

**Abstract Proceedings
of the 9th International Conference on
Biodiversity and Biotechnologies
Kuwait - 2024**



and



**Conference organized by the Kuwait Environment Protection
Society and the Zoological Society of France (SZF)**

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Biodiversity versus biotechnology: implementing science-based solutions and
strategies for biodiversity resilience - Kuwait – 2024**

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PREAMBLE

The Theme Biodiversity vs Biotechnologies, initiated since 2012, constitutes an essential bridge between the biodiversity sector and the scientific community, promoting collaboration between academic, environmental and industrial projects.

With a commitment to nature protection, endangered species preservation, innovation and knowledge exchange, we have led scientific meetings bringing together industry experts, researchers, and academic engineers.

ICBB9 on Biodiversity and Biotechnology aims to provide a platform for researchers and engineers from different countries to present and discuss their current findings and strategies. Participants were from academia and industry working in the fields of agricultural biotechnology, industrial biotechnology, marine and forest biodiversity or biotechnology. Applications in the environmental and medical fields will come together to inform new cutting-edge knowledge and establish new contacts and collaborations.

This event is the second scientific meeting organized in Kuwait and the ninth event of a continuation of successful conferences organized by members of ICBB in different countries.

We are immensely honored to convene this year's scientific meeting in Kuwait, a nation that stands as a testament to the confluence of cultures, history, and innovation. Kuwait City offers an impressive blend of natural beauty, epitomized by the majestic Delta of the Euphrates, and a rich array of historical and touristic sites. In keeping with tradition, this conference serves as a vibrant forum where the East meets the West, fostering dialogue, understanding, and collaboration among delegates from diverse backgrounds.

You are cordially invited to participate in the 9th scientific meeting of "Biodiversity versus Biotechnologies" "ICBB9 Kuwait-2024", which will be held, in webinar, in Kuwait City, from December 27 to 29, 2024. It is in partnership with the Kuwait Environment Protection Society (KEPS) and the Zoological Society of France (SZF)

On behalf of the Scientific and Organizing Committee,
 Dr. Wijdan Ali Al-OQAB
 Chairman, Kuwait Environment Protection Society, Kuwait.

<https://www.icbb9-kuwait.com>

TOPICS

Biodiversity versus biotechnology: Implementing science-based solutions and strategies for biodiversity resilience.

1. Pollution: Ecotoxicology: Parasitology and integrated biological control - Monitoring of chemical and particulate pollutants - Contamination of plants and animal communities- Public health and regulation of pollution - Assessing water, land, and air pollution impacts - Environment industrial interactions - Assessing interactions and monitoring changes in marine, land and air environments - Measuring negative impacts on environmental ecosystems and their various components - Recognition of climate change effects.
2. Medicinal and aromatic plants: Honey plants and beekeeping development - Flowering plants and beekeeping, control insecticides - Poaching and illegal trade in wild species.
3. Marine and freshwater ecosystems: management - Aquaculture - Breeding and repopulation - Protected areas- Integrity of trophic food chains - Micro-organisms - Flora & fauna interactions.
4. Ecosystems and specific spaces: Conservation of species habitats - Critical factors for species habitats - Defining boundaries for sustainable ecosystems - Invasive species.
5. Restoration of natural/semi-natural ecosystems: Preserving ecosystem structure and function including fragile/rare species Habitat integrity (forests, wetlands, mountains, coastal zones) - Promotion of national parks and biological natural reserves.
6. Restoration of constructed ecosystems: Rehabilitation and development of zoos.
7. Biotechnology and phytochemistry: Agricultural wealth, population genetics - Genetic improvement of plants - Agronomy - New products and zootechnics - Strategies for safeguarding endangered species - Strengthening regulations for species habitats - Monitoring environmental exceedance limits - Management & enforcement policies - Minimizing waste issue - Algae valuation.
8. Crisis management to support decision makers: Natural disasters, red tides and fish deaths, floods, dust storms - Monitoring and prediction using observation systems and models.
9. Remote sensing, GIS and data analytics: Use of remote sensing and GIS in mapping and monitoring- Water quality modeling - Machine learning and advanced data analytics for marine resources. - Sustainable management - Aquaculture and agriculture management.

OBJECTIVES

Biotechnologies in its widest sense can include modern agriculture and food production, pharmaceuticals, utilization of waste, environmental monitoring, and management of ecosystems. Appropriate environmental management and wise use of biotechnology can also promote species diversity and help ensure sustainability of ecosystems and their services. This event will stimulate and enrich the dialogue between scientists in the fields of biodiversity and biotechnology. It will inform decision-makers about measures recommended to enhance biodiversity resilience by adopting policies of protecting vulnerable species, their habitats and their ecosystem services.

Oral Session 1

OR01- Checklist of macroalgae biodiversity in the Moroccan eastern part of the Mediterranean Sea and spread of the brown alga *Cystoseira aurantia* in the Nador LagoonMohamed RAMDANI¹, Françoise DENIS² and Roger FLOWER³¹ Département de Biologie, Faculté des Sciences, Université Mohammed Premier Oujda-Maroc² Laboratoire de Biologie des organismes aquatiques, Université Lemans, France³ Department of Geography, University College of London, London, WC1E 6BT, UK

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The present investigation provides an update of the list of marine algae currently present in the marine waters of the eastern Moroccan Mediterranean coast between 2021 and 2024. 240 species of benthic macroalgae and two marine phanerogams were identified between Al Hoceima and Saidia. All species of algae include 135 Rhodophyceae (red algae), 53 Phaeophyceae (brown algae) and 52 Chlorophyceae (green algae). Water zones exceeding 3 meters depth remain completely unexplored and more in-depth investigations by qualified divers are expected to increase the number of species present in this part of the Mediterranean coast.

A single invasive species of brown algae was cited for the first time in Moroccan marine waters, *Cystoseira aurantia*, and in its free form is becoming more and more invasive and abundant throughout the Nador lagoon. This invasion is encouraged by widening the connection of the lagoon with the sea. Among the ways of valorizing macroalgae we cite the release of bactericidal substances (phenols). The species tested showed performances in antioxidant power and in antibacterial and antifungal activities.

Energy production from algal species is very promising and requires other, more in-depth investigations, to master production techniques and select the most efficient species.

Keywords: Macroalgae, Biodiversity, alien species, valuation, western Moroccan Mediterranean Sea, Nador Lagoon.

OR02 - Reproduction of the invasive blue crab (*Callinectes sapidus*) in the Moulay Bouselham Lagoon: spatio-temporal dynamics and implication for invasion mitigation

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The blue crab (*Callinectes sapidus* Rathbun, 1896), an invasive species native to the American Atlantic coast, has gradually expanded along the Moroccan Atlantic coast, particularly in ecologically sensitive areas such as the Moulay Bouselham Lagoon. This species threatens local marine ecosystems by disrupting populations of molluscs and crustaceans, as well as benthic communities. However, it is of growing economic importance, particularly for artisanal fishing.

The study of the biology and ecology of the blue crab is essential to understand its population dynamics and develop effective management strategies balancing the reduction of its negative impacts and sustainable exploitation.

This study, based on monthly monitoring by scientific fishing, examined the reproductive biology of *C. sapidus* in Moulay Bouselham Lagoon. Two main breeding periods have been identified: spring (with a peak in April) and summer (with a peak in August). These periods showed a correlation with high reproductive indicators: gonadosomatic index and percentage of ovigerous females. The spatio-temporal distribution revealed a dominance of ovigerous females during summer, while adult males were more present in spring. The overall sex ratio was 0.64:1, favoring females, with distinct seasonal trends: females were most abundant from February to September, while males peaked in December. These results are useful for promoting a management strategy for the invasion of the species, aiming to balance the preservation of ecosystems and the valorization of the blue crab as an additional resource, particularly for artisanal fishing.

Keywords: *Callinectes sapidus*, reproduction, invasive species, Moulay Bouselham Lagoon, Morocco.

OR03 - Effect of essential oils of lemon, thyme and oregano on the organoleptic quality and on histamine production in sardine filets stored at 10°C

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The use of essential oils is considered one of the emerging approaches to preserve the quality of foodstuffs due to the phenolic compounds with antibacterial activity that they contain. The antibacterial power of lemon, thyme and oregano essential oils was evaluated on a selection of enterobacteria, isolated from spoiled sardines, using the aromatogram method. The influence of incorporation of these oils on the organoleptic quality of sardine filets, stored at 10°C, was evaluated and the monitoring of the histamine content was carried out using the fluorometric method of Lerke and Bell (1976). The essential oils studied showed significant antibacterial activity against *Klebsiella ozaena*, *Enterobacter cloacae*, *Morganella morganii*, *Proteus mirabilis*, *Citrobacter freundii* and *Providencia rustigianii*.

Lemon EO had the lowest inhibition diameter while thyme EO showed the highest inhibition diameter. The application of these oils at a concentration of 5% on sardine fillets revealed a beneficial effect on sensory attributes and was able to improve the smell and taste and preserve the organoleptic quality of the sardine until the sixth day of storage at 10°C without reaching the organoleptic rejection threshold. The studied essential oils allowed the control of bacterial multiplication, the thyme EOs revealed a significant reduction in the bacterial microflora of approximately 57%, demonstrating bactericidal activity and the application of oregano EOs favored bacteriostatic action, while lemon EOs helped to delay bacterial proliferation. Also, no histamine production occurred following the incorporation of these EOs into the sardine fillets throughout the storage period. The essential oil of lemon, thyme and oregano have significant antibacterial activity and can constitute a complementary solution for controlling histamine in fish products.

Keywords: CMI, Lemon EOs, Thyme EOs, Oregano EOs, Histamine, Sardine, Morocco.

OR04 - Growth parameters of the lesser-spotted dogfish *Scyliorhinus canicula* (Elasmobranchii: Scyliorhinidae) from Oran Bay (West Algeria)

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This study is focused on the principal growth parameters on lesser-spotted dogfish *Scyliorhinus canicula* (Linnæus, 1758) with a total of 570 specimens (289 females and 281 males), monthly collected from the Oran commercial fishery during the period January - December 2012. The total length and weight of the fish ranged from 22.5 to 54.5 cm and 266 to 532 g respectively. The sex ratio female/male was 1:1.2.

Monthly length frequency data were analyzed using FISAT II for estimating population parameters, including asymptotic length (L_{∞}), growth coefficient (k) and recruitment pattern to assess the status of the stock. For males, the parameters of von Bertalanffy growth equations were estimated as $L_{\infty} = 55.13$ cm, $K = 0.85$ and $t_0 = -0.15$ year and $W_{\infty} = 199.97$ g. The growth performance index (Φ) value was calculated as 0.40 and in the females $L_{\infty} = 49.35$ cm, $K = 0.47$, $t_0 = -0.29$ year; $W_{\infty} = 221.19$ (g), $\Phi = 0.14$. Growth coefficient K is clearly higher than in other Mediterranean areas, indicating a rapid growth of *Scyliorhinus canicula* in Oran Bay.

There is a significant correlation between the total weight and total length of all individuals of *S. canicula*. The type of growth shows positive allometric growth ($b > 3$); it would be a major allometry which indicates that the lesser dogfish weight increases faster than its size.

Keywords: Small dogfish, *Scyliorhinus canicula*, growth parameters, Oran bay, Algeria

Oral Session 2 Topic 2	Moderators : Prof Souaâd SMAÏ and Prof. Fairouz HADDADJ Integrity of trophic food chains - microorganisms, Flora, and fauna interactions
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OR05 - Rotifers as bioindicators of trophic state in an artificial eutrophic-hypertrophic lake in a semi-arid region (Irbid-Jordan)

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Rotifers play a significant role in understanding ecosystem health, particularly in relation to trophic states and water quality. This study focused on the seasonal distribution of zooplankton, with an emphasis on rotifers, in the eutrophic-hypertrophic artificial lake JUST, located in a semi-arid region (Irbid-Jordan). Among the 26 zooplankton species identified, 11 were classified as rotifers. During summer, rotifers represented the second most abundant group (28.26% of total zooplankton), following copepods, and in winter, they were surpassed by cladocerans (25.9%).

During winter, Rotifers show low richness with only four species which were sporadically encountered such as *Brachionus calyciflorus*, *Asplanchna brightwellii*, *Aschomorpha saltans*, and *Filinia longiseta*. *Aschomorpha saltans* was the most abundant, accounting for 10% of the total zooplankton. However, during summer Rotifera were represented by 10 species. *B. calyciflorus willeyi* and *Platyas quadricornis* were the most abundant species contributing 19.7% of total zooplankton.

In JUST, the summer increase of trophic state enhanced the proliferation of Rotifera. Principal component analysis shows that Rotifera were associated with trophic level indices (TLI) in the summer. The abundance of rotifers, along with their sensitivity to changes in water temperature, dissolved oxygen, and nutrient levels, indicates that they respond strongly to trophic conditions and nutrient loading in the lake. Due to their responsiveness to environmental shifts, rotifers serve as bioindicators of high nutrient levels, making them useful for monitoring the lake's trophic status.

Keywords: Lake, Water quality, Bioindicator, Rotifer. Irbid-Jordan.

**OR06 - Characterization of two new species of the genus
Alternaria isolated from the Apiaceae in Algeria**

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The *Apiaceae* family includes plants that are widely cultivated in the Mediterranean regions. Fungal diseases caused by the genus *Alternaria* are frequently reported in these vegetable plants in Algeria, significantly reducing yield in both quality and quantity. Many *Alternaria* spp. are known to be plant pathogens on several cultivated and wild plants; they are also cosmopolitan fungi found in soil and food. During a species diversity study of the *Apiaceae*–*Alternaria* pathosystem, between 2018-2021 growing seasons, several *Alternaria* species with variable spore morphologies (*A. alternata*, *A. arborescens*, *A. radicina*, and *A. dauci*,) are frequently isolated from symptomatic tissues. Sampling in regions with intensive carrot and coriander culture in northwestern Algeria, and isolation on Potato Carrot Agar (PCA) medium revealed a high incidence of *Alternaria* (55%). A large population of this pathogen represented by small-spore species (49.5%) and 1% of this population could not be attributed morphologically to the previously described species. Phylogenetic analysis based on glyceraldehyde-3-phosphate dehydrogenase (*gpd*), second large subunit of RNA polymerase II (*rpb2*), and translation elongation factors 1-alpha (*tef1*) grouped isolates in two different phylogenetic sections.

Data sequences of these genes as well as for other small-spored species obtained from the GenBank were also included in the phylogenetic analysis. Five isolates did not correlate with any described species but correspond to the grouping obtained by multi-locus analysis used in the literature. Accordingly, morphological analyzes such as colony morphology and conidia morphometry on four culture media revealed distinct morphological characteristics from the previously identified species.

These isolates were assigned to two new species: *Alternaria longiformis* nov. sp from section *Embellisioides* and *A. radicolica* nov. sp from section *Embellisia*. The pathogenicity test showed that the two species were able to produce minor symptoms on *Apiaceae* leaves. The discovery of these two newly identified species, along with the previously documented ones, confirms earlier observations regarding the significant diversity of *Alternaria* species in Algeria. This diversity may be attributed to climatic conditions and cultural practices, as well as the presence of neighboring plants.

Keywords: *Alternaria*, *Apiaceae*, novel species, diversity, taxonomy, Algeria.

**OR07 - Distribution of the copepods assemblages during the summer along
the coastal area of Djerba Island (Tunisia, Eastern Mediterranean)**

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In the present study, we investigated the effects of pollution and anthropization on the summer distribution of copepods in relation to environmental factors in the coastal zone of Djerba Island. The study was carried out as part of an international project run by the Société d'Etude de Réalisation d'Aménagement et d'Hydraulique (SERAH). Water samples were taken in summer (July 2009-2010) along the coasts of Djerba Island at 15 stations. Temperature, salinity, pH and dissolved oxygen were measured immediately after sampling using a multi-parameter kit (Multi 340 i/SET).

Chemical parameters (nitrite, nitrate, ammonium, orthophosphate, silicate, total nitrogen and total phosphate) were analyzed with a Bran and Luebbe type 3 autoanalyzer. On the basis of chemical factors, the Djerba coasts can be divided into two parts: the western area, characterized by high values of nitrogen forms of nutrients, with higher N/P ratio, and the eastern area, poorer in inorganic nitrogen with an N/P ratio lower than the Redfield ratio (16). Zooplankton were collected using a cylindrical conical net (30 cm aperture, 100 cm high, 100 µm mesh size), equipped with a Hydro-Bios flowmeter.

The zooplankton abundance was primarily characterized by the predominance of copepods in all the stations in the Western Area of the Djerba coasts. Among copepods, Calanoids were highly dominant (up to 79% of copepod abundance). The small pollution-tolerant Calanoid copepod *Paracalanus parvus* was dominant in the Western Area, illustrating its affinity for highly eutrophic sites. Among copepod demographic classes, the adult males predominated over females, maybe due to the higher mortality rate of females which are more vulnerable to pollution. The copepod community was characterized by an overall low diversity (particularly in the Western Area) reflecting a rather poor health status. However high copepod abundance observed sporadically possibly highlights stimulation of growth rate by enhanced food concentration (microphytoplankton) in relation to the eutrophication.

Keywords: Djerba Island, Copepods, Environmental parameters, Pollution, Tunisia.

**OR08 - Parasitic evolution study in Cyprinidae from the Ain Zada dam
(Wilaya of Bordj-Bou Arreridj), Algeria.**

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This research aims to study the relationship between water pollution and parasitism in cyprinids fish, as well as its development, by examining the physico-chemical and bacteriological conditions of the water in Ain Zada Dam during the spring period of 2024.

The study focuses on detecting parasites in cyprinid fish, particularly the *Carassius gibelio* (Bloch, 1782) species by examining external teguments, gills, swim bladder, and digestive tract. The results revealed the presence of 8,299 parasites belonging to 16 genera.

The predominant parasites affecting the teguments were *Ichthyophthirius* sp. And *Lernaea* sp., with prevalence rates of 88% and 52%, respectively. According to the physico-chemical and bacteriological analyses, heavy metals were identified as the main pollutants of the dam's water, moreover fecal coliform bacteria and a low pH levels were detected and , which significantly influenced, directly and or indirectly, the total number of cyprinids fish parasites.

Keywords: Cyprinids, parasites, water pollution, Ain Zada Dam, Algeria.

OR09 - Space time organization of the ecological and biodiversity structure of the Echinoderms species in the mediolittoral coastal zone of Oran (Algeria)Djillali BAHIRI¹ and Djillali BOURAS²

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The study focuses the inventory and an assessment of the space time organization of echinoderm communities in the mid-littoral coastal zone between Madagh and Arzew in western Algeria. A total of 25 species of Echinoderms were identified in 4 sampling stations (monthly sampling) during the period 2019/2022.

The study showed that the Eleutherozoa that colonize the wave-beaten area (mid- and supralittoral level) are the most abundant with a frequency of around 80%. Ecological indices such as the abundance of organisms, the number of species (sea cucumbers, starfish, brittle stars, sea urchins). Diversity (H'), equitability (J), applied to the data, indicate that the coastal ecosystem is disturbed and unbalanced (particularly in Arzew), due to the many human activities impacting this area. The obtained results contribute to provide a distribution map and a database for the management, biomonitoring for subsequent conservation of coastal ecosystems.

Keywords: Echinoderms, biodiversity, biomonitoring, coastal area, Oran, Arzew, Alegria.

**OR10 - Reproduction and growth performance of Nile - Tilapia
Oreochromis niloticus (Linnaeus, 1875) in Foum-Gleita Lake (Mauritania)**

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This study focuses on reproduction and growth of *Oreochromis niloticus* in Foum-Gleita Lake (Mauritania). Growth parameters were used to determine median sexual maturity size and the reproduction periods during an annual growth cycle. Knowledge of the population parameters of this fish is relevant to its exploitation; growth rate data is used to estimate size distributions and fishing impacts on the Nile-tilapia population. Catch seasons and the minimum catch size for populations were obtained to assist in better stock management.

The studied species stock was sampled and caught specimens were measured for total length, fork length, and total body weight. Evisceration of fish enabled the determination of sexual maturity by examining and weighing the gonads; food availability was assessed from prey in the alimentary bolus.

Male *O. niloticus* growth rate ($k=0.16$) was higher than for females ($k=0.12$). This growth difference was confirmed by the growth performance indicator, ϕ . The same scenario was observed in *O. niloticus*. For both sexes of *O. niloticus*, the two modes of seasonal growth were well marked at between 20 and 30 cm from August to December. These results are compared to data from elsewhere and collectively they contribute useful biological indicator information relevant to supporting new policies for the rational management of freshwater fishery resources in Mauritanian lakes.

Keywords: Nile-Tilapia, *Oreochromis niloticus*, reproduction, growth, freshwater fisheries, Foum-Gleita Lake, Mauritania.

OR11 - Bacteriological diagnosis of 3 coastal hospitals wastewaters in Oran City and potential human contaminations and hazardous risks on the environment**Sabrina HANNACHI** and Djillali BOURAS

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A cross-sectional study was conducted between January 2023 and February 2024 on three coastal hospital wastewaters: Oran University Hospital Center (OUHC), Tami Medjbeur Hospital Ain El Turk and Canastel Pediatric Hospital. A total of 26 composite samples were collected on a monthly basis for bacteriological analysis.

Appropriate dilutions were prepared for *Staphylococcus aureus* and 0.5 mL of aliquot was streaked on mannitol salt agar (MSA) and incubated at 37°C for 24 hours. Colonies with a typical yellow zone of fermentation were used for Gram staining. Those colonies identified as Gram-positive cocci were counted using a digital colony counter for staphylococci according to the method used by Dudely et al.(2008).

Indicator organisms and pathogenic and potentially pathogenic bacteria were found and isolated on selective bacteriologic media. Pathogenic (*Salmonella spp.*, and *Streptococcus aureus*) and potentially pathogenic (*Escherichia coli*) bacteria were detected from 3 effluents of the studied coastal hospitals.

Hospital wastewaters with many microbes and emerging infectious particles such as prions, viroids, and toxins are hazardous for the environment, and ultimately human health. However, in Oran city, the wastewater is directly discharged into sewage water without pretreatment, it then undergoes treatment along with the municipal wastewater but the treatment is insufficient to remove micropollutants from the marine waters and the underground water.

Keywords: Wastewater, hospitals, bacterias, environment risks, hazardous public health, Oran.

OR12- Diagnosis of sperm quality in infertile men based on oxidation-reduction potential and sperm quality: first results from the population of Oran, Algeria

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This study was conducted at the Hospital-University Establishment of Oran (Algeria), from January 2023 to September 2024. During data collection, age, weight, height, reproductive history, smoking, alcohol habits, or other recreational drugs, sport activities, and chronic prostatitis were recorded. All procedures were performed in compliance with the study's established protocols. The study included 50 men from infertile couples, selected from 100 patients according to the World Health Organization guidelines (WHO, 2021). Men diagnosed as infertile were recruited. Men with azoospermia, retrograde ejaculation, infection, cancer, varicocele, azoospermia, antioxidant treatment, and high viscosity were excluded from the study.

We collected data on the following patient's characteristics, as potential confounding factors age, type of infertility, and length of abstinence were identified. The patients were divided into 2 groups according to the ORP evaluated of all subjects. Semen analysis sperm samples were obtained after 3 to 5 days of ejaculatory abstinence. Samples were collected into sterile, wide-mouthed containers and liquefied at 37°C. The sperm parameters (liquefaction duration, volume, total sperm count, progressive motility, concentration, and morphology) were evaluated according to WHO (2010 and 2021) recommendations. Sperm vitality was determined by staining using the RAL 555 kit, a quick variant of the May-Grünwald Giemsa coloring method used in spermiology; sperm morphology was assessed by evaluating the size and shape of the sperm head and features of the midsection and flagellum.

This study aimed to determine the relationship between oxidative stress (OS) measured by the oxidation-reduction potential (ORP) and the results of semen analysis among men from infertile couples. This cross-sectional study included 50 men from infertile couples, determined according to the WHO guidelines. The general characteristics, semen analysis, and ORP of all subjects were evaluated and analyzed statistically.

Among the 50 men selected from infertile couples, 2 groups appear : 31 abnormal and 19 normal. The ORP distribution in patients with at least one abnormal sperm parameter versus patients with normal sperm parameters showed an established cut-off value of 1.34 mV/10⁶ sperm/mL.

Keywords: Men infertility, Oran population, Diagnosis, Oxidation-Reduction Potential, Algeria.

**“Probable risk factors for autoimmune pathology in the Western Algeria region:
cases of systemic lupus erythematosus examined in women and men”**

OR13 - Amina CHAMI SIDI BOULENOUAR 1, Kheir Eddine KERBOUA 2, Dalila DERKAOUI 1,
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This descriptive and analytical study is carried out in the immunology laboratory of the Regional Military University Hospital of Oran during the period March - June 2021, by examining among the 199 patients those affected by systemic autoimmune pathology. The results of this study are based on the analysis of immunological data using antinuclear and anti-cirrulinis peptide autoantibodies in order to assess their value in the diagnosis. Antinuclear antibodies were searched for by the indirect immunofluorescence technique on Hep-2, Immuno dot (ENA/DOT) for the detection of soluble antinuclear antibodies (anti-Sm, anti-RNP, anti-SSA, and anti-SSB).

Antinuclear antibodies react with various components of the cell nucleus. Their detection is based on a cascade approach, as all Antinuclear antibodies tests start with indirect immunofluorescence screening, which is a key technique for autoantibody screening because it allows the detection of most antibodies useful for diagnosis, prognosis and monitoring of organ-specific or non-specific autoimmune diseases.

The observed fluorescence aspects give a first indication of the identity of the target. If the screening is positive, it will be followed by a step to identify anti-nuclear targets. Their presence (especially at high titers) constitutes a strong diagnostic argument in favor of lupus disease, even if they can be found in other connective tissue diseases, and in lupus patients, disease monitoring includes measuring of these antibodies in order to predict a possible relapse. In recent years, several autoantibodies have been identified as indicators of kidney damage, mainly antinuclear antibodies and anti-DNA.

It is known from numerous investigations into autoimmune pathology around the world that systemic autoimmune diseases affect both men and women, with a clear women predominance. In the lupus patients, the analysis of our results shows a large women predominance with a percentage of 78% (sex ratio = 7 Women/2 Men).

Keywords: Autoimmune pathology, systemic lupus erythematosus, Oran, Algeria.

OR14 - Effect of the type of cultivation and the growing area on the physicochemical characteristics and the antioxidant power of olive oil

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Olive oil was extracted from the fruit of the olive tree by physical processes. This oil is characterized by its nutritional properties and health benefits. Its physicochemical characteristics, such as acidity, fatty acid composition, peroxide and spectrophotometric indices (K232 and K270), as well as polyphenol and tocopherol contents, play a key role in the quality and classification of olive oil.

This study aims to compare the physicochemical properties: free acidity, peroxide index, saponification index, chlorophyll content. The polyphenol content by dosage of condensed tannins and by dosage of flavonoids in three types of olive oil from different geographical regions was assessed. The samples were analyzed according to the standard criteria defined by the International Olive Council (IOC). For the evaluation of the antioxidant power, we opted for the DPPH test.

The results on the physicochemical characterization of the three olive oil samples classify them into virgin, extra virgin and traditional oil, according to COI standards. Regarding the study of the antioxidant power of the three oil samples which represents great importance due to its impact on the nutritional quality and stability of the product, results showed that all three oils have important antioxidant capacities but extra virgin oil was superior. Compared to the traditional oil virgin, extra virgin olive oil is richer in bioactive compounds with an antioxidant properties, notably polyphenols, tocopherols (vitamin E), and certain pigments such as carotenoids and chlorophylls. This characterization highlights the importance of environmental factors, cultivation and production techniques in the final quality of olive oils and their antioxidant power.

Keywords: Olive oil, polyphenol, physico-chemistry, extra virgin, antioxidant power.

POSTER SESSION 2

Topic 2 : Biodiversity vs biotechnologies: Marine and terrestrial ecosystems – Aquaculture, Flora, Fauna,

Moderators : Dr. Amina SMAÏ and Dr. Mohammad ALI

**P001- Assessment of Soil Health and Native Vegetation
Support on Umm Al-Namil Island, Kuwait Bay, Kuwait**

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The effective conservation of native vegetation requires comprehensive soil assessments to understand the influence of soil physicochemical properties on plant growth, particularly in arid regions. This study focused on the soil of Umm Al-Namil Island in Kuwait Bay, investigating its potential to support native vegetation amidst saline and nutrient-variable conditions.

Using soil samples from four designated sites, a detailed analysis was conducted to measure parameters such as pH, electrical conductivity, bulk density, porosity, and levels of essential and non-essential elements (e.g., calcium, magnesium, sodium).

The findings reveal that the island's soil exhibits high salinity and variable nutrient concentrations, both of which influence vegetation distribution and health. The study underscores the need for targeted soil management strategies to support native flora while mitigating salinity and nutrient imbalances that may hinder sustainable vegetation development.

Keywords: Soil health, Native Vegetation, Salinity, Soil Conservation, Arid Soil Conditions, Biodiversity Support

PO02 - Adaptations of marine bony fish for buoyancy control and the digestive efficiency of demersal fish without swim bladders

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Marine bony fish exhibit diverse adaptations for buoyancy control, with the swim bladder serving as a primary hydrostatic organ in most species. In contrast, some demersal and other benthic bony fish lack this organ, requiring alternative strategies such as continuous swimming and enhanced liver buoyancy.

This study explores the physiological mechanisms of bony fish lacking swim bladders, focusing on demersal species like cobia (*Rachycentron canadum*) and skipjack tuna (*Katsuwonus pelamis*), which rely on high-energy digestion and rapid nutrient assimilation to sustain constant swimming.

Environmental factors like temperature and salinity also influence metabolic rates by affecting feeding and growth in species such as juvenile cobia. Through understanding of these physiological responses, aquaculture practices can optimize growth conditions and feeding regimes to maximize efficiency and support sustainable production of species with similar metabolic and buoyancy adaptations.

Keywords: Buoyancy control, Swim bladder, Demersal fish, Metabolic rates, Aquaculture practices.

PO03 - Cobia (*Rachycentron canadum* Linnaeus, 1766) fish farming to promote sustainable seafood production in Kuwait

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The current strong trend towards consumption of seafood products is becoming more and more accentuated around the world. Among the most useful solutions to meet this demand, aquaculture and fish farming offer the most gentle and efficient production methods to guarantee products that meet international public health standards and help safeguard the sustainability of the farmed species without harming the biodiversity. The cobia fish species, *Rachycentron canadum* (Linnaeus, 1766), was chosen with the aim of promoting sustainable seafood production in Kuwait.

To meet the increased demand for seafood products by consumers, KISR researchers are proposing cobia fish farming as an alternative to wild stocks, due to the appreciable quality of its flesh, its performance in rapid growth, and its ability to adapt equally well to mariculture in the open sea and in open-ground basins fed by saline groundwater.

Production of cobia juveniles using marine water or saline groundwater can provide a commercial aquaculture development opportunity for inland mariculture or in offshore aquaculture in Kuwait .

Keywords: *Rachycentron canadum*, aquaculture, seafood alternative, Kuwait.

P004 - Exploring the impact of hydrological features on summer phytoplankton and ciliates distribution in El Bibane Lagoon, Tunisia

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El Bibane Lagoon is a dynamic aquatic ecosystem in Tunisia, having unique hydrological features that control its biological communities, especially phytoplankton, and ciliates. The distribution of these organisms relative to environmental factors was studied during the summers of 2009 and 2010.

Physical parameter values did not show any significant seasonal variation. All nutrients except ammonium and nitrate did not follow distinct spatial patterns, nor varied from one season to another. Phytoplankton and ciliate did not differ significantly in terms of zooplankton abundance in any of the seasons. Maximum phytoplankton density for July 2010 was recorded at $16,950 \pm 6077$ cells l⁻¹ higher than in 2009, accounting for 8450 ± 7424 cells l⁻¹.

Ciliate abundance was moderate and averaged 081 ± 159 cells l⁻¹ in 2009 and 053 ± 088 cells l⁻¹ in 2010, with a peak of 700 cells l⁻¹ in 2009. In 2010, the zooplankton abundance ranged from 2212 (station 2) to 65,688 ind m⁻³ (station 3). To remedy eutrophication, efforts in the Gulf have aimed at sustainable development, the implementation of stricter industrial regulations, better agricultural practices, and better wastewater disposal.

Keywords: El Bibane lagoon, phytoplankton, ciliate, zooplankton, environmental factors, summer season.

P005 - Evaluating the potential for culturing two native copepod species as live feed

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The aim of this study was to establish a protocol for culturing the local copepod zooplankton species *Parvocalanus crassirostris* and *Euterpina acutifrons*. Both species were identified in the coastal waters of Kuwait, though *E. acutifrons* exhibited seasonal variation, with a significant decline in numbers from January to March, which hindered consistent culture establishment during the project.

In contrast, after several unsuccessful attempts, a stable culture of *P. crassirostris* was successfully established. The culture conditions included water salinity of 41 ppt and temperatures maintained at $22 \pm 1^\circ\text{C}$. The population was initiated from a local source and maintained a female-to-male adult ratio of approximately 8–9:1.

The culture was fed a daily diet (except Fridays) of *Isochrysis sp.* at a density of 8×10^4 cells/ml. Adequate aeration was provided using small air stones to create fine bubbles, and 20% of the water was exchanged twice weekly to maintain optimal water quality. The results demonstrated the viability of culturing *P. crassirostris* as live feed for farmed fish larvae, with potential for scaling up production.

Keywords: Aquaculture, Zooplankton, Copepoda, Larval Fish Feeding, *Parvocalanus crassirostris*, *Euterpina acutifrons*.

PO06 - Testing the impact of oil water accommodated fraction on the survival and development of *Parvocalanus crassirostris* copepod

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The present study was aiming to test the impact of oil Water Accommodated Fraction (WAF) on mortality and growth of local copepod species *Parvocalanus crassirostris* (Dahl. F., 1894). In cases of oil spills, a variety of hydrocarbonic compounds are introduced to the marine environment, WAF being a major one.

The survival experiment was done on adult *P. crassirostris*, which was not affected by the presence of WAF at any tested concentration after 72 hours. The growth experiment was subjecting freshly hatched- juvenile to 50% WAF solution. Growth speed, measured as becoming an adult, was not affected by WAF presence, nor was there any malformation in the tested nauplii.

The current study suggests that *P. crassirostris* does not respond negatively to oil spill in laboratory conditions, however, environmental conditions like temperature and sunlight could be increasing the WAF toxicity at the open seas.

Keywords: Zooplankton, Copepoda, crude oil, toxicity, hydrocarbon pollution

P007- Study of the morphometry of the sardine, *Sardina pilchardus* (Walbaum, 1792) caught along the coasts of Ghazaouet (Algeria)

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This work highlights the first observations on the growth and reproduction parameters of the sardine captured in Ghazaouet Bay. The morphometric study aims to estimate the salubrity and size of the population to help for the sustainable fishing quotas and avoid overfishing. Furthermore, it highlights the impact of pollution on human health and the marine environment. Results help to monitor the growth of sardines and to identify the environmental and nutritional elements impacting the small pelagic fish development.

We identified a total of 60 specimens on a monthly basis, from April to October 2023. We measured different metric parameters and weighed the sardines in the laboratory, analyzed them as part of a morphological study focused on gender distribution, reproductive status and nutritional health of fish.

The morphometric study sheds light on the overall health of the marine ecosystem and on the population fluctuations. The sex ratio >1 which explains the abundance of males, with GSI results indicating constancy during the summer and a consequent decrease more especially in April which means a variation in the reproduction and sexual maturity of individuals. In addition, the analysis of HSI values revealed an increase during the summer which suggests that sardines are in high numbers possibly linked to reproduction or linked to active metabolism unlike the months of May and September as well as quite low in April which suggests a metabolic adaptation to the environment.

Differences in the morphological characteristics of sardines can be directly linked to environmental factors such as warming waters, pollution and changes in marine habitats. Not only are sardine physiology and behavior affected by these changes, but also population dynamics and ecological interactions.

Keywords: *Sardina pilchardus*, morphometric parameters, pollution, marine ecosystem, Ghazaouet, Algeria.

POSTER SESSION 2

Biodiversity versus biotechnologies: Marine and terrestrial ecosystems – Aquaculture, Flora, Fauna,

Moderators : Prof. Amina BOUBEKRI and Prof. Fatma BELHOUCINE

P008 - Performance growth and reproduction of the North African catfish *Clarias gariepinus* (Burchell, 1822) in Fom Gleita Lake and Black Gorgol River (Mauritania)**Cheikhna Yero GANDEGA¹, Meriem BENSMIRA², Djimera LASSANA¹, Ahmad AL-SHAMMARI Adel Ali NASEEB³, Mohammad ALI³, Roger FLOWER⁴ & Mohammed RAMDANI⁵**

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Catch seasons and the minimum catch size for populations of *Clarias gariepinus* were investigated to assist in better stock management. Adults occur mainly in quiet waters, vegetated fringes of Black Gorgol River and in lake reservoirs where they prefer shallow and swampy areas with a soft muddy substrate and calmer water. Being Omnivorous bottom feeders which occasionally feed at the surface, they essentially predate crustaceans, insects and fish. They mainly feed at night on a wide variety of prey.

Caught specimens were measured for total length, fork length, and total body weight. The evisceration of fish enabled the determination of sexual maturity by examining and weighing the gonads; food availability was assessed from prey in the alimentary bolus.

Male *C. gariepinus* growth rate ($k=0.16$) was higher than for females ($k = 0.12$). This growth difference was confirmed by the growth performance indicator, phi. The studied fish showed two well-marked seasonal growth modes with total lengths of about 40 cm during January to July and about 30 cm between September to December in males. But in females the two seasonal growth modes are 43 cm from January and August and around 40 cm from September to December.

Analysis of the data collected from the studied fish show that the size of the smallest females is 25 cm for *C. gariepinus*. Males tend to grow faster than females. Based on current results on the reproduction of the North African catfish, it is recommended that regulation of fishing in the reservoir lake is needed to preserve its biodiversity and enable rational and sustainable exploitation of the fishery resources.

Keywords: Freshwater fisheries, *Clarias gariepinus*, growth performance, reproduction, sexual maturity, Fom-Gleita Lake, Mauritania.

PO09 - Innovative and sustainable methodology for sea cucumbers aquaculture in Algeria**Djillali BAHIRI, Saliha DERMECHE, and Fayçal CHAHROUR**

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Sea cucumbers have high nutritional profiles and, at the same time, being mainly a very simple nutritional lifestyle. They are considered optimal candidates for sustainable aquaculture, in accordance with the principles of blue growth. However, despite the efforts and all the opportunities offered by startups, echinoculture has not experienced any industrial development. In this sense, we tried to develop a new production method. In the latter, the final product is represented in the form of canned food, which is produced in batches of sea cucumbers.

Sea cucumbers have a high nutritional value because they are rich in proteins, low in lipids, rich in amino acids and trace elements. The grid induces a cyclical aquaculture of individuals. This technique also facilitates the supply of an original product under controlled conditions for biotechnological uses in order to develop new nutritional systems in Algeria.

The research develops an innovative model for the breeding of a gourmet seafood with a low ecological footprint in aquaculture. The development of this aquaculture model can promote the development of the blue economy in various coastal areas impoverished by intensive fishing, guaranteeing new economic opportunities, environmental sustainability, food security, a certified supply chain, and meeting the ethical needs of an increasingly attentive consumer segment.

Keywords: Echinoderms, Sea cucumbers, sustainable aquaculture, Alegria,

**PO10 - Ethnobotanical studies and phytotherapy used in the treatment
of thyroid abnormalities in Algeria**

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Thyroid conditions (hypothyroidism, hyperthyroidism, thyroid nodules) are very common today and require effective treatment. Herbal medicine occupies an important place in the field of modern health due to its accessibility and therapeutic potential. This study focuses on the screening of medicinal plants traditionally used in the treatment of thyroid disorders based on ethnobotanical surveys in the steppe zone of the Tiaret region (Algeria) and on using the recent literature to complete an exhaustive list of plants known for their effects on normal functioning of the thyroid gland. Twelve species have been listed in the treatment of thyroid gland dysfunction: *Lycopus europaeus* (Lamiaceae) is widely recognized for its benefits against hyperthyroidism. *Ashwagandha* (*Withania somnifera*) is a Solanaceae which is part of the traditional pharmacopeia of Ayurveda in India and of thyroiditis in Algeria and other Mediterranean countries. *Fucus vesiculosus* is a marine brown alga, often used in thyroid herbal medicine because of its richness in iodine, as is also the case with species of the *Laminaria* genus (marine brown algae).

Commiphora myrrha, the African myrrh, is a tree in the family Burseraceae. It is one of the primary trees used in the production of myrrh, a resin made from dried tree sap. It is an essential oil used in the treatment of thyroidism. The Motherwort species, *Leonurus cardiaca* (Lamiaceae) is known for its effectiveness in the treatment of thyroid dysfunction. The almond bud (*Prunus dulcis*, Rosaceae), which begins to flower at the end of winter, is traditionally recognized for its benefits to the cardiovascular system and also affects the thyroid by stimulating its functioning. The rhodiola, *Rhodiola rosea*, *Sedum roseum* or *Sedum rhodiola*, of the Crassulaceae family, is characterized by its rose-like odor and its thick, fleshy leaves without petioles. In the context of hypothyroidism, extracts of this plant improve cognitive function, mood (often close to a depressive state) and motivation. *Bunium Bulbocastanum*, of the Apiaceae family, called Talghouda in Algeria or earth chestnut, is distinguished by the use of its tuberculous root in the form of a powder mixed with honey to treat thyroid conditions. *Avena sativa* oats (Poaceae) are a food that has many benefits for regulating the thyroid. Rich in amino acids, trace elements and iodine, it stimulates the thyroid gland to increase hormone production.

The Guggul species *Commiphora mukul* (Burseraceae) is a plant from Indian medicine with stimulating properties for hypothyroidism. Its active ingredients allow better metabolism of iodine. Black spruce (*Picea mariana*), from the conifer family, stimulates the adrenal glands involved in the proper functioning of the thyroid. Its use can be useful in combating fatigue. Ginger, *Zingiber officinalis* (Zingiberaceae) is also used in herbal medicine to treat thyroid abnormalities.

The use of herbal medicine is a common practice in Algerian society. However, the development of this treatment (not taking into account the administered dose to patients) could be favorable for treating the causative factors, but sometimes the development can take a dangerous turn by causing erythroderma.

Keywords: Ethnobotany, phytotherapy, medicinal plants, essential oils, thyroiditis.

PO11 - Physicochemical diagnosis of liquid discharges from three coastal hospitals in Oran City and potential health risks for humans and beach environment

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Hospitals consume an important volume of water a day, and generate multiple amounts of infectious and hazardous polluted discharge water to the drain. Discharge water is one of the main sources of groundwater and beach contamination if not treated efficiently.

Hospital waste management is a crucial environmental and public safety issue because the pollutants should be treated by the Wastewater treatment plant of each hospital before release to the municipal drainage.

This study aims at presenting the primary results on characterization of hospital wastewaters in three hospitals in Oran city – Algeria. Hospitals were selected for this study ranging from 1.622 to 320 beds per hospital, none of them have a wastewater treatment plant, and the wastewater is rejected untreated to the sewage. This addition of polluted wastewater will increase the load to the marine water in the beach of the city and reduce the efficiency of treatment processes leading to hazardous pollution in the future. Analysis of the concentration of biochemical oxygen demand, chemical oxygen demand, total suspended solids, sulfate, nitrate, nitrite, ammonia, chlorides, and oils and grease were made during the period 2023-20234. The study showed an increase in the concentration of pollutants which is higher than the European and Algerian standards of wastewaters.

We recommend that the Algerian government introduces environmental legislation in which each hospital should have an effective wastewater treatment unit, thus protecting the marine ecosystems and groundwater.

Keywords: Hospital wastewater, hazardous chemical pollutants, diagnosis, Oran, Algeria.

**P012 - The probable risks of rheumatoid arthritis pathology in western Algeria:
Diagnosis and analyzes of 199 patients at the regional university military hospital of Oran**

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Rheumatoid arthritis is a chronic inflammatory disease primarily attacking synovial joints, leading to joint damage, physical disability and premature mortality. It affects the peripheral joints of the limbs bilaterally and symmetrically: hands, wrists, feet and ankles. These become painful, swollen, inflamed and gradually stiff and deformed following flare-ups or as a single joint.

Our analytical study was carried out in the immunology laboratory of the Regional Military University Hospital of Oran during the period March - June 2021, by examining 199 patients affected by autoimmune pathology. The results of this study are based on the analysis of immunological data using antinuclear and anti-citrullin peptide autoantibodies in order to assess their value in the diagnosis. Antinuclear antibodies were searched for by the indirect immunofluorescence technique on Hep-2, Immuno dot (ENA/DOT) for the detection of soluble antinuclear antibodies (anti-Sm, anti-RNP, anti-SSA, and anti-SSB), indirect immunofluorescence on *Crithidia luciliae* for the detection of anti-DNA. The assay of anti-Cyclic Citrullinated Peptide (anti-CCP) antibodies was carried out by the indirect ELISA technique.

Antinuclear antibodies react with various components of the cell nucleus. Their detection is based on a cascade approach, as all Antinuclear antibodies tests start with indirect immunofluorescence screening, which is a key technique for autoantibody screening because it allows the detection of most antibodies useful for diagnosis, prognosis and monitoring of organ-specific or non-specific autoimmune diseases. The indirect immunofluorescence currently remains the screening technique for most autoantibodies. The observed fluorescence images provide initial information on the identity of the target.

Our results from the ELISA test demonstrate that only 7/12 patients have positive values which confirms the diagnosis of Rheumatoid Arthritis, this can be explained by the presence of anti-cyclic citrullinated peptide (anti-CCP) antibodies, which are directed against citrullinated isoforms of certain epitopes of filaggrin. Their presence is correlated with the degree of activity of the disease and the development of erosions. The remaining 2 patients present doubtful values and 6 are negative, which means that the latter are not affected by Rheumatoid Arthritis. This implies the possible presence of another disease or anti-CCPs are not specific.

It is known from numerous investigations into autoimmune pathology of rheumatoid arthritis around the world affecting both men and women, with a large women predominance. In the examined patients with rheumatoid arthritis, 90% are women with a sex ratio of 9 women/1 man.

Keywords: Antinuclear antibody, Immunofluorescence, Immunodot, rheumatoid arthritis, anti-cyclic citrullinated peptide antibodies, Oran, Algeria