all threatened by climate change, and desert truffles specifically are threatened by unregulated harvesting. The pollution from war and other destructive activities makes the problem worse. The few parts of the region that are not arid face separate problems of their own, particularly from the pressure of the human population.

The Arab Society for Fungal Conservation has an important role in addressing these problems. It must gather scientific information about populations of the fungi that occur in the region, and political and social information about how human activities are affecting them. It must evaluate that information to produce red lists. It must identify areas particularly valuable for fungal conservation, and it must educate citizens and their governments to be aware that fungi need protection. To do all this, it must raise funds, develop infrastructure, and populate that infrastructure with dedicated activists. The International Society for Fungal Conservation looks forward to working closely with the Arab Society for Fungal Conservation helping them to achieve these objectives.

Gerhard W. Kost

Professor of Department Systematic Botany & Mycology, Faculty of Biology, Philipps University of Marburg, Germany.

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Gerhard W. Kost is a mycologist and a university professor in Philipps University of Marburg, Germany since 1993. He traveled to various countries: China, India, Kenya, Malaysia, Macedonia, Panama, Tenerife / Spain. His interests include biodiversity of Basidiomycetes, systematics, taxonomy, molecular biology methods in mycology and mycorrhiza research. He focused on interactions between fungi and plants, structure and ultrastructure of the interaction of the root endophyte *Piriformospora indica* with different hosts, biodiversity research in tropical and sub-tropical areas as well as in various forests in Europe, molecular investigations, ultrastructural Investigations (Scanning Electron Microscopy), biodiversity of macromycetes and systematics and taxonomy of fungi (Basidiomycota). He studied the biodiversity of fungi in Turkmenistan, Costa Rica, Kellerwald National park and Macedonia.

Session Title

Macrofungi as Ecosystem Resources: Conservation versus Exploitation

Abstract

Conservation and Distribution of Higher Basidiomycota

Although the number of fungal species is believed to be more than 1.5 million, many species of these species are strongly threatened, although nobody knows them. There is a strong discussion about protection of the biodiversity on earth, and the importance of fungi for the ecosystem services. But as a result of the thinking on meta-levels it may be lost track of the reality of organisms on species level. Distribution maps are still incomplete for the most regions. The fungal distribution patterns locally reflect the availability of their substrates or interaction partners. Globally it can be stated that fungal phylogeography shows similar patterns as it can be observed in vegetation. This dependency of the vegetation means that naturally changes or interventions by man dramatically influence existence of fungi. Examples for that will be presented. In many cases, the knowledge of fungal distribution has so many gaps. Therefore, the distribution maps of fungi reflect the distribution of active mycologists only.

In the past, many Basidiomycetes formerly described from Europe were identified worldwide across all ecosystems. This has led to the assumption that many fungal species are a worldwide distributed. Though, in recent years molecular and detailed morphological studies revealed that specimens labeled with one species name

encompass hidden species (crypto species). The molecular based species concept reveals that many species occur in a limited area. Members of the genus *Laccaria* give a good example for that. For a better knowledge about the fungal distribution, it will be the main aim in future to intensify taxonomical studies in the lab and especially in the field.

Key words: Distribution pattern, Basidiomycetes, Substrate, Crypto species.

Jean Mouchacca

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Session Title

Fungal Conservation in MENA region

Abstract

Mycological Discoveries in the Middle East Region in the Second Half of the Last Century

The arid Middle East extends over 9 million km² in the Eastern part of the Mediterranean Sea. Agriculture is dependent on running surface waters originating from sources situated outside the region; the management of conservation procedures could only alleviate the impact of such a constraint. Interest in the local mycobiota after the Second World War led to the discovery of taxa then regarded as being new to Science. A scan of the Index of Fungi issued in the period extending from 1940-2000 revealed that 240 novel taxa had been described.

The novel taxa recorded were examined following the chronology of their introduction at the low rate of 40 units/decade. Their distribution in the relevant fifteen political states underlines most holotypes originated from the Palestine-Israel area, Egypt or Iraq. Mitosporic fungi and Ascomycetes clearly outnumber the novel Basidiomycetes. Interestingly, their total reported members amount to 90 % of the group of novelties. It follows, therefore, that the Chytridiomycetes, the 'Oomycetes' and the Zygomycetes of this region were not adequately investigated; they are simply represented by a respective range of 4-12 taxa. All together, 145 generic names are listed in this group of fungi. Twelve new genera were based on type material collected in Egypt (5 genera), the Palestine-Israel area, Lebanon, Iraq, Sudan and Kuwait.

The Middle East novelties were also surveyed in relation to the nature of the substrate supporting their holotypes. Mitosporic fungi (93 taxa) were equally isolated from soil or from living or decaying plant parts including those of standing crops. For Ascomycetes (86 taxa), although soil-borne taxa outnumber the plant associated taxa, several also developed on other types of substrates, for example dung. In the case of novel Basidiomycetes (37 taxa), the plant-parasitic taxa encompass those collected on the ground surface. Finally, a limited number of these novelties disclosed notable thermotolerant abilities and some even qualified as thermophiles.

The main features of this assemblage of novelties suggest that, in the case of Egypt, more attention was focussed on the Mitosporic fungi and Ascomycetes from soil-borne communities. Basidiomycetes (sensu lato) received marked attention only in the Palestine-Israel area. In Iraq, local taxonomic studies focused on Ascomycetes, including those developing on dung substrates. Finally, the distribution of the few Chytridiomycetes, Zygomycetes and 'Oomycetes' reported also appeared limited to the former three states.

Present data underlines limited interest was awarded in the past to the fungi of a region presumed to harbour a specific relevant mycobiota due to its marked arid features. Since 1940, only four novel taxa have been proposed per annum from a small fraction of the present Middle East. Future research should be directed to plant related forms of lower (basal clades) and higher (Dikarya) fungi of the region. Several conservation measures have to be adopted to ensure an adequate protection of the local natural habitats against the negative pressures generated by the increase in population and the detrimental effects of its activities. Finally, in view of the overwhelming implication of mycology in the fields of biotechnology, significant knowledge of the Middle East fungi is promising.

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Michael is a director of Steinbeis Innovation Centre of Organismal Mycology and Microbiology, Germany. His scientific interests include fungal diversity, evolution, ecology and systematics. In recent years, he has particularly worked on fungal-plant interactions, with a focus on the Sebacinales, a basidiomycetous group with a broad spectrum of mutualistic (including endophytic) interactions with plant roots and high cryptic biodiversity. Recently, he has become very interested in developing methods to apply soil fungi for sustainable horticulture and agriculture. Michael is a referee in Sydowia, Revista Iberoamericana de Micología, PLoS ONE, Nova Hedwigia, New Phytologist, Mycotaxon, Mycoscience, Mycorrhiza, Mycological Research, Mycological Progress, Mycologia, Molecular Phylogenetics and Evolution, Molecular Ecology, Microbial Ecology, Journal of Basic Microbiology, Fungal Ecology, Fungal Diversity, FEMS Yeast Research, FEMS Microbiology Ecology, Central European Journal of Biology, BMC Evolutionary Biology, Australian Journal of Botany, Applied Microbiology and Biotechnology, Antonie van Leeuwenhoek, American Journal of Botany and Agriculture Ecosystems & Environment.

Session Title

Macrofungi as Ecosystem Resources: Conservation versus Exploitation

Abstract

Key Players in the Underground? An Overview on Biodiversity, Ecology, and Systematics of the Sebacinales

For several reasons the basidiomycetous order of the Sebacinales has raised conspicuous interest in the past years. First, by means of molecular ecology we found fungi of this group to be distributed in soils all over the globe, involved in a great diversity of mycorrhizal or mycorrhiza-like interactions. They have been detected as mycobionts of ecto- and ectendomycorrhiza, orchid and ericoid mycorrhiza, and of the jungermannioid mycothallus (an interaction with foliose liverworts). They have also been found as abundant root endophytes of angiosperms, gymnosperms, and pteridophytes. Second, the endophytic interaction turned out to trigger various systemic effects that are beneficial to host plants, ranging from enhancement of growth and yield to increased resistance to both abiotic and biotic stress, e.g.,

drought or fungal pathogens. Thus, Sebacinales are highly promising bioagents for sustainable agriculture.

The order branches early in the Agaricomycetes and splits into two families, Sebacinaceae and Serendipitaceae. Micromorphological characters are longitudinally divided phragmobasidia; clamp connections are lacking. Macroscopically visible basidiocarps, known only in Sebacinaceae, are pustulate, effused, cushion-shaped, clavarioid or infundibuliform. Basidiocarps have not yet been reported from the Serendipitaceae, which harbours all strains that so far were used to test the agricultural potential of sebacinalean endophytes.

This talk will give an overview of what we know about the biodiversity, ecology and potential applications of the Sebacinales, a hidden fungal group that we have just begun to explore.

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Mona is a professor of Remote Sensing and GIS applications in Environmental Hazards assessment. She graduated from Suez Canal University, Faculty of Science in 1988. Ph.D. in Coastal Zone Management from Reading University, UK in 2004. She had a Post-doctor Fellow in the Center of Remote Sensing, Boston University, USA in 2011. She published 34 research papers in international journals and supervised 6 MSc. & Ph.D. theses, in addition 7 theses which are in progress. **Mona Kaiser** is a member in the Institute of Electrical and Electronics Engineers **IEEE** Geosciences and Remote Sensing Society and reviewer in 12 international journals.

Session Title

Macrofungi as Ecosystem Resources: Conservation versus Exploitation

Abstract

GIS AS A CONSERVATION TOOL

Threats to fungi and fungal diversity throughout the world have prompted debates about whether and how fungi can be conserved. Global warming and climatic changes are the most effective factors controlling the distribution and abundance of fungi due to its impacts on soil characters.

It is a legal requirement in the Nile Delta that development, spatial planning and land-use management decisions include the biodiversity of the area under consideration. Systematic biodiversity planning involves mapping a wide range of information about biodiversity features and patterns of land and resource use, as well as setting conservation targets. A biodiversity spatial support tool is aimed at providing planners with a tool containing the most relevant and most recent biodiversity-related spatial information, which should be used during land-use planning and conservation allocation processes. Some aspects of the soil environment were correlated with fungal community structure, with the abundance of some fungi positively correlated with various parameters e.g. air temperature, electrical conductivity, pH, humidity and % of organic matter. Climatic changes and global warming may affect the soil properties controlling abundance and distribution of fungi. This study aims to investigate and assess the ecological factors regulating the distribution and survival of Macrobasidiomycete fungi inhabiting some selected sites in the Nile Delta of Egypt which affected by climate changes during the period between 2003 to 2015.

Electrical conductivity showed a negative effect on the occurrence and distribution of fungi. All the soil samples showed good amount of organic matter and the fungi were generally found to be proportional to the soil organic matter, and pH. It was observed that with a slight increase in pH value of the soil samples, there was a corresponding increase in the number of fungal species. Soil pH is considered as one of the major factors affecting fungal population and diversity, on the other hand, high electrical conductivity does not support fungal growth. The occurrence of fungi was found directly proportional to the soil organic matter and humidity. Slight alkalinity, high electrical conductivity (salinity), low amount of some nutrients and harsh climatic conditions, such as, extremely low temperature and arid conditions do not suppress the prevalence of fungi in such habitats.

The approach used to develop the proposed biodiversity spatial support tool is called systematic biodiversity planning, which is the most well developed conservation planning approach in the Nile Delta and the most recognized method internationally. The biodiversity spatial support tool will allow for the identification of areas where further loss of natural habitat should be avoided and aims to prevent the degradation of fungi, while encouraging sustainable development and integrated land use in other natural areas. The areas of main concern here is the biodiversity hot-spot class and to better represent this class. The purpose of highlighting clusters was to investigate areas that were making them more suitable for formal protection. An essential component of conservation is to effectively identify which parts are under the greatest threat. Further developments of the tool are planned including the integration with other data sources, including field survey, satellite images and remote sensing image processing analyses. These tools provide managers and planners with the ability to rapidly assess landscape attributes and link these attributes with species-habitat information. With GIS, environmental microbiologists can work quickly and efficiently with the geographic data elements. The development of these tools has given resource managers the means to evaluate the merits of proposed landscape management scenarios and to choose the scenario that best fits the goals of the managed area. GIS allows specialists to examine local, regional, national or global trends to assist decision makers in plotting conservation strategies. It also helps researchers to examine historic information for trends and account for potential problems arising from natural and anthropogenic factors controlling distribution of each species. GIS is an important tool for ecologists and mycologists to monitor biodiversity. Monitoring natural changes or anthropological over time can help us to not only reconstruct the environment of the past but also to plot models and make predictions of what might happen for fungi in the future.
In conclusion this study illustrates how GIS can be used to assist with biodiversity management at a municipality level. The GIS biodiversity spatial support tool offers users the ability to query and thus make better informed decisions behind the biodiversity significance and management guidelines of fungi in the Nile Delta. Furthermore the Biodiversity Hot-spot Map gives decision makers a better insight on where to invest their biodiversity conservation efforts.

LIST OF ORAL PRESENTERS

Abstracts

Session Title: Conservation and Bioprospecting

- Kavileveettil V. Sankaran
- Fatma M. Salem
- Nivien A. Nafady
- Waleed F. Khalil
- Randa A. Mohamed
- Ahmed M. Younis
- Bassem A. Balbool

Session Title: Plant Microbial Interactions

- Zeinab A. Abdel-Salam
- Amany A. Hassan
- Merhan M. Tawfik

Session Title: Clean Up the Environment

- Nilly A. Kawady
- Marwa T. Mohesien
- Fatma A. Allam

Session Title: Animal Microbial Interaction

- Metwally R. Kottb
- Essam A. Ali

Session Title: Human-Microbial Interactions and Microbial Nanoparticles

- Sherif M. Zaki
- Ferial M. Imam
- Eman A. Helmy

Session Title: Microbes and World Heritage and Industrial Applications

- Ahmed M. Abdel-Azeem
- Eman A. Attia
- Yousra A. Kamal
- Samah F. Boghdady

ORAL ABSTRACT SESSIONS

FUNGAL CONSERVATION IN INDIA – SCOPES AND CHALLENGES

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A database on 'Indian Fungi' revealed that a total of 27,500 species of fungi have been described from India so far. This is against the estimated 1, 20,000 species (based on the 6:1 ratio) that may occur in the biodiversity rich ecological niches in the country. Like in other parts of the world, the Indian fungal flora is also threatened by habitat destruction, invasive species, pollution, over exploitation and other reasons. Hence, concerted efforts have become mandatory to conserve the rich fungal flora of India. To achieve this, several programs have been initiated. Most importantly, a database on 'Fungi of India' has been generated which contains information on fungi recorded from the country from early 1800's to the present. The database has been hosted on Cybertruffle' Robigalia under 'Indian fungi' and is searchable for information on location, associated organism, literature etc. This database will aid in deciding conservation status of each fungus and to prioritize areas for protection. Also, attempts at *ex-situ* conservation of fungi as cultures (including cryopreserved cultures) and specimens have been strengthened at the National Facility for Culture Collection and several herbaria across the country. Establishment of a central repository for conserving trait-based cultures has been proposed recently which requires collaboration between research laboratories and industries. *In situ* conservation is attempted through protection of pristine ecosystems but success of these is debatable. Raising of awareness on the importance of fungal conservation is attempted through a network of fungal enthusiasts and interactions through Facebook pages.

Key words: Fungal conservation, India, Database on fungi, Culture collection.

BIODIVERSITY AND STRATEGIC PERSPECTIVES FOR GLOMEROMYCOTA CONSERVATION IN FOUR EGYPTIAN PROTECTED AREAS

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Protected areas consider a suitable place for the in situ conservation of Arbuscular Mycorrhizal Fungi (AMF) where their conservation status under the auspices of national and international authorities, providing them with adapted situations together with various interactions networks within different specific ecosystem components. In order to investigate the effect of edaphic factors and anthropogenic disturbance on diversity and conservation status of AMF, spore density, colonization of rhizsopheric soils and plant roots of the dominant plant species in El-Omayed, Saint Katherine, Wadi El-Alaqi and Wadi El-Assuiti Protectorates were analyzed. The results showed that all wild plants under investigation could form strong symbiotic relationships with AMF. There existed obvious differences in AMF colonization status among the four protectorates ($P<0.05$). Correlation analysis showed that AMF colonization and spore density were influenced by edaphic factors. All studied AM species could be classified into four groups in the biplot of canonical correspondence analysis (CCA), and each group affected by various edaphic factors. Taxonomically a total number of 23 morphotypes of AMF belonging to six genera and 15 species were recovered from 800 soil samples throughout the four Protectorates. Conservation status of all AMF taxa isolated from wild plants in the studied protected areas is Data Deficient, because of the knowledge gap between their distribution range, population trends and size. The present work contributed to the inventorying and conservation of AMF in Egypt through two ways either by conserving the habitats of protected areas through volunteers or by in situ conservation of wild plants reserves and ecological niches though awareness campaigns of local Bedouin tribes.

Keywords: Arid desert, colonization, distribution, fungal diversity, Mycorrhizal conservation, Orphans of Rio.

BIOPROSPECTING AND CONSERVATION OF EGYPTIAN ENDOPHYTIC MYCOBIOTA: TAXA PRODUCING ANTIOXIDANT, ANTIMICROBIAL AND HEPATOPROTECTIVE METABOLITES AND THEIR BIOCHEMICAL EFFECTS ON EXPERIMENTAL ANIMALS

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The aim of the present study was to investigate the antioxidant, antimicrobial and hepatoprotective activities of secondary metabolites produced by endophytic mycobiota in Egypt. A total of 36 endophytic fungi were isolated from seven dominant medicinal plant host species in different wadis, Saint Katherine Protectorate, arid Sinai, Egypt. Zygomycota represented by one species, teleomorphic Ascomycota by 6 species, and anamorphic Ascomycota by 29 species. Of those taxa, five species namely *Alternaria alternata*, *Curvularia lunata*, *Penicillium chrysogenum*, *Chaetomium globosum* and *Trichoderma viride*, being the most frequent taxa, were recovered and screened for their H_2O_2 scavenging activities. Out of those taxa *C. globosum* and *C. lunata* came first by recorded the higher radical scavenging activity. Those endobionts, *C. globosum* Kunze and *C. lunata* (Wakker) Boedijn recovered from *Adiantum capillus-veneris* L. and *Verbascum sinaiticum* Benth., identified morphologically and using molecular techniques, were then used for the screening itself. Results showed that endophytic fungi from medicinal plants are a significant potential source of novel bioactive compounds. The present work contributed to the inventorying and conservation of endophytic fungi in Egypt and isolated taxa are now conserved in the Fungarium of Suez Canal University. Our work is also interesting from a conservation point of view, because it is an example of an exciting use of fungal technology to generate potentially valuable pharmaceutical products.

Keywords: *Chaetomium globosum*, Fungi, Liver, Medicinal Plants, Native, Paracetamol, Saint Katherine Protectorate.

BIOPROSPECTING AND CONSERVATION OF EGYPTIAN ENDOPHYTIC MYCOBIOTA: TAXA PRODUCING L-ASPARAGINASE ENZYME

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L-asparaginase considered one of the most important enzymes, studied intensively with regard to its anti-tumor activities against lymphoblastic leukemia (ALL). The harsh side effects of many of the current drugs like infertility and immune suppression made it a must to find some natural alternatives. Endophytic fungi recorded to be an immense source of wide variety of novel bio-active compounds. The main objective of the present study is to screen endophytic mycobiota hosted 8 medicinal plants growing in Saint Katherine Protectorate for the production of L-asparaginase enzyme. L-Asparaginase-producing endophytes were detected by the formation of pink zones on agar, a result of hydrolyzes of asparagine into aspartic acid and ammonia that converts the phenol red dye indicator from yellow (acidic condition) to pink (alkaline condition). 31 species were recovered and identified by phenotypic and molecular means. Zygomycota represented by 2 species, teleomorphic Ascomycota by 6 species, and anamorphic Ascomycota by 23 species. Results revealed that a total of 22 morphotypes produced L-asparaginase. L-Asparaginase producing isolates were belonging to genera of *Aspergillus*, *Fusarium*, *Phoma* and *Penicillium*. Taxa produced the anticancer enzyme will be further quantified via Nesslerization to select the most promising species for further studies on the target enzyme. Isolated taxa are now conserved in the Fungarium of Suez Canal University,

Keywords: Anticancer- Egypt- Saint Katherine- Conservation.

SPECIES DIVERSITY AND CONSERVATION OF CHAETOMIUM IN EGYPT

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Since Gustav Kunze described and published genus *Chaetomium* based on *C. globosum* as its type species in 1817 the genus attracted an immense interest. *Chaetomium*

(Ascomycota, Sordariales, Chaetomiaceae) is a diverse genus occurring worldwide and found on various substrates as saprobe. The genus currently contains 163 accepted species and is known to play a major role in the decomposition of plant and other cellulose-rich materials. Data on the occurrence of *Chaetomium* species in Egypt were not yet summarised; in this paper we reinvestigate the diversity of genus *Chaetomium* in Egypt utilizing a combination of phenotypic and molecular methods. The internal transcribed spacer (ITS) 1–5.8 s – ITS2 rDNA sequences obtained were compared with those deposited in the GenBank Database. A total of 34 isolates represented by 15 species were collected from six different substrata at 75 sites in Egypt. The most diverse substrata were medicinal plants (9 species per 34 isolates), soil (4 species per 34 isolates) and decaying wood (2 species per 34 isolates). The most abundant species isolated from all substrata was *Chaetomium globosum*. Isolated taxa are now conserved in the Fungarium of Suez Canal University and Minnesota University. This work was suppported by the Science and Development Technology Fund in Egypt (STF project No. 12295).

Keywords: Chaetomiaceae, *Chaetomium globosum*, ITS1, ITS2 rDNA, Molecular identification.

BIOPROSPECTING AND CONSERVATION OF EGYPTIAN ENDOPHYTIC MYCOBIOTA: TAXA PRODUCING ANTI-INFLAMMATORY METABOLITES AND THEIR EFFECTS ON RHEUMATOID ARTHRITIS' RAT MODEL

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The main objective of the present study was to investigate the anti-inflammatory activities of secondary metabolites produced by some endophytic mycobiota hosted medicinal plants growing in Saint Katherine Protectorate, South Sinai, Egypt. Through the present study, 40 species belonging to 20 genera were isolated and identified from five plant species dominated different altitudes in Saint Katherine Protectorate. Teleomorphic *Ascomycota* was represented by 9 species, and anamorphic *Ascomycota* by 31 species. *Chaetomium globosum* and *Curvularia lunata* recovered from *Capparis spinosa* and *Chiliadenus montanus* were subjected to sequencing for confirmation of phenotypic identification. The internal transcribed spacer (ITS) 1–5.8 s – ITS2 rDNA sequences obtained were compared with those deposited in the GenBank Database and registered with accession numbers KJ418360 and KJ418361 for *C.*

globosum and *C. lunata* in the NCBI Database respectively. Both taxa were cultivated on half – strength potato dextrose broth for 14 days at 28°C on a rotatory shaker at 180 rpm, and extracted in ethyl acetate. The probable inhibitory effects of organic and aqueous extracts against an adjuvant induced arthritis (AIA) rat model were examined and compared with the effects of methotrexate (MTX) as a standard disease-modifying anti-rheumatoid drug. The therapeutic effects of both EtOAc and aqueous extracts of each fungus were evaluated on inflammation and arthritis scoring, Anti-ccp, C- Reactive protein (CRP), Rheumatoid factor (RF) and Tumor necrosis factor (TNF), Moreover, their effects on some liver, kidney, random blood sugar and complete blood picture (CBC) biochemical parameters were also investigated. Results showed that both EtOAc and aqueous extracts of *C. globosum* (KJ418360) significantly decreased inflammation and arthritis scores in addition to serological parameters including CRP, RF, Anti-ccp and tumor necrosis factor (TNF). Kidney functions not affected and random bloods sugar but liver enzymes simply increased. Data showed that endophytic fungi are significant potential source of novel bioactive compounds. The present work contributed to the inventorying and conservation of fungi in Egypt in three ways. Our work is also interesting from the conservation point of view, because it is an example of an exciting use of fungal technology to generate potentially valuable products and medicines.

Keywords: *Chaetomium globosum*, *Curvularia lunata*, Freund's Adjuvant, Egypt, Saint Katherine.

ANTICANCER POTENTIAL OF HERICIUM ERINACEUS EXTRACTS AGAINST PARTICULAR HUMAN CANCER CELL LINES

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Cancer is a leading cause of death worldwide. Cancer caused 7.98 million human death in 2010, and 8.2 million in 2012. Moreover, it is expected that the annual cancer cases will rise from 14 million in 2013 to 22 million within the next two decades. Mushrooms are extensively used as nutritional supplements in many countries. Moreover, mushrooms have many medicinal properties, including anticancer activity. In this study, the anticancer activity of different polar and non-polar extracts of *Hericium erinaceus* (monkey's head mushroom) were evaluated against different human cancer cell lines including human liver carcinoma (Hep G2), the human colonic epithelial carcinoma (HCT 116), the human cervical cancer cells (HeLa) and the human breast adenocarcinoma (MCF-7) using 3-(4,5-Dimethylthiazol-2-yl)-2,5-diphenyltetrazolium bromide (MTT) assay. Furthermore, as a control the cytotoxicity effect of the different extracts were tested against isolated mouse hepatocytes. It was observed that the extracts by water and methanol from fresh and lyophilized fruiting bodies of *H. erinaceus* had the strongest anticancer effect. In

contrast, the extracts by ether and ethyl acetate from mycelia and broth of *H. erinaceus* showed lower anticancer activity against the tested carcinoma cell lines. The highest anticancer activity was recorded for aqueous extract of lyophilized fruiting bodies with half maximal inhibitory concentration (IC_{50}) values of 6.1±0.2, 5.1±0.1, 5.7±0.2 and 5.8±0.3 µg/ml against Hep G2, HCT 116, HeLa and MCF-7 cells, respectively with non-significant effect on the normal mouse hepatocytes. In summary, polar extracts of *H. erinaceus* can be good sources for isolating natural anticancer compounds. I recommend further chemical studies to isolate the active principles of the extract of *H. erinaceus* evaluated in the present

Key words: Anticancer activity, monkey's head mushroom, mushroom extracts, Hep G2, HCT 116, HeLa, MCF-7.

INDUCTION OF SALT TOLERANCE FOR OLIVE TREES USING EFFECTIVE MICROBIAL CONSORTIA UNDER SALT STRESS

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The scarcity of irrigation water in Egypt owing in addition to the use of low quality water is becoming an appeal. A field experiment was carried out during two successive seasons (2014 and 2015) on three years old olive trees growing in El-Sheikh Zowaid Station, Desert Research Center, located at North-East Sinai, Egypt. This study was designed in order to decrease the negative effect of irrigation with saline water (2800 and 3800 ppm) on 60 olive trees using native fungal and bacterial treatments either singly or in consortium in a randomized complete block .In the root zone, one liter per tree of pure active culture of *Azotobacter chroococcum*, *Streptomyces microflavus* and *Glomus macrocarpus* was applied. Fruit yield, water use efficiency, tree height, fruit characteristics, contents of macro- and micro-nutrients in leaves, proline concentration, chlorophyll and microbiological content were determined. Results indicated that trees irrigated with water salinity of 2800 ppm and applying the mixed microbial cultures recorded the highest significant values of the aforementioned parameters, compared with the single applications of microbes. However, proline concentrations in the trees irrigated with water salinity of 3800 ppm and treated with mixed microbial cultures were significantly highest than other treatments. Summing up the results, mixed application of the microbial cultures performed better than the single applications for coping up the negative effects of saline water on olive trees.

Key words: Salinity, Olive, Biofertilization, *Azotobacter chroococcum*, *Streptomyces microflavus*, *Glomus microcarpus*.

ESTIMATION OF THE BIOTECHNOLOGICAL PROSPECTS OF RHIZOBIUM SPECIES FROM ROOT NODULES OF CICER ARIETINUM AND VIGNA UNGUICULATA FOR EXOPOLYSACCHARIDE PRODUCTION

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The exopolysaccharide (EPS) produced by rhizobia is found to be require for the establishment of symbiosis with compatible legumes. Also, rhizobial EPS have attracted much attention from the scientific and industrial communities. This study aimed to determine the ability of Egyptian rhizobial isolates from root nodules of *Cicer arietinum* L. and *Vigna unguiculata* (L.) Walp. to synthesize exopolysaccharide (EPS) and to optimize the nutritional factors for maximum production. The ability of twenty rhizobial isolates were tested for their EPS production in yeast extract mannitol broth (YEMB) medium. The effect of different nutritional factors was carried out to give maximum EPS yield. Growing of two isolates of *Rhizobium* sp. (C6 and V4) isolated from root nodules of *Cicer arietinum* L. and *Vigna unguiculata* (L.) Walp. on sucrose produced high EPS yield (195 and 118 mg/ml, respectively). Two-fold increase in EPS by *Rhizobium* sp. V4 when medium supplemented with 9.0 g/L sucrose and 1.0 g/L lactose. Addition of 1.68 g/L KNO_3 or 2.49 g/L glycine to modified YEMB medium were significantly increased EPS production by C6 and V4, respectively. Maximum amount of EPS during growth of *Rhizobium* isolates C6 and V4 in modified YEMB was 254.6 and 179.5 mg/ml, respectively. Furthermore, the presences of magnetic Fe_3O_4 nanoparticles (25 µg/ml) in the modified YEMB medium increase EPS yield by *Rhizobium* sp. V4. Those findings are considered a step forward using a safer and an economic method in production of polysaccharides permits scientists to open new gates in their application.

Key words: EPS -Magnetic Fe_3O_4 nanoparticles -Nutritional factors, Egypt.

ALFALFA AUTOTOXICITY AND ITS ALLELOPATHIC ACTIVITY AGAINST SOME PLANTS, SOIL BACTERIA AND MICROFUNGI

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Alfalfa (*Medicago sativa* L.) releases allelochemicals in the soil through their root exudation that arranged their associated soil microorganisms and neighbor plants

growth. The obtained result of *M. sativa* plants extracts (aqueous and methanol as well as root exudates extracts) revealed an autotoxicity in their seeds germination and seedling growth. These extracts at the tested concentrations achieved a significant reduction upon purslane (*Portulaca oleracea* L.) weed seeds germination and seedling growth. *M. sativa* allelochemicals have the ability to extract and their phytoxicity increased by raising the extract concentrations. However, treating this plant with the lowest concentration resulted in activation in their seed germination and seedling growth. The total count of microbial community (bacteria and microfungi) associated with *M. sativa* was varied greater in low density than high density area, rhizospheric and non rhizospheric soil and as well as the soil types. These microbial interactions can be beneficial, neutral or detrimental to alfalfa plant growth. Root exudates of *M. sativa* collected after the seeds were grown in solid MS media for 7 days and transfer to MS liquid media for 28 days. Then centrifuged and passed through a nylon syringe filter with pore size 0.45 mm and was concentrated by freeze-drying. The residues were re-suspended in distilled water and adjust pH to 3 after that extracted with partitioning with ethyl acetate three times. Extracts from the media re-suspended in methanol and diluted to 125, 250, 500, 1000, and 1500 µg $ml^{-1}$and tested for one week against *M. sativa* and *P. oleracea*. Both *M. sativa* roots methanol extracts and ethyl acetate root exudates extracts give phytotoxicity at the same concentration at both *M. sativa* and *P. oleracea*, then ethylacetate root exudates extracts subject to identification using UV-VIS spectrophotometers (Thermo, Nicolet evolution 300), FTIR (Perkin Elmer) and MS (Thermo, Triple Quadrupole).These instruments appeared both chlorogenic acids (molecular mass: 354) and ferulic acid (molecular mass: 194) in alfalfa root exudates. These compounds need more studies for direct use in weed control.

Keywords: Allelopathy, autotoxicity, root exudates, seed germination, seedling growth and bacteria –fungal community.

CLEAN UP THE ENVIRONMENT: EFFECT OF RADIONUCLEIDES ON NATIVE FUNGAL SPECIES WITH EMPHASIS ON BIOSORPTION

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Bioleaching of uranium and other radionuclides resulted in two alternative effects; effect of fungal strains on the distribution of uranium and other radionuclides and effect of radionuclides on the morphology and structure of the biomass. This work was stressed on the radionuclides effect on the biomass with emphasis on biosorption which started from the leaching process on a sandy dolomite representative sample using both *Aspergillus niger* and *A. terreus*. Biosorption controlling factors such as ore

concentration, pH, incubation temperature and time were studied during the whole phases of this work. The results showed that the optimum biosorption limiting factors were at 5% ore concentration, 9 days as the incubation period, temperature of 35 ℃ and pH9. Furthermore, variations of cellular deformations of *A. niger* were enhanced by increasing the ore concentrations.

Key words: Uranium, Biosorption limiting factors, fungal morphology, fungal ultrastructure.

STATISTICAL OPTIMIZATION OF BIOETHANOL PRODUCTION USING AN ENDOPHYTIC ASPERGILLUS ISOLATED FROM WATER HYACINTH

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Ethanol becomes one of the most important products which can be used as an alternative fuel. Moreover, it can be used with the fatty acids or oils in transestrification reaction to produce another biofuel, the biodiesel. Agricultural wastes and exotic plants in Egypt seem to be a real challenge e.g. water hyacinth (*Eichhornia crassipes*). The aim of the present study is to estimate the capacity of a native endophytic *Aspergillus* spp, isolated from water hyacinth stems, to produce ethanol efficiently. Fermentation was carried out at static and shaking condition with the addition of dried powder of water hyacinth. For screening and evaluation of the effect of culture conditions on the bioethanol production in shaking culture, a Plackett-Burman fractional factorial design was used. Twenty four trials were tested for twenty three variables including water hyacinth and waste cooking oil (WCO). Results showed that the fungal growth and ethanol production is directly related to the amount of the dried water hyacinth powder added as a substratum in static cultures. By using Czapek medium amended with water hyacinth powder as the sole carbon source, the amount of ethanol produced was 0.25 mg/100 ml. No ethanol produced on Czapek medium standard medium. Among the tested variables, olive oil, yeast extract, pH, incubation time, glucose, and WCO appeared to be the most effective variables. Yeast extract, glucose and WCO increased the production at their high levels, while pH and incubation time enhanced the production but in their low levels.

Key words: Bioethanol, Plackett-Burman, *Eichhornia crassipes*, Biofuel, Alternative fuel.

ASSESSMENT OF DIESEL DEGRADING POTENTIAL OF FUNGAL AND BACTERIAL ISOLATES FROM EGYPT

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Two naturally occurring fungal and bacterial species, *Aspergillus flavus* and *Bacillus* sp. H6 strains, were capable of utilizing diesel oil as a sole source of carbon in synthetic microcosoms. The initial diesel oil contamination of 1666 mg kg^{-1} dry soil was reduced to 166.667 mg kg^{-1} after 150 days of incubation in fungal-bacterial consortium microcosm. That is mean 89.9%, of the initial oil concentration was removed. Abiotic process reduced the diesel oil contamination to about 616 mg kg^{-1}dry soil at the end of the experiment. Seven microcosms were set up to fulfill the experiments. The decontamination activity follow this order; *Bacillus* sp. H6 + *A. flavus* consortium › *Bacillus* sp. H6 › natural control › *A. flavus* › cycloheximide treated › benzyl Penicillin-Streptomycin treated › poisoned control. Gas chromatographic analysis data revealed that both *A. flavus* and *Bacillus* sp. H6 treatment led to complete utilization of carbon-17 compounds. Other biodegradation products such as C-15, 16, 20, 21, and 24 appears in the chromatogram after 150 days incubation. Increase of C-20, 21 and C-24 compounds also noticed. The fungal- and bacterium consortium treatment depicted a decrease of all detected n-alkanes. The microbial success in biodegradation was evaluated by determining the number of germinating seeds of *Phaseolus vulgaris*. The highest level of germination (92 %) was detected in consortium microcosms after 150 days incubation. The treatment with *A. flavus* and *Bacillus* sp. H6 separately led to a lower percentage of germination (86%). The other treatments showed variable results except the poisoned control that showed negative germination and minor chemical degradation of diesel oil. Thus, bacterial-fungal consortium treatment is effective in bioremediation of contaminated oils than separate treatment.

Keywords: Diesel, biodegradation, *Aspergillus flavus*, *Bacillus* sp. H6.

ANIMAL-FUNGAL INTERACTIONS: BIOACTIVITY OF TRICHODERMA'S 6-PENTYL **A**-PYRONE AGAINST PHYTOPATHOGENIC MITE, TETRANYCHUS *URTICAE* KOCH (ACARI: TETRANYCHIDAE)

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Several *Trichoderma* species used as biocontrol agents due to their high potentiality to produce a wide array of bioactive secondary metabolites, some of which are low molecular weight volatiles. *Trichoderma asperellum* isolated from the rhizosphere of *Zea*

mays at Ismailia, identified by morphological and molecular techniques, showed high antifungal and nematicidal activities from previous preliminary experiments. This motivated us to examine the bioactivity of *T. asperellum* against *Tetranychus urticae* Koch, the twospotted spider mite, under laboratory conditions. Results showed high mortality after 48-h exposure time reached up to 80% mortality rate. Since the major volatile compound emitted from *T. asperellum* was identified to be 6-pentyl- α-pyrone (6PP), with rate of 450 ng/µl. Mass spectra were obtained using the scan modus (70 eV, total ion count, 40–280 m/z) and confirmation of structure assignments was done by comparison of mass spectra and retention times with those of commercial standard obtained from sigma, as well as by comparison of Kovats indices. The effect of different concentrations (0.125, 0.25, 0.5 and 1mM) of 6PP (Sigma) has been examined to find out their effect on *T. urticae*. Results showed that 20%, 40%, 80% and 90% mortality rate have been recorded respectively after two and three days. The data confirmed the role of volatile organic compounds (VOCs) of *Trichoderma asperellum* as killing compounds on twospotted spider mite and their potential value as a new alternative natural plant protection compounds. *Trichoderma asperellum* is now conserved at The Centraalbureau voor Schimmelcultures (CBS) under accession number CBS 137093..Projects like this raise interesting and often difficult questions about how management and exploitation of fungal diversity (with industrial, agricultural and commercial applications potentially worth millions of dollars) can be kept sustainable and reconciled with conservation.

Key words: *Trichoderma*, volatiles, Fungi, mites, Biocontrol.

ANIMAL-MICROBIAL INTERACTIONS: INSECTICIDAL POTENCY OF NATIVE BACTERIAL ISOLATES AGAINST PHENACOCCUS PARVUS MORRISON (HEMIPTERA: PSEUDOCOCCIDAE)

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Insects are one of the most challenging pests to control in agroecosystems, side effects of synthetic pesticides on the environment and rapid progress of resistance are problematic issues. Recently different isolates of bacteria recovered from different environmental habitats have been extensively studied in terms of their production of extra-cellular compounds toxic to insects. 13 bacterial isolates were isolated from natural sources (soil and water) on nutrient agar and King's media plates. Isolates were coded as: P1, P2, P3, P4, P5, P6, F, E2, E3, E4, E5, E5P and AC2. Those isolates were tested against *Phenacoccus parvus* Morrison (Hemiptera: Pseudococcidae) nymphs and adults by using leaf deep technique under laboratory conditions. Results showed

a significant level of mortality for the most bacterial isolates after 72-h exposure time. Bacterial metabolites were toxic against mealy bug adults and nymph. Metabolites of four bacterial isolates (E3, E5, P3 and P6) were the most toxic by recording 70 to 80 % of mortality rate. Bacterial cells free of metabolites had more killing effect on nymph than adults. Isolate E4 recorded 30, 52.2, and 70.5% of mortality for adults, and 54, 84.7 and 95.5% for nymph after 24, 48, and 72 hours respectively. Isolate E2 recorded 18, 36.3, 54.5 % of mortality for adults and 42, 76.1, 90.1 % of mortality for nymph after 24, 48, and 72-h respectively. Seven isolates (P2, P5, P6, F, E3, E5, and EP5) recorded 70.5 to 88.7 % of mortality after 72 hours treatments for nymph, while seven isolates (P2, P5, F, E2, E3, E4, and EP5) recorded 47.7 to 95.4% of mortality after 72-h for adults. In chemical treatments of adults, Malathion and mineral oil came first by recording 100 % of mortality after 24, 48 and 72-h. Both of Ashok and Kenz oil came second and recorded 84, 95.7, 100% and 76, 95.7, 100 % of mortality respectively. The same trend of results was recorded against nymphs. Data from the effect of pesticides and biopesticides against *P. parvus* revealed that the chemicals were dominated over biopesticides. No mortality of nymphs and adults were recorded in control treatment. Data regarding bacterial secondary metabolites against insect are of significant importance. The present study highlights the remarkable use of bacterial technology to produce potentially valuable products (insecticides) and is interesting from a conservationist point of view, as isolated native bacterial taxa are maintained in Soil Fertility and Microbiology Department culture collection in Desert Research Center, Egypt. We recommend further chemical and structural studies on the active principles of E3, E5, P3 and P6 isolates.

Keywords: Biocontrol, Egypt, Bioassay, Phytopathogenic Bug, Desert Research Center.

CONSERVATION OF HUMAN PATHOGENIC FUNGI: INVASIVE PULMONARY INFECTIONS BY BASIDIOMYCETES IN EGYPT

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This study reported for 2 cases of invasive Basidiomycetes' fungal infections in uncontrolled diabetic patients in Egypt. Two taxa isolated from aspirated biopsy tissue specimens of two clinical cases on Sabouraud's glucose agar (SGA) plates supplemented with chloramphenicol. *Phanerochaete chrysosporium* and *Perenniporia* sp. isolates were identified by phenotypic and molecular techniques using ITS rRNA region sequences. Histopathological examination revealed the presence of fungal elements in the infected tissues. Antifungal susceptibility testing of the 2 isolates was performed by the disk diffusion method against 7 antifungal drugs. The two isolates showed sensitivity to azoles antifungal and resistance to Amphotericin B and Caspofungine. Both pathogenic taxa are now conserved in fungal collection of

Microbiology Department, Faculty of Science, Ain Shams University and in AUMC culture collection for further studies.

Keywords: Azoles, Diabetes, Histopathology, Invasive, *Phanerochaete chrysosporium*, Conservation.

NANO-BIOTECHNOLOGY BREAKTHROUGH AND FOOD-PACKAGING INDUSTRY

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Nanobiotechnology has been renowned as extremely essential scientific and industrialized advancements that have the actual ability to renovate virtually each feature of lifetimes and economy. Chemical and physical methods for the synthesis of nanoparticles are the common approaches, but their use is limited because they are costly and harmful to the environment. In this methods the biological systems such as bacteria, fungi, plants were used to transform the organic metal into metal nanoparticles via the reactive capacity of proteins and metabolites present in these organisms. The biogenic synthesis using biological routes especially fungal pathways is, therefore, the best choice. The use of fungi in the green synthesis of metal nanoparticles has been reported in several promising studies, since fungi contain enzymes and proteins as reducing agents and can be invariably used for the synthesis of metal nanoparticles from their salts. Generally, microbial nanobiotechnology can adapt of packaging stuff, rising barrier characteristics, refining mechanical and heat-resistance, evolving functioning antimicrobial exteriors, and generates nano-biodegradable packaging stuffs. Improving intelligent packaging to elevate the nutritional goods validity timing via nanobiotechnology became the ambition of many corporations. This review will focuses on tremendous benefits of nanobiotechnology in nutrition trade concerning Foodstuff Wrapping systems and materials. Such packaging (wrapping) structures would be able to fix minor holes/tears, react to ecological conditions as temperature and/or moisture changes and attentive the client if the food is spoiled. Nanobiotechnology has utilized in inventive improvement of biosensors for recognition of pathogens and chemical pollutants. Elaboration of food analytical approaches for the uncovering of tiny aggregates of a chemical and/or any microbial pollutant during food processing is an extra prospective practice of nanobiotechnology. This will leads to further safety for the food handling approaches.

Keywords: Food-packaging, Microbial nanobiotechnology, nanoparticles fungal biosynthesis.

EVALUATION OF ANTIFUNGAL ACTIVITY OF BIOGENIC SILVER NANOPARTICLES (AGNPS) AND MEDICINAL PLANTS EXTRACTS ON HUMAN AND PLANT PATHOGENIC FUNGI

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A simple and reproducible biosynthetic method was employed to synthesize silver nanoparticles which resulted in monodispersed nanoparticles of high concentration. Silver nanoparticles have been a potent antibacterial, antifungal, anti-viral and anti-inflammatory agent. The current study aims to evaluate antifungal activity of green synthesized AgNPs by a native endophytic taxon isolated from medicinal plants from arid South Sinai and some extracts of medicinal plants on 17 human and plants pathogenic fungi and bacteria. The obtained silver nanoparticles were characterized by UV-vis spectroscopy, while Energy Dispersive X-ray Spectroscopy (EDX) has been employed to confirm elemental silver and weight percentage and the morphology of prepared nanoparticles was confirmed by transmission electron microscopy (TEM). TEM images of silver nanoparticles synthesized by *Trichoderma viride* showed 26.3-34.2 nm sized particles. Antimicrobial effects of biogenic, chemically synthesized AgNPs and medicinal plants with a range of concentration (25, 50 and 100ppm) were studied against human and plant pathogenic fungi. Selected pathogenic taxa were recorded different degrees of susceptibility towards antibacterial and antifungal drugs. Chemically synthesized AgNPs showed negative results against all filamentous fungi under investigation. On the other hand positive antifungal activity has been recorded by biogenic AgNPs (100ppm) against *Aspergillus flavus* and *A. fumigatus*. In the case of yeast (*Candida albicans* and *Cryptococcus neoformans*) biogenic AgNPs with concentration 50 and 100 ppm showed positive activity against *Candida albicans*, while chemically synthetic AgNPs showed negative activity. Both biogenic and chemically synthetic AgNPs showed negative effect against *Cryptococcus neoformans*. Both biogenic and chemically synthetic AgNPs with concentration of 100ppm have antimicrobial activity against tested gram-negative bacteria (*Salmonella typhi* and *Vibrio cholera)*. In the case of gram-positive bacteria (*Staphylococcus aureus*) biogenic AgNPs of *T. viride* and chemical synthetic nanoparticles showed positive effects at 100ppm. Out of 5 medicinal plants under investigation only 2 showed positive effects at 100ppm against dermatofungi. The mechanism of antimicrobial property of nanoparticle lies with the fact that the extremely small size means a large surface area relative to the volume, which effectively covers the microorganisms and reduce oxygen supply for respiration. It was found that silver nanoparticles synthesized by the microbial route have a greater antibacterial activity. The present work contributed to the inventorying and conservation of endophytic fungi in Egypt through three ways either by conserving the habitats of protected areas through volunteers or by *ex situ*

conservation of isolated taxa and *in situ* conservation of wild plants reserves and ecological niches though awareness campaigns of local Bedouin tribes.

Keywords: Dermatofungi, Egypt, Saint Katherine, South Sinai, *Origanum syriacum*, *Trichoderma viride*.

WOOD DECAY ASSESSMENT OF ANCIENT WOOD FROM THE ABYDOS MIDDLE CEMETERY PROJECT, EGYPT

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Abydos is a large, complex archaeological site located approximately 500 km south of Cairo in Sohag Governorate, El-Balyana City in Upper Egypt. North Abydos is divided into the Middle Cemetery and the North Cemetery separated from each other by a wadi, where the Early Dynastic royal tombs are located. The objectives of this study were to characterize the type of wood degradation found in wooden objects from the Middle Cemetery Project site by light and scanning electron microscopy studies, and to identify the diversity of wood decay fungi currently present in the wood or soil adjacent to the wood by phenotypic study and sequencing the ITS region of rDNA. Many of the wood samples were exceedingly degraded and had also been attacked by termites. Evidence of soft rot attack in many samples was found and in some samples what appeared to be brown rot was observed. Isolated fungi using the ITS region of rDNA and morphological characteristics were identified as *Aspergillus niger*, *A. flavus*, *A. ochraceous A. terreus*, *A. fumigatus*, *Cladosporium cladosporioides*, *Fusarium solani*, *F. oxysporium*, *Stemphylium globuliferum* and *Trichoderma longibrachiatum*. The results provide important information on the current condition of the wood and give insights to the possible fungi responsible for the attack. This information is being used to develop conservation methods to preserve these degraded and fragile wooden objects.
This work was suppported by the Science and Development Technology Fund in Egypt (STF project No. 12295).

Keywords: Brown rot, Soft rot, Middle Cemetery Project, *Trichoderma longibrachiatum*, Conservation.

DIVERSITY OF ROCK-INHABITING FUNGI IN SAINT KATHERINE, EGYPT

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Rock-inhabiting fungi (RIF) are peculiar organisms that apparently lack sexual reproductive structures and form compact, melanised colonies on bare rock surfaces. By comparison to other fungal groups, no concern has been given to rock-inhabiting fungi in Egypt. This study assessed the diversity of cultivable rock-associated fungi in different elevation mountains, Saint Katherine, aird Sinai, Egypt. One hundred rock samples were collected from different elevations and fungi were isolated on malt extract agar (MEA), MEA supplemented with different concentrations of sodium chloride, dichloran-glycerol agar base (DG18) and dichloran-rose bengal agar base (DRBC) A total of 153 fungal isolates obtained were identified as 21 Ascomycota and 1 Basidiomycota taxa by sequencing different regions of DNA. *Cladosporium sphaerospermum*, *C. cladosporioides*, *Penicillium chrysogenum*, *P. purpurogenum* and *Aspergillus terreus* were the most frequent species, which occur at least in three different altitudes (1500-2130 m. a. s.). Rock samples were analyzed by X-ray Diffractometer in order to find the relationship between chemical composition of each rock type and associated fungal taxa. Our study represents the first report of a new habitat of fungi associated with rocks of the mountains of the World Heritage site of Saint Katherine and indicated the presence of interesting fungal community, including species related with saprobes, parasite/pathogen and mycotoxigenic taxa.

Key words: world heritage site, fungal community, altitude, X-ray Diffractometer.

REVEALING THE ANTIMICROBIAL AND ENZYMATIC POTENTIALS OF TWO ENDOPHYTIC FUNGI FROM MEDICINAL PLANTS IN EGYPT

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Medicinal plants are ahead worldwide attention due to the fact that they are cost effective, simply available and with no significant side effects. Endemic medicinal plants in Saint Katherine protectorate are reported to harbour endophytic fungi with bioactive metabolites. The objectives of this study were to 1- investigate what types of enzymes are being produced by two endophytic ascomycete species namely

Chaetomium grande and *Sordaria fimicola* activities isolated from medicinal plants in Saint Katherine Protectorate, South Sinai, Egypt and, 2- evaluation of their antimicrobial activities against human pathogenic bacteria and fungi. Qualitative analysis was performed for amylase, cellulase, chitinase, laccase, lipase, pectinase, and protease on appropriate agar media. For estimation of antimicrobial activity, taxa were grown on potato dextrose broth for 14 days at 25°C on a shaker at 180 rpm, followed by extraction twice with ethyl acetate. Antimicrobial activities of crude extracts were examined against human fungal pathogens (*Aspergillus flavus*, *Syncephalastrum racemosum*, *Candida albicans*, *and Cryptococcus neoformans*) and bacteria (*Vibrio cholera*, *Salmonella typhi*, *and Staphylococcus aureus*). Gentamycin and fluconazole were used as positive control for bacteria and fungi respectively. Results showed that *C. grande* secreted amylase, lipase, cellulase, chitinase, and protease, while *S. fimicola* produced only amylase, laccase, and chitinase enzymes. The negative control of water and DMSO had no inhibition of the bacteria and fungi, whereas the positive control of *C. grande* (0.025 mg/ml) dissolved in water had marked inhibition of *V. cholera*, *S. aureus*, *S. typhi* and *A. flavus*. Positive control of *C. grande* in DMSO (0.025 mg/ml) inhibited *A. flavus*. Both positive controls showed no effect on *C. albicans*, *S. racemosum* and *C. neoformans*. Positive control of *S. fimicola* dissolved in water (0.025 mg / ml) recorded zero antimicrobial activity against all tested species, while DMSO (0.025 mg /ml) showed antimicrobial inhibitory effect on *A. flavus*, *C. albicans* and *S. racemosum*. We revealed the diversity and the novel profiling of enzymatic and antimicrobial potential of endophytes from medicinal plants in aird Sinai and more investigation and production on commercial scale is urgently needed.

Key words: Saint Katherine, *Chaetomium grande*, *Sordaria fimicola*, antibacterial, antifungal, enzymes.

ENDOPHYTIC FUNGUS OR SOME EFFECTIVE MATERIAL FOR ORNAMENTAL PLANT IS RESPONSIBLE FOR THE MUMMIFICATION PROCESS?

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Mummification is undoubtedly the most distinctive technique or art which developed in Ancient Egypt. It greatly affected the habits and customs of the ancient Egyptians and, through it, much knowledge was gained in anatomy, chemistry, and many arts and industries. In our study fruits of an ornamental plant were examined for their capability to mummify plant and animal tissues. A weight of dried fruits was surface sterilized and soaked in sterilized distilled water for a minimum period of 6 hours.

Samples of rabbit, fish, tomato fruit and potato tuber were covered with this solution to study the aforementioned target. Dehydration of all samples started at the first hour and extended beyond the 3rd day till reach the complete dryness according to the weight and size of each sample. An endophytic fungus was isolated during the fermentation processes and identified as *Aspergillus parasitcus*. Dehydrated samples (mummified) not deteriorated even they are preserving at room temperature for more than three years till now. We are running now a series of experiments to find out the relationship between dehydration process and the causative agent if it the fungus only or the active principles of the fruit or both??

Keywords: Dehydration, *Aspergillus parasitcus*, fish, rabbit, anatomy, chemistry

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Dedicated to ICFC-2016

HOW TO CONSERVE FUNGI THROUGH ART?

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Drawing fungi is one of the joys of mycology, and something that anybody can try. Art has been a part of mycology since earliest times and published in many international journals and books. Line drawings are essential for showing details of fungal structure, whether in a field guide or fungal monographs. Ancient Egyptians produced a number of hieroglyphic depictions of psychedelic mushrooms on temples and through hieroglyphic texts throughout the country. A new attractive tool to raise national and international awareness on fungal conservation is drawing of fungi in many attractive portraits as ancient Egyptians documented them every where. In this occasion, The First International Conference on Fungal Conservation in the Middle East and North of Africa, I participated with these portraits to attract young mycologists in MENA and to apply a new tool for conserving fungi.

Keywords: Ancient Egyptians, tool, paintings, hieroglyphic, awareness.

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