22 APRILE, VENERDÌ

14:00 - 15:30
AULA MAGNA
CENTRO CONGRESSI PARTENOPE

NET-TR
MUNA - WRAP UP SESSION

CHAIR
Prof. Gilberto Sammartino, General Coordinator of the Mediterranean and Middle East University Network Agreement (MUNA)

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Serena Calabrò, Renato Capozzi, Valeria Costantino, Francesca Galgano, Giulia Guerriero, Antonello Santini

POSTER
On borders. An operational proposal for a sustainable city
E. Di Chiara, Università degli Studi di Roma "La Sapienza"; N. Campanile, Politecnico di Bari; O. Lubrano, Università degli Studi di Roma "La Sapienza"

A new portal for City Information Modelling: Systems' integration in industry and sustainable urban regeneration (CIMSUR)
R. Aburamadam, Applied Science University; C. Trillo, C. Ncube Makore, A.Moustaka, C. Udeaja, G. Kwasi, University of Salford; A.J. Nashwan, N. Jawarneh, Yarmok University; V.A. Cotella, Università di Napoli Federico II

Vegan food pigments: not a safe solution
C. Fogliano, C. Agnisola, C. Arena, B. Avallone, C.M Motta, Università di Napoli Federico II

Trout as biosentinel species in ORBIS cooperation for the monitoring of organochlorine contamination
A. Monnolo, Università di Napoli Federico II; M.T. Clausi, Istituto Zooprofilattico Sperimentale del Mezzogiorno; F. Del Piano, M.C. Ferrante, Università di Napoli Federico II

Xenopus laevis: model for cooperating to ecotoxicology studies

R. Carotenuto, Università di Napoli Federico II; M.M. Pallotta, IRGB, Consiglio Nazionale delle Ricerche (CNR)

Co-operation for exploration of endolichenic and endophytic fungi for application in agriculture and medicine

S. Padhi, D. Kumar Jha, A. Sarma, University of Gauhati; M. Masi, A. Cimmino, K. Tayung, Università di Napoli Federico II

Lathyrus sativus (grass pea): morphological characterization and in vitro digestion

S. Lassoued, University of Tunis EL Manar; C.V.L. Giosafatto, L. Mariniello, Università di Napoli Federico II; N. Trifi, University of Tunis EL Manar

International Cooperation Italy-Tunisia: Ecocytotoxicological studies to enhance management actions for reducing pharmaceuticals in the Mediterranean area

G. De Marco, S. Afsa, Università degli Studi di Messina; M. Galati, H. ben Mansour, Higher Institute of Applied Sciences and Technology of Mahdia University of Monastir; T. Cappello, Università degli Studi di Messina

Modeling approach to simulate the impact of an aquifer recharge management in rural area in the El Tarf region (North-East Algeria)

H. Gouiez, Chadli Bendjedid El-Tarf University; S. Labar, REDD Lab, Houari Boumediene University of Science and Technology; F. Medjani, University Kasdi Merbah Ouargla; M. Djidel, University Kasdi Merbah Ouargla

Cow breeding and feeding methods as a bridge between environmental sustainability and human health

F. Cimmino, L. Petrella, G. Cavaliere, C. Sarro, Z. Coppola, R. Tudisco, P. Iommelli, A. Pizzella, G. Trinchese, Università di Napoli Federico II

Use of Ulva lactuca to detoxificate and reduce DNA damage in Lates calcarifer (Bloch, 1790)

A.R. Bianchi, O.S. Olanrewaju, E. Leonetti, A. De Maio, Università di Napoli Federico II, Universiti Malaysia Terengganu

Acute toxicities of Ketoprofen and Paracetamol in Danio rerio embryos

I. Ben Chabchoubi, Université de Monastir; N. Louhichi, A. Baanannou, S. Masmoudi, Centre de Biotechnologie de Sfax; O. Hentati, Université de Sfax

Studies on antibacterial activity of actinobacteria isolated from Moroccan ecosystem against a freshwater psychrophilic bacterium

A. Krituhi, Sultan Moulay Slimane University Beni Mellal - Cadi Ayyad University; K. Ouaissa, M. Hasnaoui, Sultan Moulay Slimane University, Beni Mellal

Mortality of Micropterus salmoides (Lacépède, 1802) and Cyprinus carpio (Linneaus, 1758) and Oreochromis niloticus (Linnaeus, 1758) (Al-Massira dam Lake, Morocco)

S. Ouahb, M. Bousseba, L. Ferraj, M. Hasnaoui, University of Sultan Moulay Slimane

Linear and weight growth parameters of Micropterus salmoides (Lacépède,1802), in Moroccan fresh waters

L. Ferraj, M. Bousseba, S. Ouahb, M. Hasnaoui, University of Sultan Moulay Slimane

Aging effect on the reproductive output of silver carp (Hypophthalmichthys molitrix, Valenciennes, 1844)

F.Z. Majdoubi, A. Ouizgane, S. Farid, M. Droussi, M. Hasnaoui, University of Sultan Moulay Slimane

Assessment of sediment quality in Lake Dayet Er-Roumi (Morocco) using metal contamination indices

S. El ghizi, University of Sultan Moulay Slimane; S. Hssaissoune, M. El bouch, National Laboratory for Pollution Studies and Monitoring (LNESP); M.Sadik, National Center for Hydrobiology and Fish Farming, Azrou. HCEFLCD; M.Hasnaoui, Sultan Moulay Slimane University

Pollutants Impact Detection on Biosentinels by Non-Invasive Procedures: a Cooperative Sustainable Development Goal to Achieve

C. Parisi, J. Sandonnini, M.R. Coppola, Università di Napoli Federico II

Exploring the diagnostic potential of cancer stem cell in prostate cancer

N. Srividhya, G. Choudhary, K. Kant Shukla, All India Institute of Medical Sciences

Aging effect on the reproductive output of silver carp (Hypophthalmichthys molitrix, Valenciennes, 1844)

K. Ouaissa, A. Kritihi, University of Sultan Moulay Slimane; A. aziz Maycha, Y. Oumessoud, Fish Farming Ain Aghbal; M. Hasnaoui, University of Sultan Moulay Slimane

Cooperation in times of emergency and beyond: virtual, in silico and in vitro or in vivo wet labs for training innovators of sustainable development and improving Lifelong Learning opportunities

R. Del Gaudio, Università di Napoli Federico II

Studies on antibacterial activity of actinobacteria isolated from Moroccan ecosystem against a freshwater psychrophilic bacterium

A. Kritihi, K. Ouaissa, M. Hasnaoui, University of Sultan Moulay Slimane

Why are Neglected Tropical Diseases (NTDs) persistent despite the significant efforts to eradicate them: case of Schistosomiasis in Burkina Faso?

R.F. Compaoré, United Citizens for Sustainable Development (UCSD); M. Sou/Dakouré, World Bank Group; PH. Yacouba, International Institute for Water and Environmental Engineering, Laboratory of Water, Hydro-systems and Agriculture (LEHSA); J. Simporé, University Professor Joseph Ki-Zerbo

Argan seeds proteins valorisation to obtain amylose-containing blended bioplastics

M. Famiglietti, L. Mariniello, Università di Napoli Federico II

Identifying integrated approaches to soil quality assessment in Mediterranean areas: Italy-Algeria cooperation

A. De Marco, Università di Napoli Federico II; P. Napoletano, Università degli studi del Molise; N. Guezgouz, University Mohamed Chérif Messaadia Souk Ahras

Determination of trace metals and some biochemical parameters in mussel organs *Mytilus galloprovincialis*

S. Amamra, K. Melwah, F. Amamra, Laboratory of Aquatic and Terrestrial Ecosystems, Department of Biology; C. Bouallegu, Badji Mokhtar University Annaba; N. Kaouachi, Laboratory of Aquatic and Terrestrial Ecosystems, Department of Biology

Biological study of Platyhelminthes Parasites of the Bivalve Mollusc *Donax trunculus* (Bioindicator Species of Pollution in the Gulf of Annaba in the North East of Algeria)

S. Amamra, K. Melwah, F. Amamra, Laboratory of Aquatic and Terrestrial Ecosystems, Department of Biology; C. Bouallegu, Badji Mokhtar University Annaba; N. Kaouachi, Laboratory of Aquatic and Terrestrial Ecosystems, Department of Biology

Bio-active materials based on whey proteins functionalized with Palestinian *Satureja capitata* essential oil

M. Abdalrazeq, N. Jaradat, M. Qadi, An-Najah National University, Nablus; C.V.L. Giosafatto, R. Gaglione, E. Dell'Olmo, A. Arciello, R. Porta, Università di Napoli Federico II

Bisphenol-A and fedrozole-regulated expression of brain-specific *cyp19a1b* gene in swim-up fry of *Labeo rohita*

D. Mukherjee, University of Kalyani

A multidisciplinary approach to the study of siderophores from cyanobacteri

R. Teta, G. Esposito, K. Kundu, M. Lega, V. Costantino, "The Blue Chemistry Lab" Dipartimento di Farmacia, Università di Napoli Federico II, Università degli Studi di Napoli "Parthenope"

Deciphering The Molecular Mechanism Of Diatoms' Adhesion

A. Castaldi, L. Le Moyec, M. Triba, J. Petitbois, A. Blond, G. Le Pennec, M. Bourget-Kondracki, Laboratoire Molécules de Communication et Adaptation des Micro-organisms UMR 7245 CNRS, Muséum National d'Histoire Naturelle

ABSTRACTS

ON BORDERS. AN OPERATIONAL PROPOSAL FOR A SUSTAINABLE CITY

E. Di Chiara, Università degli Studi di Roma "La Sapienza"; N. Campanile, Politecnico di Bari; O. Lubrano, Università degli Studi di Roma "La Sapienza"

The paper intends to serve as a theoretical-operational proposal in the field of urban morphology and the study of city phenomena, starting from the demands of goal 11 of the 2030 Agenda for Sustainable Development. In particular, the 10 targets set by the 2030 Agenda are instrumental in resolving the trade-off between the efficiency of city life and the healthiness offered by rural conditions. Although the problematic relationship between city and nature has emerged with particular topicality as a result of the health emergency, it has its roots in the distant past. An example of this is the provocative thesis of the "culture of congestion" proposed by Rem Koolhaas in 1978 in reference to the urban experience lived by man in most of the world's metropolises, a precursor to the crisis that the proximity condition linked to metropolitan life reached with the outbreak of the epidemiological situation. The problems of the city that have emerged from the state of emergency of the last two years should be read with reference to the ever-present, and never resolved, relationship between the forms of the built and the forms of the natural open space. In response to these and other solicitations (for example, the UN's World Urbanization Prospects report in the 2014), a part of contemporary architectural and urban culture seems to be challenging the trend towards urbanisation. In Italy, Stefano Boeri and Massimiliano Fuksas, in the light of the Covid-19 pandemic, propose a scenario centred on the "flight from the big metropolises" in favour of resettlement in small historic and rural villages, whose actual advantages, however, should not be discussed so much as their feasibility in economic, social, environmental and above all urban-architectural terms. Indeed, it is clear that this strategy sidesteps the main critical issues that are well highlighted in the 2030 Agenda: for example, reducing the negative environmental impact of cities, particularly in terms of air quality and the provision of large, inclusive and accessible green spaces, so that they become, as Sennett affirmed, "healthy and habitable". Even a staunch defender of the "closed system"of the city, and thus of densification, such as the American sociologist Richard

Sennett, as a result of the discomfort caused by the conflict between the occluded spaces of cities and the new needs for distance, has recently argued for the need to embrace new forms of urban life that produce openness. In the essay Città aperte, Sennett's proposal can be operationally interpreted as the possibility of inverting the paradigm of city construction, moving from a "closed system" to an "open system" in which it is possible to reconcile the city in terms of healthiness and habitability through the grafting of pieces of nature: this relationship between the built and the natural element imposes a rethinking of the "architecture of density", at the basis of the logic of compact cities. New "physical forms of density", capable of stimulating economic activity, coping with climate change and allowing individuals to socialise, can be achieved by re-drawing the "borders"of the city. In this sense, it recalls the distinction offered by the biologist Stephen Jay Gould who in natural ecologies distinguishes two types of boundaries: limits and borders. The "limit" indicates where things end; the "borders" significantly represents those spaces where different components interact. If sociologists understand the"borders" as the place where relations between individuals manifest themselves, by translation in the field of urban studies the term refers to that finitezza of relations between urban parts that Giuseppe Samonà mentions when he states that cities must have a limit and the need for urban studies to return to deal with these boundaries. The theoretical field to which the contribution intends to refer is therefore the "city by parts", where by this locution is meant, recalling the long tradition of Italian urban studies and in particular those advanced by Carlo Aymonino, a city that has acquired new dimensions compared to the past and that, for this reason, can no longer be traced to a single forma urbis but rather to different recognisable parts that have been added to over time. On the basis of these theoretical premises, the contribution focuses on the transformation of the city through the re-drawing of "borders"of its various parts, applying the natural element as a means of distinguishing and enhancing the different morphologies that make up, according to Claude Lévi-Strauss' well-known definition, "the human thing par excellence". The case study concerns the city of Palermo. Panormus, a city consolidated in the late Middle Agesand then transformed in the following epochs, is today an exemplum not only of an urban heritage of high historical and cultural value, but also of an Italian metropolis, which has been structured over the centuries mostly through the formation of dense and compact fabrics that are still clearly distinguishable. The goals of Agenda 2030 thus become a pretext for understanding how the definition of green and accessible spaces can be both a structural and transformative condition for making the "city by parts" intelligible and for adopting a model of inclusiveness and sustainability in line with the challenges that the world poses to all those who study the city and its phenomena.

A NEW PORTAL FOR CITY INFORMATION MODELLING: SYSTEMS' INTEGRATION IN INDUSTRY AND SUSTAINABLE URBAN REGENERATION (CIMSUR)

R. Aburamadam, Applied Science University; C. Trillo, C. Ncube Makore, A.Moustaka, C. Udeaja, G. Kwasi, University of Salford; A.J. Nashwan, N. Jawarneh, Yarmok University; V.A. Cotella, Università di Napoli Federico II

City Information Modelling (CIM) is a new approach which merges existing digital technologies for urban management and building management, i.e., digital technologies known as Geographic Information Systems (GIS) and digital technologies known as Building Information Modelling (BIM). Thus, CIM becomes an enabler to achieve horizontal (with the network), vertical (with the manufacturing) and end-to-end (engineering the product lifecycle) integration of systems and relates to Industry 4.0 revolution. Currently, either planners manage cities with GIS, or construction industry uses BIM for managing buildings, but very little systemic connection exists between GIS and BIM databases. This creates lack of opportunity for sustainable and for systemic innovation. In fact, a CIM open web platform would allow residents to report issues by residential unit and directly feed into the CIM database.

The main aim of this project is to apply City Information Modelling (CIM) to achieve sustainable management of integrated issues in urban management. i.e. a new approach which merges existing technologies to make the most out of digital technologies for urban management. CIM_SUR will allow creating a prototype to monitor existing built environment, residents' conditions and supporting development of alternative sustainable scenarios. This will feed into the goals of Agenda 2030, by supporting achievement of UN targets on water resource management, clean energy, and healthcare accessibility and innovation. In addition, CIM_SUR feeds into the ODA (Official Development Assistance) programme goals in terms of assistance in upgrading efficiency of energy systems, reducing pollution and water supply. CIM_SUR is based on building a prototype platform and developing a demonstrator based on an area in Amman, Jordan.

The city of Amman, the Jordanian capital has over 4 million inhabitants and hosts around 400,000 refugees. This is creating an important challenge and putting a strain on the municipal services. The municipality is planning to introduce smart solutions to improve the quality and sustainability of its services. Investments will work to ease the high burden of traffic congestion in the city and to apply the latest advances in information technology for Amman's residents.

The project targets a high population area –Al Baqa' area, which is officially a Palestinian refugee's camp since 1948, now consolidated into an informal city and challenged by rapid population increase. Al Baqa' area is suffering from shortage of resources, services and demanding on

socio-economic impact on the neighbourhood. The camp has an a high density of population while in Jordan the density of population is 64 persons in one kilometer square, the density of Al Baqa' area is around 200.000 persons in one and half kilometer square, that influences on environment in terms of pollution, shortage of services, sewage efficiency and waste management.

In this regards, the project concept leads ODA by monitoring infrastructure in Al Baqa' and establishing a model through remote technology –CIM -for observing and documentation insufficient water and energy services, waste management, and construction requirements which are on the list of ODA programme for Jordan.

The scale of the challenge we are tackling through our project is potentially worldwide, since we are aiming at producing a prototype demonstrating the potential of CIM to develop and implement more sustainable urban management and strategies, by enabling community engagement and integrated systemic transformations.

This demonstrator will enable cross-analysis of interrelated issues on heavy metal pollution and CO2 levels in the air, water and soil (impacting on agriculture and food production). This will be made by creating an open web data platform, thus allowing gathering data simultaneously on multiple variables and from end-users through active community engagement.

Finally, the prototype itself will target 220,000 residents of the Al-Balqa neighbourhood, hence it will directly contribute to improve the conditions of this community, which is deprived and living in a highly polluted environment. In so doing, it will contribute to a different approach to tackle urban management in informal cities.

VEGAN FOOD PIGMENTS: NOT A SAFE SOLUTION

C. Fogliano, C. Agnisola, C. Arena, B. Avallone, C.M Motta, Università di Napoli Federico II

The presence of additives in foods and dyes, in particular, is becoming a concern due to the countless side effects they cause. In recent years, steps have been taken to replace artificial ones with vegan products extracted from fruit and vegetables. Vegan dyes and their metabolites will therefore progressively replace the artificial dyes as contaminants in wastewater. To determine their possible interference with the aquatic communities, we have analyzed the effects of 2 yellow, one blue, andone red pigment, sold in markets for domestic preparation, on two model species. Artemia salina nauplii were chosen as representative of zooplanktonic communities, and Cucumis sativus seeds as a model of horticultural species exposed to watering with contaminated water. Acute treatments (5days), under static conditions, reveal profound effects of vegan pigments on both models with significant interference with hatching, germination, and larval and seedling growth. In conclusion,

these vegan products would be as unsafe for aquatic animals and plants as the artificial pigments red E124, blue E131, and yellow E102 they are intended to substitute. This problem is extended worldwide, and its resolution would require international interest and collaboration.

TROUT AS BIOSENTINEL SPECIES IN ORBIS COOPERATION FOR THE MONITORING OF ORGANOCHLORINE CONTAMINATION

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Polychlorinated biphenyls (PCBs) and organochlorine pesticides (OCPs) are synthetic organochlorine compounds (OCs) used worldwide in the past. Due to their high chemical stability and lipophilicity, PCBs and POCs tend to persist in the environment for many years and to bioconcentrate and biomagnify in the food chains (Prince et al., 2021). Long term exposure to such compounds induces a wide range of toxic effects, among which damages to the nervous, endocrine, reproductive and immune systems (Faroon and Ruiz, 2016). In particular, they might induce a modulatory effect on the immune system modifying the organisms' response to microbial and parasites contaminants. While OC contamination showed a recent trend of reduction in many countries, for instance due to the application of banson production and use in the European Union, recent studies show that certain OCPs are still employed for agricultural purposes and for the control of malaria in malaria-endemic African areas (Veludo et al., 2022). Further evidence also signals that in Africa PCBs contamination is increasing mainly because of e-waste recycling activities (Orisakwe et al., 2019). E-waste handling and disposal as well as pesticides use in that geographic area expose environment, animals, and people toa serious health threat.

Large proportions of pesticides and PCBs reside in coastal sediments, seawater and fresh water ecosystems. This occurrence suggests the role of the aquatic environment as a reservoir of such persistent contaminants making them available to enter aquatic food chains. Trout (Salmo trutta and Oncorhynchus mykiss species) is a common fish in Africa as well as in Europe. It belongs to a high trophic level and is thus regarded a carnivorous fish (Jonsson and Gravem, 1985). Trout biomagnifies the OCs and therefore can be considered a sentinel species for the monitoring of such contaminants in the environment. Trout is commonly infected by helminth species among which trematodes. As is known, parasite incidence in fish consumers is also a cause of concern for Africans (Fenthaun et al., 2021). Very recently we collected wild brown trout from Southern Italy and analyzed OCs concentration in the muscle. Some OCPs and several dioxin-like and non-dioxin-like PCBs were measured. We also investigated the parasitic infection degree in the gut and its relationship with OCs concentrations. Moreover, we evaluated the risk for human health deriving by the consumption of trout fillet contaminated by several OCs. The results showed the presence of both a background PCBs and OCPs levels and trematodes infection of fish. A significant negative relationship between

parasites number and OC concentrations showed that OCs can affect parasite survival. Overall, our study suggests the relevance of using the trout as bioindicator for OC contamination in aquatic ecosystems as well as intestinal parasite infection degree. Risk assessment for human health should be carried out through the monitoring of parasites, which can be transmitted to human beings, and OCs presence in the species. This continuative monitoring should encourage, if necessary, to adopt/implement appropriate political and environmental strategies. The latter would be aimed at mitigating environmental degradation, increasing food security, and protecting African people from health problems and related economic problems as proposed by ORBIS objectives.

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XENOPUS LAEVIS: MODEL FOR COOPERATING TO ECOTOXICOLOGY STUDIES

R. Carotenuto, Università di Napoli Federico II; M.M. Pallotta, IRGB, Consiglio Nazionale delle Ricerche (CNR)

Ecotoxicology has emerged as a discipline that aims to identify and predict the effects caused by anthropogenic pollutants defined as emerging on ecosystems. Worrisome are engineered nanoparticles and microplastics found in many consumer products but also chemicals and drugs found in both marine and freshwater aquatic ecosystems. Although thein vitro study is supported by the authorities, continuing evidence indicates that in vivo testing is of extreme relevance in bioscience. X.laevisis a very relevant model for both environmental and biomedical studies (Carotenuto et al., 2016,2020, 2021, 2022). It allows studies on gametogenesis and embryogenesis as well as on the juvenile and adult stages. Furthermore, compared to alternative models of invertebrates and vertebrates, it shows greater genetic homology and pathways that can be superimposed on mammals, including humans, so the data obtained can be easily translated (Takagi

et al., 2013; Session et al., 2016; Tandonet al., 2017). The literature strongly suggests that Xenopushas all the characteristics required of a model organism for studies on bio-interactions and adverse effects of pollutants, also in the perspective of a safe development of new materials (Libralato et al., 2017).The use of this amphibian in the laboratory, offers some advantages: 1) eggs can be obtained almost all along the year by injecting females with gonadotropic hormones and in vitro fertilization is easy to perform; 2) the ease of manipulating of gametes, embryos and adult; 3) the direct visualization of organs morphogenesis;4) the relative ease of manipulating of gene expression and genetic engineering (Takagi et al., 2013;De Marco et al., 2017) 5) the genome have been completely sequenced (Session et al., 2016) and hasa high percentage of homology with that of humans; 6) the availability of Xenopusgenetic and genomic data to study genes, gene families and gene networks, including ESTs (expressed sequence tags) (Sczyrba et al., 2005), 7) UniGene clusters continually update genomic sequences for the use of technologies as RNA-Seq (Amin et al., 2014) and quantitative proteomics (Sun et al., 2014). Furthermore, the National Xenopus Resource (NXR), the European Xenopus Resource Centre (EXRC), and other stock centers, have an increasing resource of transgenic lines; 8) the possibility to use techniques for modifying gene expression (morpholino) (Takagi et al., 2013; De Marco et al., 2017), and genome editing techniques like the CRISPR/Cas9 system (Naert et al., 2020). The possibilities offered by X.laevis are an excellent link to undertake cooperation in the study of one of the most challenging environmental aspects, the activity of pollutants on biota including humans.

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CO-OPERATION FOR EXPLORATION OF ENDOLICHENIC AND ENDOPHYTIC FUNGI FOR APPLICATION IN AGRICULTURE AND MEDICINE

S. Padhi, D. Kumar Jha, A. Sarma, University of Gauhati; M. Masi, A. Cimmino, K. Tayung, Università di Napoli Federico II

Endophytes fungi are microbes that colonize inner healthy plant tissues without causing any disease symptoms to its host. They have been isolated from every plant species investigated so far. The functional roles of endophytes are manifold. They are known to confer considerable benefits to the host by producing substances that stimulate plant growth, enhanced resistance to biotic and abiotic stress. Besides they produce secondary metabolites that inhibit both phytopathogens and clinically significant human pathogens. Till recently, 5000+ bioactive metabolites have been isolated from endophytic microbes. Therefore, endophytes are recognized as repository of bioactive metabolites and have been commonly term as "chemical synthesizers" inside the host. Endolichenic fungi are cryptic, associative microfungi that reside within healthylichen tissues and are ecologically diverse. Just like endophytic fungi, endolichenic fungi are also rich source of bioactive metabolites. Most of the compounds derived from endolichenic fungi possess various biological activities like anticancer, antiviral, antibacterial, antifungal, and anti-Alzheimer's activities. Many scientists believe that plants growing in lush tropical rainforests, where competition for light and nutrients is severe, are most likely to host the greatest number of bioactive endophytes than temperate parts of the worlds. Thus, considering the myriad of medicinal plants and lichen species particularly in biodiversity rich regions, study of endophytic microbes from lichens and medicinal plants might lead to the discovery of new and effective molecules with wide application in medicine and agriculture.

In this endeavor, we have reported few bioactive metabolites from endophytic and endolichenic fungi in collaboration with Department of Chemical Sciences, University of Naples,Federico-II, Italy. Further co-operation in exploration of endophytic microbes inhabiting medicinal plants and lichen

species of North East India may result into discovery of novel and effective bioactive molecules for multiple applications.

LATHYRUS SATIVUS (GRASS PEA): MORPHOLOGICAL CHARACTERIZATION AND IN VITRO DIGESTION

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Grass pea is one of the most cultivated species in the genus Lathyrus, widely cultivated in poor countries. It is considered as pasture crop, green fodder, animal feed, and human food. Seven varieties of Lathyrus sativus were used to study their morphological characterization and thein vitro digestion in order to detect accessions useful for future breeding strategies. Using various quantitative and qualitative morphological traits, an important intra-and interpopulation diversities was found. The variance analysis (ANOVA) based on populations effect showed a significant heterogeneity between genotypes for all morphological traits at $p<0.01$. Additionally, the high correlation results had confirmed this diversity which could be explained by the large distribution area of the studied accessions and the natural selection of the species. The clustering pattern by Principal Component Analysis (PCA) and by Hierarchical Cluster Analysis (HCA) showed the accumulation of a large number of genotypes from different geographic origins in the same cluster which indicate that the studied genotypes are not distributed according to their origin. Whereas, the individuals of grass pea Ethiopia were collected in distinct group which indicate that these samples were very closed between themselves and diversified regarding the other accessions. Thein vitro digestion of grass pea flour showed that the most of proteins were digested after 60 min of incubation except the β-lathyrin protein. In fact, the densitometry analysis of β-lathyrin protein band showed that grass pea Ethiopia, Germany, Bangladesh, and Morocco were more digested than grass pea, Canada, Afghanistan, and Greece in gastric phase and Grass pea Afghanistan and Germany were more digested than the rest of the samples in the duodenal phase. Different digestion kinetics were found, indicating that this kind of investigation could be used as a method to distinguish different crop varieties.

INTERNATIONAL COOPERATION ITALY-TUNISIA: ECOCYTOTOXICOLOGICAL STUDIES TO ENHANCE MANAGEMENT ACTIONS FOR REDUCING PHARMACEUTICALS IN THE MEDITERRANEAN AREA

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Nowadays, the Mediterranean area is characterized by increasing contamination of pharmaceutical residues, released into the environment by effluents of municipal and hospital wastewater treatment plants. In this scenario, the coastal site of Mahdia, located in the central-east part of Tunisia along the coasts of the Mediterranean Sea, is an area with high productive activities. The local economy is mostly centered on farming and fishing, while tourism ensures a consistent affluence of people throughout the year. Furthermore, in the same area is presenta hospital, which provides a wide range of specialist health services. Considering that increased drug input into waste water is correlated with higher human activities, the occurrence of several pharmaceutical residues was examined in specific points (i.e.hospital wastewater effluent, wastewater treatment plant and coastal areas) of Mahdia to better elucidate the critical steps of the wastewater management. Among the various detected pharmaceutical compounds, different concentrations of salicylic acid (SA), the active form of the aspirin, were revealed in all sampling locations. Therefore, given the persistence of SA from waste water to coastal zone, studies regarding the biological impact of this drug on endemic non-target organisms in the Mediterranean area can be helpful to address future actions for mitigation of marine pharmaceutical contamination. In light of this, an international cooperation Italy-Tunisia was therefore instituted. Within this partnership, the biological effects induced by real environmental concentration of pharmaceutical residues on non-target aquatic organisms, such as mussels, could be useful to define novel and more effective guidelines for waste water treatment strategies. Starting from the levels detected in seawater collected at Madhia, five concentrations of SA (C1: 0.05 µg/L; C2: 0.5 µg/L; C3: 5µg/L; C4: 50 µg/L; C5: 100 µg/L) were adopted for a sub-chronic exposure (12days) under laboratory conditions using mussel Mytilus galloprovincialis, a very common species along the coasts of the Mediterranean Sea and widely employed as bioindicator in several ecocytotoxicological studies. To evaluate the time-dependent biological responses over the entire experiment, sampling of mussels was conducted at several time-points (T3: 3 days; T5: 5 days; T12: 12 days). All the analyses were performed on the gills, since they are in direct contact with the external environment and with the contaminants potentially dissolved in the water, and therefore able to elaborate "early" biological responses being the first organ of exposure. A histological approach, based on Hematoxylin & Eosin(H/E) staining, was applied to identify the occurrence of branchial morphological alterations. Spectrophotometric methods were applied for different biochemical analysis. The lipid peroxidation (LPO), the enzymatic activity of catalase (CAT), superoxide dismutase (SOD) and glutathione-S-transferase (GST) were assessed to characterize the antioxidant and detoxyfing response induced by SA, whereas the analysis of acetylcholinesterase (AChE) activity was utilized as a biomarker of neurotoxicity. Based on the histological analysis, no tissue impairments were detected on gills, but a moderate haemocyte infiltration was notable, probably associated with a defensive response against SA. The evaluation of antioxidant and detoxifying action revealed different activity

trends in relation to the sampling times. GST showed an increased activity at T5 and T12, while CAT and SOD activity exhibited a riseat T3 and T5, and the nadropas revealed atT12. LPO,except for a raise at T3, did not show significant alterations. The results of these biochemical assays elucidated the progression of pro-oxidant effects induced by this pharmaceutical compound during a sub-chronic exposure in mussels. The inhibition of acetylcholinesterase (AChE) activity, observed at T12, highlighted an impairment of the cholinergic system triggered by the SA exposure. All these findings presented in this study as an international cooperation between Italy and Tunisia offer a relevant support for a more deeply understanding of the effects of pharmaceutical residues on non-target aquatic species in marine environments. Overall, these data could be helpful to ameliorate and define novel and more efficient actions for waste water treatment plants, with the aim to reduce pharmaceutical pollution in the Mediterranean area.

MODELING APPROACH TO SIMULATE THE IMPACT OF AN AQUIFER RECHARGE MANAGEMENT IN RURAL AREA IN THE EL TARF REGION (NORTH-EAST ALGERIA)

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The study region situated in the north east of Algeria has a cold and rainy Mediterranean climate in winter with a dry and hot summer. The general objective of this study is to quantify the effects of the constraints induced by the three pumping wells and to simulate the impact of an aquifer recharge management program in rural area by adding an agricultural pond to this synthetic case According to the potentiometric map, the groundwater flow direction is from West to East. During model building, a single layer numerical model was developed using the MODFLOW-2005 code and FREEWAT modeling tool. Some GIS functionalities were run on the model in steady state during the water year 2020 and two MODFLOW packages were activated MODFLOW Well (WEL) and MODFLOW Recharge (RCH) to simulate the withdrawal and recharge of the groundwater system successively. Interpretation of the pumping test data showed that the overall contribution across the western boundary is less than the well extraction term due to excess pumping. The analyses of the simulation of the groundwater supply and recharge balance after the implementation of the agricultural pond either without or with pumping show the decrease of the hydraulic load where the wells are located, thus the rate of exploitation of these resources can approach or exceed that of their renewal. In conclusion, our work provides us a useful test example of a conceptual and methodological model for an integrated management of water resources in rural area.

COW BREEDING AND FEEDING METHODS AS A BRIDGE BETWEEN ENVIRONMENTAL SUSTAINABILITY AND HUMAN HEALTH

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Cow milk is widely used for human nutrition and in food industry processing, thus the nutritional quality of milk is of special interest not only from the point of view of environmental sustainability, but also for human health. Identifying the key components of milk's nutritional quality is crucial to promote sustainable production and ecological impact of dairy products and improve human health. Ruminant agriculture has been criticized for the uncontrolled usage of land, and for the contribution to greenhouse gas emissions. A recent study indicates that low-yield, pasture-based production may have lower emissions per liter of milk than more intensive, higher-yielding system [1]. Furthermore, despite claims that dairy products are unnecessary sources of saturated fat and calories, milk fats area complex of important fatty acids (FAs) [2], many of which are beneficial to human health [3,4]. II is noteworthy that higher forage consumption by cows correlates with an increased concentration of beneficial fatty acids in the milk, linking environmental profits with nutritional gains. Different animal species yield milk of different quality, with different compositions of FAs, but also within the same animal species the quality of milk depends on several factors, such as animal feeding, rearing systems, and seasonal variability. An important parameter to determine the nutritional value of milk is its fatty acid profile and in particular, the content of the essential fatty acids n-3 and n-6. Indeed, a low n-6:n-3 ratio, ranging from 2 to 4, is considered optimal for human health[5]. Recent studies have shown that animal diet is the decisive factor determining the fatty acid profile of cow milk[6]. Indeed, a high forage: concentrate ratio (F:C) results in a milk with low n-6:n-3 ratio. Among healthy fatty acids, the conjugated linoleic acids (CLAs) are positional and geometric isomers derived from octadecadienoic acid, whose content is high in milk fat. The major isomer of CLA, cis-9, trans-11(rumenic acid), represents up to 80% of total CLA in food. The CLA level in the milk from different ruminant species is significantly increased when animals are fed with fresh forage[7]. Based on this data, some Italian breeders are feeding dairy cows with a high F:C (70:30), obtaining milk with a low n-6:n-3 ratio and high CLA level that satisfy consumer demand for healthy foods[8]. Several studies have indicated that administration of CLA and n-3 fatty acids to rats improves fatty acid oxidation and decreases inflammation and oxidative stress through the modulation of mitochondrial function[9,10]. We hypothesized that milk from cows fed a high-forage diet (high forage milk, HFM), modulating mitochondrial function, would ameliorate the inflammatory state and oxidative stress in consumers. To test this hypothesis, we evaluated, in a rat model, the effects of HFM administration on energy balance, lipid metabolism, and anti-inflammatory and antioxidant defenses, compared with those of rats fed isoenergetic amounts of milk obtained from cows fed with a diet with a low F:C ratio (low forage milk, LFM). Our results indicate that HFM may positively affect lipid metabolism,

leptin: adiponectin ratio, inflammation, mitochondrial function, and oxidative stress, providing the first evidence of thebeneficial effects of HFM on rat metabolism.

USE OF ULVA LACTUCA TO DETOXIFICATE AND REDUCE DNA DAMAGE IN LATES CALCARIFER (BLOCH, 1790)

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The accumulation of heavy metals and organic pollutants introduced into the environment through industrial discharges, agricultural uses, or improper waste disposal practices, domestic waste and agricultural runoff represents a threat not only to the environment, but also negatively affects the stability of many aquatic ecosystems. The persistence of these pollutants in the environment isochronic threat to the health and safety of human and wildlife. Recently, there has been increasing interest on using algae to remove, degrade, or to make harmless the organic pollutants in aquatic systems. Furthermore, since algae are an excellent source of proteins, carotenoids, minerals, polysaccharides and vitamins they lend themselves to various industrial applications which include the production of human food and additives for animal feed. The present research was conducted on fish mesocosms using a non-lethal cadmium concentration as a trace metal pollutant to verify, respectively, whether post-remediation byUlva lactuca reduces the need for activation of cellular antioxidative defenses and DNA repair mechanisms. Spectrophotometric measures of total soluble and fat-soluble antioxidant capacity and Poly (ADP-ribose) polymerase activity were performed on the Lates calcarifer liver (DOI:10.1007/978-3-030-51210). Cadmium represents an environmental risk but its toxic effect seems mitigated by the bioaccumulation properties of Ulva lactuca. We detected high total soluble antioxidant capacity, low levels of PARP activity and undamaged DNA in the fish liver when seaweeds were added as compared to standard feeding. These results suggest a safe and sustainable implementation of Lates calcarifer sea farming using Ulva lactuca. In conclusion, as it's well known that nuclear poly (ADPR) polymerases are activated by DNA damages, we intend to use these enzymes as new markers of the health offish, which live in polluted waters, in the context of international cooperation. In addition, we also consider it interesting to verify the detoxifying action of Ulva lactuga on other edible fish.

ACUTE TOXICITIES OF KETOPROFEN AND PARACETAMOL IN DANIO RERIO EMBRYOS

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The non-steroidal anti-inflammatory drugs (NSAIDs) have a major attention nowadays due to their great consumption by people who can be buy them without prescriptions. Most importantly, the lack of regulations of discharges of pharmaceutical wastes in aquatic environments represents a great concern for animal and human security. The present study was designed to analyze the effects of NAIDs such as Diclofenac and Ibuprofen on zebrafish embryos e.g. malformations and heartbeats' rate. The test was performed in accordance with OECD TG 236 (OECD, 2013), the Fish Embryo Toxicity Test (FET). Zebrafish embryos (n= 20 per treatment group) exposed for 120 hours to each solution were analyzed for lethal effects according to OECD TG 236 as well as sub-lethal alterations. The calculation of the LC50 was based on the four main criteria of the FET: coagulation of the embryo, absence of heartbeat and blood circulation, absence of tail detachment and of somite formation. The EC50 calculation was based on at least one of the following effects: blood congestion, pericardial edema, yolk sac edema and yolk sac enlargement. In addition, special attention has been paid to the ocular effects associated with non-steroidal anti-inflammatory drugs, which are currently being investigated as new thyroid-related parameters in fish (Baumann et al., 2019). Endpoints were monitored every 24 hours until the end of the test using a Stemi 2000-Cstereomicroscope (Zeiss, Göttingen, Germany) and captured using the Zeiss Axiocam 105 color camera. In addition, heartbeats' rate was monitored for 1 minute after 48, 72 and 96 h of exposure. After exposure to Ketoprofen and Paracetamol, the LC50values were 1.52 and 3.27 mg/L, respectively. On the other hand, the EC50 was 1.91 and 1.12 mg/L after Ketoprofen and Paracetamol exposure, respectively. Further investigations including additional assessment criteria, i.e.: axial malformation (scoliosis,lordosis), hyperactivity/decreased movement and decreased eye size, are necessary to identify the underlying modes of action and unambiguously interpret the toxic potential of the select NSAIDs.

STUDIES ON ANTIBACTERIAL ACTIVITY OF ACTINOBACTERIA ISOLATED FROM MOROCCAN ECOSYSTEM AGAINST A FRESHWATER PSYCHROPHILIC BACTERIUM

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Rainbow trout (Oncorhynchus mykiss) is a salmonid bold, easy to lay and rapid growth. It is a species well adapted to the Moroccan climate and it is high in the cold waters in the region of Azrou. However, several diseases and pests can affect its intensive farming and cause significant mortality of trout in the early ages and this even though in some cases and under the permission of the veterinarian, antibiotics and other pharmaceutical products are prescribed and used for treatments. Furthermore, it was noted that certain microorganisms developing resistance to broad-spectrum

antibiotics, among these microorganisms, we find the species Flavobacterium psychrophilum, which is a Gram-negative bacterium, filamentous, rod-shaped. This bacterium is part of the bacterial flora of the skin of the fish and the aquatic environment (Bullock. 1972; Bullock and Snieszko. 1981) and because that the flavor bacteriosis qualified as cold-water disease.

In order to fight against this pathogen, a screening program of bioactive substances has been developed which consists of among others the screening of Moroccan ecosystems actinobacteria capable of producing bioactive molecules against F. psychrophilum. Many isolates showed activities vary according to pathogenic strains and testing biological and chemical characterization of these activities is possible.

MORTALITY OF MICROPTERUS SALMOIDES (LACÉPÈDE, 1802) AND CYPRINUS CARPIO (LINNEAUS, 1758) AND OREOCHROMIS NILOTICUS (LINNAEUS, 1758) (AL-MASSIRA DAM LAKE, MOROCCO)

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The present study is to address the stock status of Micropterus salmoides, Cyprinus carpio and Oreochromis niloticus at one of the interesting dam lakes in Morocco. It aims at estimating the important parameters necessary for the evaluation of the stock dynamics of these species which are economically important resources in Morocco where they are exploited by the commercial fishery. A better understanding of the dynamics and regulation of these species in this site is essential for the sustainable management of their stocks.

The FISAT II software was used to analyze the length data of 233 specimens caught at the Al Massiradam Lake between September 2020 and May 2021. The total length of the sampled fish varied from 17.5 to 37 cm for Micropterus salmoides, from 14.5 to 43 cm for Cyprinus carpio and from 10.5 to 43cm for Oreochromis niloticus. Total mortality (Z), fishing mortality (F), natural mortality (M) and exploitation rate (E) for Micropterus salmoides are respectively 2.5, 1.55, 0.95 and 0.62. For Cyprinus carpio, these parameters are 2.3 (Z), 1.33(F), 0.97 (M) and 0.58 (E). For Oreochromis niloticus, they are recorded at 2.89 (Z), 2.25 (F), 0.64 (M) and 0.78 (E). The high exploitation rate (>50%) and fishing mortality of all fish species analyzed in this study indicate that there is a sign of overfishing of these fishery resources in the waters of Al Massira dam Lake. Therefore, sustainable fisheries management is necessary to prevent the depletion of these important fisheries resources.

LINEAR AND WEIGHT GROWTH PARAMETERS OF MICROPTERUS SALMOIDES (LACÉPÈDE,1802), IN MOROCCAN FRESH WATERS

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Micropterus salmoides is of socio-economic interest and a sport fishery in Morocco. This noble fish has shown a good capacity for acclimatization to Moroccan conditions. Information on its bio-ecology is urgently needed to develop a sustainable resource policy for this species in Morocco. The present work consists in establishing a study of the growth biology of males and females of Micropterus salmoides. For each specimen, the total length was measured and its total weight was weighed.

The study was based on a set of 81 specimens (48 females, 33 males) captured at Lake Al-Massiraduring 5 months (from September 2020 to January 2021). The length-weight regression was W=0.0055LT3.2769 (females) and W = 0.0098LT3.1135 (males) with no significant difference between sexes. The parameters of the Von Bertalanffy growth curve based on the frequency-length (LFQ) data were estimated by the ELEFAN _GA method using the TropFishR package embedded in the R language. These parameters are: $L\infty$ = 43.17, K = 0.23 and t_anchor= 0.61 for females and $L\infty$ = 39.81, K = 0.15 and t_anchor= 0.53 for males. The sex ratio is 59.26% females and 40.74% males. The condition factor indicates that the population of Lake Al-Massira is in excellent condition.

AGING EFFECT ON THE REPRODUCTIVE OUTPUT OF SILVER CARP (HYPOPHTHALMICHTHYS MOLITRIX, VALENCIENNES, 1844)

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Nowadays, there is an increasing interest in fry production of fish species that have an economic and ecologic importance. In fish farms, many efforts have been made in order to determine the safe time lapse in which eggs remain viable even if stripping was performed after the moment of ovulation. Silver carp have been introduced in Moroccan inland waters to ensure water quality. After introducing it in 1983, this specie was successfully acclimatized and reduced the algal blooms significantly. Also, its rapid growth makes of it a sustained food resource to cover the protein demand of the population leaving near to water dams.

The present study was performed in Deroua fish farm and it deals with the evaluation of the effect of ova aging of silver carp (Hypophthalmichthys molitrix) caused by suturing female genital papilla. It seeks to determine how long the eggs, when ready to be stripped, can remain in the ovarian cavity without affecting reproductive success and fry production. Eggs quality was determined by assessing variability of fertilization success, survival of embryos for ova stripped between 0-90 minutes after ovulation. The obtained data revealed that eggs quality decreased during in vivo retention. The fertilization success at ovulation was 70.24% then declined to 31.2% in ova stripped after 90 minutes' post-ovulation. Further, the ova retention for 90 minutes decreases the survival of the embryos by 36% which causes a fail in fry production of this specie. On the other hand, the study investigated about the changes of total lipids and total proteins in the retained ova. These components are

considered as the main energetic source used for embryo's development. The results revealed that the concentration of the cited components didn't vary significantly from ovulation to 90 minutes of post-ovulation. The values were 2.21% for proteins and 3.76% for lipids at ovulation and 2.05 % for proteins and 4.07% for lipids at 90 minutes' post-ovulation.

ASSESSMENT OF SEDIMENT QUALITY IN LAKE DAYET ER-ROUMI (MOROCCO) USING METAL CONTAMINATION INDICES

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Sediments are an essential compartment in aquatic ecosystems, they play an important role for many animals and plants as a biotope or spawning site, but they can act as a reservoir of micropollutants and then as a potential source of contamination for fauna and flora. Dayet Er-Roumi Lake is the only permanent natural lake in the region of Khemisset (Morocco), it also has a very important biological interest because it's a refugee and a vital feeding area for migratory birds and also shelters very important fish species, etc. This wetland is affected by several forms of pollution that are linked in particular to human activities (agricultural, domestic, industrial, etc.). The objective of this work is to evaluate and quantify the metallic contamination of the sediments of Dayet Er-Roumi Lake through spatio-temporal monitoring of certain toxic heavy metals such as Cd, Mn, Pb,and Zn. Metalanalyzis carried out at three measuring points during winter season reveal high concentrations of Zn, Mn, and Pb, which largely exceed the recommended standards. The calculation of indices, such as the pollution load index, degree of contamination, and contamination factor, reveal polymetallic contaminations dominated by two elements, zinc and lead, which are the most worrying. These results state that the Dayet Er-Roumi Lake is highly polluted. The strategies to limit the pollution of the lake must be put in place to protect and maintain this site classified as a site of biological and ecological interest.

POLLUTANTS IMPACT DETECTION ON BIOSENTINELS BY NON-INVASIVE PROCEDURES: A COOPERATIVE SUSTAINABLE DEVELOPMENT GOAL TO ACHIEVE

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New emergent xenobiotics come from different sources including drugs used in COVID-19 pandemic and post-pandemic period, for cancer therapy, infertility treatments and several others. These

contaminants from different sources once released in the ecosystem, may cross physiological barriers of organisms and may interfere with their biological functions, leading to lethal, sub-lethal and physiological changes. Non-invasive procedures can be applied on large numbers of specimens and also can be used for repeated assessments without negatively impacting the population of the selected biological species but hardly ever used. In our monitoring we are adopting the redox skin biopsy status evaluation in amphibian and the symmetry detection in reptiles. Skin biopsy is an epithelial cells removal procedure which does not require animal sacrifice, avoiding ethical issues. It provides the adequate biological material needed for biochemical and molecular antioxidative assays. Fluctuating asymmetry results a morphological measure of developmental instability defined as a random deviation of both sides of a bilateral symmetric organism. The amphibians Pelophylax bergeri and Bufo spinosus and the reptile Podarcis sicula are considered sentinel organisms, serving as bioindicators to evaluate environmental pollutants which have a wide European distribution. Pelophylax bergeri and Bufo spinosus use their skin as a secondary respiratory surface, which is permeable to endogenous and exogenous substances. Their highly vascularized skin permits cutaneous gas exchange resulting in being highly susceptible to environmental stressors.
Podarcis sicula is characterized by a large set of measurable and countable meristic features such as scales, femoral pores and head shape/size which can be easily recorded for fluctuating asymmetry evaluations. The deleterious biological effects of xenobiotics to these species include developmental instability and/or abnormalities, decreased growth and fertility, damage to germ lines, and susceptibility to disease. Joint studies have previously demonstrated that the reactive oxygen species status and antioxidant defense systems, as well as the body symmetry, are influenced and shaped by xenobiotics. In particular, we have shown that Reactive Oxygen Species (ROS) by Electron paramagnetic resonance-Spin Trapping as well as antioxidants expression by quantitative Real Time-PCR of Glutathione S-Transferase (GST) and Glutathione Peroxidase 4 expressions (gpx4) on skin biopsy can be used as optimal biomarkers for eco-monitoring. Thus, the advantages of non-invasive procedures avoiding sacrifice must support and enhance eco-friendly approaches for biomonitoring pollutants in fragile geographical areas. Since new emergent xenobiotics and their impact are issues of global concern for biodiversity and sustainability loss, the use and implementation of non-invasive procedures require awareness and a cooperative international effort.

EXPLORING THE DIAGNOSTIC POTENTIAL OF CANCER STEM CELL IN PROSTATE CANCER

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Background: Prostate cancer (PCa) is the second most common cause of cancer and the sixth leading cause of cancer death worldwide. The prostate is an androgen-dependent organ, and PCa is an androgen-dependent disease. Androgen Receptor (AR), a hormone-activated transcription factor,

mediates the androgen. Recent discoveries of cancer stem cells (CSCs) have opened up a new avenue for understanding their regulation in various malignant tumours, including prostate cancer, which is critical in cancer diagnosis. As a result, we evaluated the diagnostic value of cancer stem cells based on their cell death parameters in the PCa.

Methods: We undertookCD44+/CD24−andPSA, testosterone, apoptosis, TNF-α, IL-6 and ROS on a total of 90 individuals including 30 benign prostatic hyperplasia (BPH) as control, 30 localised and 30 metastatic PCa histopathologically confirmed, untreated, and newly diagnosed.

Results: The results showed higher expression of CD44+/CD24− in localized PCa and metastatic PCa than in BPH. The levels of PSA, testosterone, apoptosis, TNF-α, IL-6 and ROS also showed a significant increase ($p<0.001$) in both metastatic PCa and localized PCa compared with BPH control. The inter-correlation of different studied variables in localised PCa was significant ($p<0.05$), and positive correlation was found between CD44+/CD24− and PSA ($r=0.32$, $p=0.030$), a significant ($p<0.05$).

Conclusions: The findings of this study suggest cancer stem cells play a role in prostate cancer invasive phenotype, and overexpression of these results in poor outcomes inmetastatic PCa, and hence can be used as a diagnostic biomarker for PCa patients.

AGING EFFECT ON THE REPRODUCTIVE OUTPUT OF SILVER CARP (HYPOPHTHALMICHTHYS MOLITRIX, VALENCIENNES, 1844)

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The increase in world population and the increase in the average per capita consumption of fish, resulting the improvement in the quality of people life in developing countries, have led to an explosion in the demand for fish. For both reasons, economic and ecological, the comparative trial of the three feeds (A, B and C) carried out within the OumEr-Rbia grow-out station made it possible to retain that feed B presented a better zootechnical performance and low reject fish.

In this sense, the recommendations of this trial on the issue of the economy / environment interaction have made it possible to continue research in order to develop an ideal and ecological feed. The experiment was conducted at Oum-Er-Rbia fish farm, which is located almost 70 km from Azrou (Morocco). The magnification basins were supplied with spring water at a constant temperature about 14 ° C, with a water renewal time every half an hour (48 times / day) with an oxygen level of 90% of the water saturation. 600 trouts with an average weight of 500g from the same batch of eggs were randomly distributed at the two basins (2 repetitions). Every 15 days, 90 fish were caught in each pool and anesthetized after 24 hours of fasting to measure the size and weight of each fish, weight gain, feed conversion index, rate growth factor (SGR) and factor condition (K). The results revealed that the rainbow trout fed with the elaborate feed showed better growth

performance with a final weight of 1060g for 45 days while preserving the environment since the nitrogen and phosphorus discharged are negligible.

COOPERATION IN TIMES OF EMERGENCY AND BEYOND: VIRTUAL, IN SILICO AND IN VITRO OR IN VIVO WET LABS FOR TRAINING INNOVATORS OF SUSTAINABLE DEVELOPMENT AND IMPROVING LIFELONG LEARNING OPPORTUNITIES

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This contribution highlights findings about Innovative Continuing Professional Development and Learning (ICPDL) activities realized implementing CLIL (Content and Language Integrated Learning) teaching, ICT tools with IBSE (Inquiry Based Science Education) methodology. Here I present a new interdisciplinary teaching proposal to improve High School students involvement through digital learning resources for science education, through laboratory experiences of comparison and sharing that increase student participation and bring the class to a much higher communication level, and not only in English language. Due to the beginning of the COVID-19 pandemic it was impossible to carry out any activity in person, because both the teachers and the students could not access the classrooms and the laboratories. To give a sense of continuity and normality to my undergraduate students, I started documenting and learning by myself choosing, and using some innovative technologies, to provide a suitable alternative to face-to-face laboratory activities. I reinvented molecular biology hands-on laboratory of my molecular biology teaching course (degree in Biology) during the COVID-19 pandemic, and I applied the lessons learned during my academic activities to HighSchool students participating in the second edition of the Italian PLS Virtual Summer School (http://www.pls.unina.it/home/pubblicazioni/) and P.C.T.O activities (Orientamento Scuole | Dipartimento di Biologia–Università degli Studi di Napoli Federico II (unina.it). Interactive learning and teaching; evaluation and feedback; open educational resources, students as producers and co-authors, are some methodological and operative ideas of my proposal for an innovative use of ICT to support teaching and to develop soft skills, transversal skills transferable indifferent contexts of study, work and/or personal life. Science Education Resources at “Jove.com” and/ or MOOCs (FedericaWebLearning) and/or virtual laboratory simulations (Labster.com) were used as new tools in a risk-free simulated learning environment, to implement and make effective the teaching of STEM disciplines. Moreover, the variety of languages of virtual laboratory simulations has been and will be an additional value for a different learning context useful to potentiate also learning of foreign languages learning with an inclusive experience in learning key science concepts. In conclusion, although it is difficult to replace the "hands-on" experience of a real laboratory environment, I got a very positive in silico experience with my university students and during last (2021) PVS3 edition

(www.pls.unina.it). The overturning of some theoretical lessons in synchronous virtual simulations will be the basis of new creative and inclusive activities that students will be able to carry out in the future with greater mastery and confidence in a real laboratory with their own teachers or instructors in real scientific laboratories. Protocols of new activities will be one of the expected results building University-Industry cooperation networks for training innovators of sustainable development while also improving the inclusive, equitable Lifelong Learning opportunities.

STUDIES ON ANTIBACTERIAL ACTIVITY OF ACTINOBACTERIA ISOLATED FROM MOROCCAN ECOSYSTEM AGAINST A FRESHWATER PSYCHROPHILIC BACTERIUM

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Rainbow trout (Oncorhynchus mykiss) is a salmonid bold, easy to lay and rapid growth. It is a species well adapted to the Moroccan climate and it is high in the cold waters in the region of Azrou. However, several diseases and pests can affect its intensive farming and cause significant mortality of trout in the early ages and this even though in some cases and under the permission of the veterinarian, antibiotics and other pharmaceutical products are prescribed and used for treatments. Furthermore, it was noted that certain microorganisms developing resistance to broad-spectrum antibiotics, among these microorganisms, we find the species Flavobacterium psychrophilum, which is a Gram-negative bacterium, filamentous, rod-shaped. This bacterium is part of the bacterial flora of the skin of the fish and the aquatic environment (Bullock. 1972; Bullock and Snieszko. 1981) and because that the flavor bacteriosis qualified as cold-water disease.

In order to fight against this pathogen, a screening program of bioactive substances has been developed which consists of among others the screening of Moroccan ecosystems actinobacteria capable of producing bioactive molecules against F. psychrophilum. Many isolates showed activities vary according to pathogenic strains and testing biological and chemical characterization of these activities is possible.

WHY ARE NEGLECTED TROPICAL DISEASES (NTDS) PERSISTENT DESPITE THE SIGNIFICANT EFFORTS TO ERADICATE THEM: CASE OF SCHISTOSOMIASIS IN BURKINA FASO?

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Context: Despites a significant effort to eradicate Neglected Tropical Diseases (NTDs), they are still exacting on human communities a heavy burden estimated for the case of Schistosomiasis to 70 million Disability-Adjusted Life Years (DALYs). In order to achieve the SDG 3 related to NTDs by 2030, there is a necessity to figure out the factors governing this persistence of schistosomiasis, still endemic with high prevalence and high infection intensities, maintaining populations in poverty.
Objective: The purpose of this study is to identify the health determinants of schistosomiasis persistence.
Methods and Materials: Three factors have been evaluated: the treatment method, the sampling method and the diagnostic technic. As regard to treatment, we assessed the accuracy of the World Health Organization height gauge for drug doses estimation; the drug doses has been estimated according to each of involved 258 subjects' weight and their height and compared through Spearman ANOVA at 1% significance level. Regarding the current sampling method for prevalence estimation based on school-age children effectively attending schools, we compared using Fisher Exact test at 5% significance level, the prevalence from three groups of people: scholarized children, non-scholarized school age children and the overall population of Panamasso, the village where the study has been performed. As regard to the diagnostic technic, we compared the traditional parasitological technic of Kato-Katz for stools samples screening to a molecular biology technic especially Real-Time Polymerase Chain Reaction.
Results: a significant difference has been observed between the treatment adapted according to height and the normal one based on weight (p-value <0.0001). It appeared from the analysis of height-based doses, 50 cases of overdoses (19.38%), 117 (45.35%) cases under the normal dose and 91 (35.27%) cases of normal doses. Besides, according to World Health Organization (WHO) criteria, 50.78% of acceptable doses (30-40mg/Kg), 97.29% of appropriate doses (30- 60mg/Kg), 46.51% of optimal doses (40-60mg/Kg) and 2.71% of inaccurate doses (< 30mg/Kg) were noted. As for sampling method, we noted a significant difference between the prevalence (p-value = 0.307). As regard to the diagnostic technics comparison, the Kappa Indice of 0,634 indicated a relatively weak correspondence between the two methods; the PCR technic showed a sensitivity of 100% while the Kato-Katz technic showed a sensitivity of 57.14%.
Discussion: The significant differences identified in this study revealed a very relevant issue: the one of accurate data shortage. Indeed, development plans in health sector are established based on data and the necessity of getting accurate data is well known. Considering the treatment based on height that entails low doses administration, the low doses contribute to develop a parasite resistance to treatment. As of today, praziquantel is only medicine used to treat schistosomiasis and a resistance of parasite will be a big obstacle to the eradication of the disease. Also, high doses of drug that entail violent adverse events in body will lead to people reluctance or refusal to take part to the mass treatment; another obstacle to disease eradication. As regard to the sampling method, the study revealed a significant difference between the reality and the data on which strategies are based. The sampling method based on scholarized children only does not allow getting the accurate disease profile that is the basis for health plans development. This is an important aspect to consider as the

eradication of this debilitating disease relies on the ability to establish accurate disease profile. At last, the PCR technic showed that there is a high risk of not getting a real prevalence and then, influence the decision making on the solutions to apply to eradicate the disease.
Conclusion: the emergency of using suited methods and tools to get accurate profile for the disease is a stake of major concern. A strong collaboration between world universities and stakeholders intervening in the fields of NTDs is a high level priority.

ARGAN SEEDS PROTEINS VALORISATION TO OBTAIN AMYLOSE-CONTAINING BLENDED BIOPLASTICS

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Argan, Argania spinosa, is a plant typically widespread in arid and semiarid regions of Northern Africa useful for protecting soil from desertification and erosion. Until now, argan was mainly used to obtain a biologically active oil extracted from its seeds producing oilcake, a by-product rich in proteins, generally used as animal feed. Recently argan oil cakes have been attracting attention as a waste to be recovered to obtain high-add value products for different applications. This work aimed to investigate the possibility to produce novel bioplastics, made up of argan proteins extracted from oil cakes and amylose obtained from barley by RNA interference technique. Amylose is an optimal raw material for bioplastic purposes because of its linear molecular structure and it was already demonstrated that it is provided with better performances compared to starch. Moreover, we studied the effect of the enzyme transglutaminase as reticulating agent for the argan protein component to influence the mechanical properties and gas barrier properties of these novel blended bioplastics. Our results confirmed the possibility to valorise a by-product using it as new raw material, thus contributing to the development of new sustainable processes of production.

IDENTIFYING INTEGRATED APPROACHES TO SOIL QUALITY ASSESSMENT IN MEDITERRANEAN AREAS: ITALY-ALGERIA COOPERATION

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The Sustainable Development Goals promote human prosperity through the protection and preservation of the environment, emphasizing the close relationship among the economic, social and ecological interests. The need to provide food and have water to support the predicted world's

population of over nine billion requires good quality and availability. The provision of reliable and affordable energy while minimizing impacts on climate will depend on continuing energy supply and alternatives that do not result in increased greenhouse gas emissions. These pursuits can deeply affect ecosystems and services providing as they are challenging into global biodiversity preservation. The EU Biodiversity Strategy 2030 as well as the EU Nature Restoration Plan highlight the key role of soil in ensuring the maintenance and functioning of ecosystems and as important non-renewable resource, vital for human health and economy, as well as for production of food and new medicines. Soil is pivotal for human wellbeing although the persistence of many threats. International and national (Italy and Algeria) global policies and agreements are facing the issues both directly and indirectly. Without healthy soils and sustainable land use, many of the 17 goals (targets) set by the UN 2030 Agenda for Sustainable Development cannot be achieved. The priority is therefore to curb soil consumption and restore degraded soils by focusing on soil fertility protection, soil erosion reduction and soil organic carbon (C) increase. Decreases in water resources and C-storage capacity, soil erosion, soil fertility loss, desertification, salinization, food production reduction and several (alien) species or communities endangerment or prevalence are the most critical aspects to consider especially in Mediterranean areas. Infact, in the Mediterranean Basin the combination of a large range of ecosystems, the high biodiversity, socioeconomic conditions, governmental policies, and long-term human influence make soil monitoring and soil quality maintenance extremely important. Additionally, the arid and semi-arid regions are particularly sensitive to degradation processes induced by direct and indirect human interference because of their intrinsic main characteristics. In this context, the current research aims to highlight the impacts of different human activities on the soil quality by using indices that may help to monitor soil variation over time, more than individual pedogenetic characteristics. Soil quality has been related to several degrees and types of anthropogenic impacts and, in this view, specific single and integrated indices have been tested. Moreover, agricultural and natural soil losses have been related to the biodiversity decline occurring in the study site. Interesting data were obtained in the upstream part of Medjerda River before AinDalia dam (Algeria): this region was characterized by different land managements and anthropogenic impacts due to the urbanization and agricultural activities. Therefore, soils were sampled according to different land uses and human impacts along the river banks. Different water quality was taken into account to better focus on quality dynamics of the investigated soils. In conclusion, our results suggest their usefulness into defining methods and tools to evaluate and monitor ecosystem services, in order to elaborate models on ecosystem status and evolution for the decision makers, by supporting their choices among different locations for planning and designing at different scales.

DETERMINATION OF TRACE METALS AND SOME BIOCHEMICAL PARAMETERS IN MUSSEL ORGANS *MYTILUS GALLOPROVINCIALIS*

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The toxicological impact of heavy metals depends on their chemical form, their concentration, the environmental context, and the possibility of passage through the trophic chain. To this end, our study focused on the analysis of heavy metals, on samples of the mussel Mytilus galloprovincialis.

The research carried out during the completion of this master's thesis focuses on the study of the impact of possible pollution on the quality of the marine environment in the Gulf of Annaba, based on the use of a bioindicator species., Mytilus. galloprovincialis which is an edible bivalve mollusk.

Samples of this species were taken in February and March during the year 2021 at six sites located in the Gulf of Annaba; El Battah, considered asite of less pollution because it is far from any source of pollution; Seraidi, saint cloud, cape de garde, chetaibi and finally Sidi Salem, a site exposed to industrial and port pollution. In this context, we have studied several aspects, we have made measurements at the level of the flesh of: Proteins, Carbohydrates, Lipids .

The metals sought are: Cd, Cr, Pb, Cu, Fe and Zn, due to their level of toxicity and their effect on the environment as well as on human health. Analysis was performed by flame atomic absorption spectrophotometry and graphite furnace.

Overall analysis of the results showed that the metal content of all samples is below the guideline values for metal contents authorized at European level and are not significantly contaminated by metals.

We have also obtained results that the mussel contains high levels of proteins, carbohydrates and fats.

BIOLOGICAL STUDY OF PLATYHELMINTHES PARASITES OF THE BIVALVE MOLLUSC *DONAX TRUNCULUS* (BIOINDICATOR SPECIES OF POLLUTION IN THE GULF OF ANNABA IN THE NORTH EAST OF ALGERIA)

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Parasites of bivalve molluscs are good indicators of pollution and play an important role in regulating population dynamics by influencing their community structure. This work aims to study the parasitism of Donax trunculus, an edible bivalve mollusc known in the Gulf of Annaba. The composition of the parasitic fauna was determined from the examination of 360 host individuals collected from three sites in the Gulf, El Battah, a site far from any source of pollution; Echatt, site subject to urban and agrarian pollution and Sidi Salem, site subject to mainly industrial pollution during the four seasons of 2016.

The collection of 8794 parasitic individuals divided on different cloths (gonad, digestive gland, mantle), allowed us to reveal the presence of two parasitic species belonging tot wo families different from digènes trematodes Bacciger bacciger (Rudolphi, on 1819) (Fellodistomidae) and Postmonorchis sp (Hopinks, on 1941) (Monorchidae). The stocks of parasitical indications in the thre esites of study show that species Postmonorchis sp records the most important parasitical load (65,55%) in comparison with Bacciger bacciger (16,66 %). The distribution of parasitical indices at the level of the three tissues of D. trunculus shows that it is the digestive gland, which records the rate of infestation the most well brought up in comparison with other tissues, and then the site of Echattrecords the most important parasitical loads in comparison with other sites. Statistical results showed a significant difference of the parasitical infra-communities owed probably to spatio-temporal and biotic variations.

BISPHENOL-A AND FEDROZOLE-REGULATED EXPRESSION OF BRAIN-SPECIFIC *CYP19A1B* GENE IN SWIM-UP FRY OF *LABEO ROHITA*

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In all vertebrate species, estrogens play a crucial role in the development, growth, and function of reproductive and nonreproductive tissues and the effects are mediated mainly by estrogenic receptors (ERs), which function as ligand-regulated transcription factor. A large number of natural and synthetic chemicals present in the environment and diet can interfere with estrogen signalling affects behaviour and reproductive potential of living organism. Estrogenic regulation of membrane associated G protein-coupled estrogen receptor, GPER activity has also been reported. Bisphenol A (BPA), a ubiquitous endocrine disruptor is present in many household products, has been linked to many adverse effect on sexual development and reproductive potential of wild life species. Cytochrome P450arom (CYP19), a product of *cyp19a1* gene, catalyzes the conversion of androgens to estrogens. Cyp19 genes are expressed in gonad, brain and other tissues and regulate the location, timing and quantity of estrogens available for activating genomic and non-genomic action during early development and reproduction. Unlike most mammals that contain a single cyp19 gene many teleost species including L. rohita, possess a pair of aromatase gene: cyp19a1a that encodes aromataseA and is expressed mainly in the gonad, and cyp19a1b encodes aromataseB, mostly found in the brain The present work is aimed to elucidate how an environmentally pervasive chemical BPA

and a non-steroidal inhibitor fadrozole affects in vivo expression of a known estrogen target gene, cyp19a1b in the brain, and a known estrogenic biomarker, vitellogenin (Vg) in the whole body homogenate of 30 days post fertilization (dpf) swim-up fry of Labeo rohita. We confirm that, like estrogen, the xenoestrogen BPA exposure for 5–15 days induces strong over-expression of cyp19a1b, but not cyp19a1a mRNA, while fadrozole had contrasting effect in the brain in swim-up fry. BPA was shown to increase concentration of vitellogenin in whole body homogenate of fry. BPA also induces strong over-expression of aromatase B protein and aromatase activity in brain. Experiments using selective modulators of classical ERs and GPER argue that this induction is largely through nuclear ERs, not through GPER. Collectively the results suggest that BPA and FAD can disrupt cyp19a1b activity more effectively than can cyp19a1a. The enhanced spatial and temporal sensitivity of cyp19a1b than cyp19a1a suggest that brain sex of fish is more susceptible to disruption by environmental pollutants such as BPA and aromatase inhibitor fadrozole and we propose that the response of cyp19a1b in brain tissue of early swim-up fry of *Labeo rohita* is a more suitable marker or indicator of estrogenic pollution of aquatic environment.
Estrogenic pollution of aquatic environment is a global issue and results of the present study will be very much useful in International cooperation programs.

A MULTIDISCIPLINARY APPROACH TO THE STUDY OF SIDEROPHORES FROM CYANOBACTERI

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The increasing spreading of cyanobacterial blooms all over the globe in the last years has sparked a greater interest in their study, mainly in that they represent a serious environmental issue. Indeed, the blooms deplete oxygen in surface waters through excessive bacterial respiration and decomposition and often release toxic substances (cyanotoxins) causing fish mortality and risks for public health. The nutrient enrichment, often of anthropogenic origin, and the resulting euthrophication process have been identified as the major trigger for their abnormal growth. The flip-side is that cyanobacteria are excellent bioindicators of environmental status and can be used both as an indication and monitoring tool, and in the identification of the pollutant source. Thanks to an inter-university collaboration, the idea and its implementation of a program for the specific monitoring of cyanobacteria on the coasts and coastal basins of Campania region in Italy, a territory plagued by significant environmental criticalities, was born. We have set up a multidisciplinary strategy for the early detection of cyanobacterial bloom and their toxins based on the combined use of remote/proximal sensing and MS-based molecular networking. Our strategy has been validated in several case studies and is supporting the environmental protection bodies in the current environmental monitoring activities. Conversely of their pitfalls, cyano bacteria produce a wide array of bioactive compounds, making

them a cornucopia of newlead compounds (anticancer,antibiotic, anti-inflammatory, siderophores). In our recent researches, we have explored the most of the various talents of cyanobacteria and here we report our main results of these activities, highlighting the importance of the multidisciplinarity and the collaboration for their realization and success.