

INTERNATIONAL CONGRESS ON
THE VALORIZATION AND CONSERVATION OF ARID ECOSYSTEMS
NOVEMBER 25-27, 2025
GHARDAIA, ALGERIA



Congress Book of Abstracts





INTERNATIONAL CONGRESS ON
**THE VALORIZATION AND CONSERVATION
OF ARID ECOSYSTEMS**

NOVEMBER 25-27, 2025
GHARDAIA, ALGERIA

Table of contents

About ICVCAE 2025.....	01
Speakers.....	02
Floristic biodiversity.....	03
ORAL PRESENTATION.....	04
POSTER PRESENTATION.....	12
Faunistic biodiversity.....	60
ORAL PRESENTATION	61
POSTER PRESENTATION.....	68
Microbial ecosystems.....	109
ORAL PRESENTATION.....	110
POSTER PRESENTATION.....	120
Agrosystem functioning.....	151
ORAL PRESENTATION.....	152
POSTER PRESENTATION.....	160
Others.....	207
ICVCAE 2025 final photo.....	217

Sponserd by



About ICVCAE 2025

Arid ecosystems are facing major challenges caused by climate change, environmental degradation and excessive exploitation of resources, which are affecting the biodiversity and sustainability of these systems. In spite of being fragile, these environments have economic and ecological potential that can be exploited through innovative and sustainable strategies.

The ICVCAE 2025 congress aims to discuss ways of preserving arid ecosystems and developing their resources through a multidisciplinary approach encompassing environmental sciences, sustainable agriculture and the green economy. It also seeks to strengthen scientific research and international cooperation, propose concrete solutions to mitigate the effects of environmental degradation, enhance the value of arid ecosystems, and promote sustainable development based on the responsible use of resources.

Among the speakers



**Prof. Sherif
SAEED EBADA**
Egypt



**Prof. Sergio Giorgio
Antonio RASMANN**
Switzerland



Prof. Messaoud CHOKRI
Tunisia



Prof. Noria SAADOUN
Algeria



**Prof. Jose
NAVARRO PEDREÑO**
Spain

TOPIC

ORAL PRESENTATION

**FLORISTIC
BIODIVERSITY**

Valorization of Saharan Knowledge in Sustainable Bioproducts for the Agroecological Protection of Arid Ecosystems

Amel HEROUINI^{1,2**}, Rekia CHERIF^{1,2}, Zakaria TAIBAOUI³, Ahmed AITOU DIA², Abdellah KEMASSI⁴

¹ Laboratoire de Valorisation et Conservation des Ecosystèmes Arides (LVCEA), Faculté des Sciences de la Nature et de la Vie et Sciences de la Terre, Université de Ghardaïa, B.P. 455, 14 Ghardaïa, Algeria

² Faculté des Sciences de la Nature et de la Vie et Sciences de la Terre, Université de Ghardaïa, B.P. 455, 14 Ghardaïa, Algeria

³ Laboratoire de Mathématiques et Sciences Appliquées, Université de Ghardaïa, BP 455 Ghardaïa- Algeria

⁴ Laboratoire de Protection des Ecosystèmes en Zones Arides et Semi-arides, Université KasdiMerbah-Ouargla, BP 511 Ouargla-Algérie

**Corresponding author e-mail: amherouini@gmail.com

ABSTRACT.

Arid ecosystems contain an exceptional and important reservoir of spontaneous Saharan flora with considerable ethnopharmacological and agroecological value. Basing our work on ethnobotanical studies and laboratory experiments carried out in the Ghardaïa region (northern Sahara, Algeria), we have inventoried medicinal species with hypotensive, hypoglycaemic and biocidal properties, and assessed them as culturally appropriate and affordable alternatives for healthcare and agricultural protection. According to the local pharmacopoeia, there are 39 species used to treat hypertension, including 17 that grow spontaneously (43.6%); preparations are dominated by infusions (39.39%) and decoctions (27.27%). The species being targeted include *Citrullus colocynthis* Schrad, *Cleome arabica* L., *Capparis spinosa* L., *Datura stramonium* L., *Euphorbia guyoniana* Boiss. & Reut., *Pergularia tomentosa* L., and *Peganum harmala* L., which have morphological and metabolic adaptations to hyperaridity (thick cuticles, concentrated secondary metabolites). Bio-assays were carried out in vitro and in vivo and revealed significant insecticidal and anti-appetent activities, particularly against stored product and agricultural pests such as *Tribolium castaneum* Herbst and the locust *Schistocerca gregaria* (FORSKÅL, 1775), as well as allelopathic effects inhibiting plant weed germination. These results support the development of phytomedicinal treatments (antihypertensives, hypoglycaemic agents, urinary infection treatments) and plant-based pesticides as sustainable indigenous alternatives. We describe the following research pathways: green encapsulation to stabilise active fractions, standardisation and safety analysis (particularly for taxa containing tropanes and ß-carbolines), incorporation into integrated pest management (IPM) for smallholder farmers, and creation of regional biobanks of genetic material and extracts. Exploiting of indigenous plants in the Sahara can improve public health and food security and contribute to biodiversity conservation in arid environments.

Keywords: Arid ecosystems, Agroecological, Spontaneous plants, Ethnobotany, , Biocidal activity, Northern Sahara,

Potential Functional Resilience to Drought Stress of Purslane as a Wild Edible Species.

Yasmina ARFA^{1,2**}, Soumia HADIADJ²

¹ Saharan Bioresources, Preservation and Valorisation Laboratory, KASDI Merbah University, Ouargla Algeria

² Protection of Ecosystems in Arid and Semi-Arid Zones Laboratory, KASDI Merbah University, Ouargla Algeria.

**Corresponding author e-mail: jasminarf@gmail.com

ABSTRACT:

Often referred to as a weed, Purslane (*Portulaca oleracea* L.), an annual succulent species growing all over the world, with long history of medicinal and culinary uses, it also demonstrates remarkable viability as a component of biodiversity, particularly in extreme environmental conditions. Its ability to thrive in habitats subject to drought, high salinity, and high temperatures is underpinned by a suite of sophisticated adaptation systems. These traits not only make it a successful cosmopolitan weed but also a promising crop for agriculture in marginal lands, sometimes referred to as a "future power food". People in the southern regions of Algeria are familiar with and appreciative of *P. oleracea*, where they grow it in the harsh Saharan climate mainly for culinary uses. By simulating the dry environment, this study aims at determining how drought stress affects the seed germination of two local ecotypes where one of them is of spontaneous origin and the other is cultivated. Different water potential of PEG 6000 solutions (From -0.25 to -1.98Mpa) were used to germinate seeds on petri dishes at 25 °C. The findings showed that germination was moderately affected by medium to high drought intensity, for both ecotypes with one ecotype outperforming the other in terms of tolerance and germination rates. These results highlight *P. oleracea*'s potential as important biodiversity element and useful food source in areas with harsh environmental conditions, especially those impacted by drought, which is a major challenge to food availability and security. More investigations are required.

Keywords: *Portulaca oleracea* L., Drought stress, Germination, Human nutrition, Future food, Biodiversity.

Mobile Application For Promoting The Safe Use Of Medicinal Plants In Algeria.

Nafissa BELKESSAM ^{1**}, Sarah TABOURI ¹, Asmaa DRICI ¹, Amel SAYAH ¹

¹ Sidi Bel Abbes University, Faculty of Medicine, Department of Pharmacy, Sidi Bel Abbes, Algeria.

^{**} Corresponding author e-mail: nbelkessam11@gmail.com

ABSTRACT:

Algeria's plant heritage embodies an exceptionally rich botanical diversity, reflecting the wide range of ecosystems that characterize its territory. From the vast desert expanses of the Sahara to the lush forests of the Atlas Mountains, and from semi-arid regions to verdant oases, Algeria is home to a multitude of unique and endemic plant species.

Historically, Algerians have used these plants to treat a variety of ailments and diseases, often due to their accessibility and relatively low cost compared to pharmaceutical drugs. Despite the benefits associated with the informal use of medicinal plants, this practice also carries certain risks—such as overuse or misidentification of species—which may lead to adverse effects or reduced treatment efficacy. Moreover, the oral transmission of traditional knowledge can result in its gradual loss, particularly with increasing urbanization and the adoption of modern lifestyles.

The online marketing of medicinal plants without considering users' individual health profiles and with limited product information raises legitimate concerns regarding their safety and effectiveness.

Although the current market does not yet offer mobile applications specifically designed to provide comprehensive information on the use of medicinal plants in Algeria, this gap represents a valuable opportunity for innovation.

Fyta Pharm is an innovative digital platform designed to democratize access to knowledge about medicinal plants in Algeria. The application provides personalized recommendations based on each user's health profile, ensuring the safe and effective use of herbal remedies. Furthermore, Nebtha offers a reliable online marketplace for high-quality medicinal plants, ensuring transparent and trustworthy sourcing for all users.

Keywords: Mobile Application, Fyta Pharm, Nebtha, Innovation, High-quality, Medicinal Plants

Seeds of resilience: agrobiodiversity and ecological knowledge in Algerian Saharan ecosystems

Mériem MARFOUA ^{1,2**}, Elise BUISSON ³

¹ Department of Agricultural Sciences, Faculty of Sciences, Amar TELIDJI University, PO BOX 37G, Laghouat 03000 – Algeria.

² Mechanics Laboratory, Team: Environment and Natural Resources (ERN), TELIDJI Amar University, PO BOX 37G, Laghouat 03000 – Algeria.

³ Mediterranean Institute of Biodiversity and Ecology (IMBE), Avignon University, CNRS, IRD, Aix Marseille University, Avignon, France.

^{**} Corresponding author e-mail: m.marfoua@lagh-univ.dz

ABSTRACT:

Agrobiodiversity is a cornerstone of food security, particularly in arid and semi-arid regions where climate change poses serious threats to agricultural production systems. This presentation explores farmers' strategies for the co-management of plant resources across several Algerian agro-pastoral areas and integrates findings from an ecological study of the Saharan ecosystem. The research adopted a participatory approach combining field surveys, semi-structured interviews with 120 farmers, floristic inventories, and controlled laboratory experiments. In the field (31°38'49"N–32°25'24"N; 4°17'11"E–5°23'27"E), seed samples were collected from natural grazing environments *Ergs*, *Hamadas*, *Regs*, and depressions such as *Dayas*, *Oueds*, *Sebkhas*, and *Chotts* to build a herbarium and an illustrated reference of native seeds. Results show that spontaneous plants of the Algerian Sahara provide essential pasture, food, and medicinal resources, yet face multiple environmental stresses. Only strictly native species can withstand prolonged drought by remaining dormant as seeds, and their regeneration after intense anthropogenic disturbance remains a major conservation challenge. We inventoried and described 57 seed species from both natural and disturbed habitats, producing a Descriptive Atlas of the Seeds of Saharan Rangelands (Ouargla Region), richly illustrated with more than 150 photographs and detailed taxonomic–morphological diagrams. Meanwhile, local farmers and herders maintain traditional practices such as seed selection and conservation, collective management of steppe rangelands, and the valorization of spontaneous plants, all of which sustain unique genetic diversity and enhance food-system resilience. Integrating this traditional ecological knowledge with the eco-physiological data obtained provides a solid foundation for ecological restoration initiatives and for safeguarding sustainable plant production in these fragile environments.

Keywords: Saharan rangelands, native seeds, traditional ecological knowledge, ecological restoration.

Phytochemical diversity across space and time

Sergio Rasmann^{1**}

¹*Institute of Biology, University of Neuchâtel, Rue Emile-Argand 11, 2000 Neuchâtel,*

^{**}Corresponding author e-mail : sergio.rasmann@unine.ch

ABSTRACT:

Understanding how biodiversity is generated, maintained, and altered across environmental gradients is a central challenge in ecology. While functional trait approaches have advanced our ability to quantify plant ecological strategies, they often overlook the underlying metabolomic diversity that directly mediates plant–environment interactions. This presentation explores how plant phytochemical diversity varies across space and time, and how it contributes to ecological processes from individual physiology to community-level dynamics. Using elevation gradients in the Swiss Alps as a model system, we demonstrate that plant metabolomes shift consistently with environmental conditions, revealing distinct growth–defense strategies across species and elevations. In Cardamine species, chemical defense profiles converge along elevation stages and correlate with plant functional traits, while glucosinolate diversity is shaped more by environment than phylogeny. These metabolomic changes translate into ecological consequences: alpine plants exhibit reduced resistance to generalist herbivores. At the community scale, phytochemical diversity shows strong phylogenetic structure and clear biogeographic patterns, with high chemical diversity at low to mid elevations and increased chemical endemism in alpine communities. Expanding beyond alpine systems, analyses along sub-Saharan aridity gradients reveal similarly rapid metabolomic shifts associated with environmental stress, highlighting the generality of these patterns. Together, these findings argue for integrating metabolomics into the functional trait framework, enabling the mapping of phytochemical landscapes and a more mechanistic understanding of biodiversity loss, plant–animal interactions, and ecosystem functioning. This work demonstrates how chemical ecology can inform conservation strategies and address pressing environmental challenges.

Keywords: ecology, plant–environment, metabolomics, environmental challenges.

Contribution to Multi-Taxonomic Biodiversity Assessment of Steppe Dayas in the Laghouat Region under Desertification.

Farida BOULAGHMEN^{1**}, Zohra BABAAMER², Abdel Illah CHIKHAOU³, Faïza BOULAGHMEN

¹ *Structures et Rehabilitation and Materials Laboratory (SREML), Civil Engineering Department, University of Amar Telidji, Laghouat, Algeria.*

² *Ghardaïa University, Faculty of Natural and Life Sciences and Earth Sciences, Department of biology, Ghardaïa, Algeria.*

³ *Laboratory Management and Valorization of Agricultura & Aquatic Ecosystem (LMVAAE), Morsli Abdallah Tipaza University Center, Oued Merzoug 42000. Algeria.*

^{**}Corresponding author e-mail: f.boulaghmen@lagh-univ.dz

ABSTRACT:

The Algerian steppes are currently experiencing a marked ecological and climatic imbalance, resulting from the intensive degradation of this fragile ecosystem under the combined effects of sand encroachment, Wind erosion, overgrazing, land clearance and Stalinization, processes which accentuate the phenomenon of desertification. In response to this environmental issue, this study aims to characterize the biodiversity of dayas ecosystems in the Wilaya of Laghouat, temporary wetlands playing a crucial ecological role in arid regions. The methodological approach adopted is based on a descriptive and multidimensional Framework integrating several environmental parameters, supplemented by systematic inventories of flora, fauna and soil fauna. Field data collection was conducted at four representative Dayas located in the south-eastern and south-western areas of the regions; Dayet El Noss, Dayet Lihoudi, Dayet Ezgoug and Dayaet El Ma. The biodiversity analysis relies on the exhaustive census and enumeration of species present at each site, thus enabling the establishment of specific taxonomic inventories for each daya studied. This characterization constitutes an important contribution to the knowledge of the biodiversity of these threatened steppe ecosystems and provides essential Baseline data for the implementation of conservation strategies and sustainable management of these natural environments particularly vulnerable to environmental changes.

Keywords: Biodiversity, Conservation, Dayas, Desertification, Laghouat.

Biotechnological valorization of henna *Lawsonia inermis*

Fahima OUTTAR^{1**}, Djillali MAHDJOUBI²

¹ Saharan Higher School of Agriculture. Adrar

² Nutrition, Biodiversity and Environment Laboratory. Medea, Algeria. NUBE

^{**}Corresponding author e-mail: outtarfahima@gmail.com

ABSTRACT:

The flora Henna "*Lawsonia inermis*" is a medicinal plant of the Lythraceae family. This plant has been used in the field of medicine, cosmetics and biological control. It is in this context that we were interested in carrying out a phytochemical study by evaluating some biological activities of the aqueous extract and the cream prepared from its leaves. This present study aims to know the composition of secondary metabolites. It is carried out either on the powder of the ground material or on an infusion. The healing activity consists of the application of the product to be tested (the powder of the leaves mixed with pure petroleum jelly) on previously provoked wounds. The applications are made daily for 15 days. A comparison of different scars was carried out taking into account the depth of the wound, the presence and the thickness of the scab. The insecticidal activity is made from the aqueous extract prepared previously, three doses were prepared. The control group was treated with distilled water. Insect mortality and survival rates were assessed after treatment. A phytochemical study of *L. inermis* leaves revealed the presence of flavonoids, mucilages, free quinones, tannins, anthocyanins, and alkaloids. The healing activity of the cream prepared from *L. inermis* leaves showed that wounds treated with *L. inermis* cream exhibited better healing compared to those treated with Madecassol. The insecticidal activity of different concentrations of the aqueous extract of *L. inermis* leaves on *Sitophilus oryzae* individuals showed that all doses provided varying degrees of efficacy.

Keywords: *Lawsonia inermis*, Phytochemical study, Healing activity, insecticidal activity.

POSTER PRESENTATION

Investigation of allelopathic activity in *Atriplex canescens* metabolites against the growth of a cereal weed *Hordeum murinum* associated with *Triticum durum*

HOUYOU Zohra ^{1,2**}; BOUMEDIENNE Med Abdelmadjid ³; BENSOUILAH Sofyane ³; GHOUGALY Faycel ³; YUCEFI Mostafa ³

¹ Department of Agronomy – University of Laghouat

² Mechanics Laboratory, Desertification and Climate Team – University of Laghouat

³ Faculty of Science, University of Laghouat

**Corresponding author e-mail: z.houyou@lagh-univ.dz

ABSTRACT:

The presence of weeds in a cereal field is harmful from an agronomic and economic point of view. The discovery of a natural herbicide can reduce the harmful environmental impacts. With the aim of finding natural plant-derived products that may have herbicidal activity, we selected the plant species *Atriplex canescens* to test its allelopathic potential on the growth and physiological behavior of seedlings of the cereal weed *Hordeum murinum*, and also on durum wheat (*Triticum durum*). Chemical characterization of *A. canescens* revealed that it synthesizes flavonoids, terpenoids, and alkaloids. These molecular groups were extracted from the aerial parts of the plant *Atriplex*. Subsequently, aqueous extracts were prepared from these molecular groups at respective concentrations of 6.10⁻⁴ (g/l), 9.10⁻⁴ (g/l), and a control at 0 (g/l). After germination of the target plant seeds, the seedlings were transplanted into peat and watered for 15 days with these extracts at ambient temperature (22-25 °C). At the end of this period, the lengths of the stems and roots of *H. murinum* and *T. durum* were measured. Chlorophyll and proline levels were also measured in the fresh leaves of both plants. The results primarily showed that the flavonoids extract stimulates the chlorophyll activity of *T. durum* wheat, with the growth of its roots. Furthermore, the terpenoids extracts and the alkaloid extract at a concentration of 9.10⁻⁴ g/l caused an accumulation of proline, inducing stress in *H. murinum*. Our results are promising in the field of biological control against this cereal weed.

Keywords: *Atriplex canescens*, *Hordeum murinum*, *Triticum durum*, Alkaloids, Flavonoids, Triterpenoids, allelopathy.

Physicochemical study and biological properties of the essential oil of *Deverra scoparia* Coss. & Dur. from a region of the Northern Algerian Sahara (Ghardaïa).

Ouarda BELABBASSI^{1**}, Soumia LACHEHEB¹, Djoumana SLIMI¹, Aicha Zerbani¹, Khaoutar BEN MESSAOUD¹, Amel BEHISSA¹.

¹Ghardaia University, Faculty of Natural and Life Science sand Earth Sciences, Department of biology, Ghardaia, Algeria.

**Corresponding author e-mail: o.belabbassi@gmail.com

ABSTRACT:

In order to promote Saharan medicinal plants and highlight their beneficial effects on health, linked to their richness in therapeutic compounds, a physicochemical and biological study was carried out on the essential oil of *Deverra scoparia* Coss. & Dur., a species native to the Sahara of Ghardaïa (Algeria). In this context, the essential oil, extracted by hydrodistillation of the aerial parts of the plant, has been the subject of characterization of some physicochemical properties and the identification of certain biological activities. A yield of 0.48% was obtained after hydrodistillation of *Deverra scoparia*, this oil was of strong and characteristic odor. The physicochemical analysis of the plant's essential oil indicates that it has a slightly acidic nature (pH = 5), a relative density of 0.905, a refractive index of 1.3, and is miscible with ethanol at a ratio of 5.3 mL per 1 volume. The antioxidant activity of this essential oil proven to be particularly exceptional estimated by the total antioxidant capacity, the DPPH free radical scavenging test and the β -carotene bleaching test gave significantly important values respectively of 547.16 $\pm$ 7.5 μ g EAA/mg DM; IC₅₀=75.23 $\pm$ 0.87 μ g/mL; 30.09 $\pm$ 2.5% inhibition compared to the ascorbic acid standard. *D. scoparia* essential oil has proven to be a valuable plant resource of interesting bioactive compounds, offering considerable potential for the development of new natural products.

Keywords: Antioxidant activity, *Deverra scoparia* Coss. & Dur., Essential oil, Ghardaïa, Physicochemical parameters, Northern Sahara.

Evaluation of the antidiabetic activity of aqueous extracts of *Marrubium deserti* de Noé harvested in the Ghardai and Laghouat regions

Bachir BENSALAH**

Ghardaia University, Faculty of Natural and Life Science sand Earth Sciences, Department of biology, Ghardaia, Algeria.

**Corresponding author e-mail: biobachir@gmail.com

ABSTRACT:

This study examined the antidiabetic activity of aqueous extracts of *Marrubium deserti* de Noé collected in two different regions of Algeria: Ghardaia and Laghouat. These regions have different climatic and environmental conditions, which can change the chemical composition of the plant and therefore its biological effects. The analyzed extracts include infusions and decoctions. Their antidiabetic potential was evaluated based on their ability to inhibit the enzyme (α -amylase), an essential enzyme involved in carbohydrate hydrolysis. Inhibition of this enzyme is a widely studied therapeutic approach for the regulation of postprandial hyperglycemia in diabetic patients. The results obtained reveal that the inhibitory activity of *Marrubium deserti* extracts varies depending on the collection region. For extracts from the Ghardaia region, the IC₅₀ values of the infusions and decoctions are 1.731 mg/mL and 1.251 mg/mL, respectively. These values are significantly higher than that of the reference inhibitor, Acarbose, whose IC₅₀ is 0.083 mg/mL, thus indicating a relatively low inhibitory activity of *M. deserti* extracts from this region. In contrast, extracts from the Laghouat region show a significantly more marked enzymatic inhibition, with IC₅₀ values of 0.042 mg/mL for the decoction and 0.420 mg/mL for the infusion. Notably, the *M. deserti* decoction from Laghouat displays a significantly higher inhibitory activity than that of Acarbose, highlighting its potential as a natural antidiabetic agent. These observations suggest that *M. deserti* extracts, particularly those collected in the Laghouat region, could be a promising alternative for the management of diabetes. Furthermore, the variation in inhibitory activity between the two regions highlights the influence of ecological conditions on the bioactive properties of medicinal plants.

Keywords: *Marrubium deserti* de Noé, Decoction, Infusion, Antidiabetic activity, Ghardaia, Laghouat

Impact of Plant Diversity Loss on Ecosystem Functioning (North-Eastern Algeria)

Amina AMAMRA ^{1**}, Amel BOUKHATEM ², Hamza BOUCHAHED ³, Abd raouf BENSLAMA ⁴, Mohamed BENSLAMA ⁵

¹Badji-Mokhtar Annaba University, Faculty of Science, Department of Biology, Laboratory of Soils and Sustainable Development Algeria.

²Chadli Ben Idid El taref University, Faculty of Science, Department of Biology, Algeria.

³Badji-Mokhtar Annaba University, Faculty of Science, Department of Hydraulic, Laboratory of Soils and Hydraulic, Algeria.

⁴ University of Ghardaia, Department of biology , Algeria.

⁵ Badji-Mokhtar Annaba University, Faculty of Science, Department of Biology, Laboratory of Soils and Sustainable Development Algeria.

**Corresponding author e-mail: amina.amamra@univ-annaba.dz

ABSTRACT:

Biodiversity is a key component for ecosystem stability and the continuity of ecosystem services, yet natural and anthropogenic pressures contribute to its gradual loss, raising concerns about its implications for ecological functioning. This study aims to evaluate the impact of the loss of plant species and functional groups on ecosystem processes, within the framework of a long-term experiment conducted on thirty Swedish islands, regarded as a unique model worldwide. Researchers progressively removed various species and functional groups, and collected data for over twenty years using multiple indicators focusing on vegetation, soils, and ecosystem services. The results revealed that reduced plant diversity is strongly associated with a significant decline in ecosystem efficiency, particularly in nutrient cycling, soil productivity, and the balance of ecological services. They also showed that more diverse ecosystems are more resilient to natural disturbances compared to less diverse ones. This long-term experiment highlights that conserving biodiversity is not merely an environmental option but a necessity to ensure the sustainability of the vital services upon which humanity depends.

Keywords: Biodiversity, Plants, Ecosystems, Environmental Sustainability.

Physicochemical characteristics of soils under healthy and dying *Phoenix dactylifera* stands in the Bresina palm grove in the Wilaya of El Bayadh (south-west Algeria).

Bouazza Khaldia^{1*}, ABDI Nourelhouda², TURKI Hakima², ZID Souad²

¹ Ibn Khaldoun University, Faculty of Natural and Life Science, Ecology, Biotechnology and Environment, Laboratory of Agrobiotechnology and Nutrition in Semi-Arid Zones, Tiaret, Algeria.

² Ibn Khaldoun University, Faculty of Natural and Life Sciences, Department of Ecology, Biotechnology and Environment.

**Corresponding author e-mail: khaldia.bouazza@univ-tiaret.dz

ABSTRACT:

The date palm has been one of the first plants cultivated by humans since ancient times. It is one of the oldest known angiosperms. This species is of great ecological and economic importance. Our study was carried out in the Brézina palm grove, located in the Wilaya of El Bayadh in south-west Algeria. This area marks the transition between the Saharan Atlas and the pre-Sahara region. This work aims to understand how edaphic factors influence the decline of date palms in two populations : healthy and declining. A total of 42 soil samples were collected using a soil auger at a depth of 20 cm under the two types of stand. Pedological analyses are carried out on each of the samples and the following are deduced: humidity; total and active limestone content; pH; electrical conductivity; organic matter; and soil texture. The results show that the soil in Brezina is sandy loam with slightly dry humidity. The pH level is alkaline and the electrical conductivity is high for both healthy and dying stands. The soil is very rich in organic matter (2–6%) and is not particularly calcareous. Searching for possible relationships between the decline of the date palm and various edaphic parameters reveals significant differences between these parameters and the phenomenon.

Keywords: *Phoenix dactylifera*, Dieback, Brezina, Soil physicochemical parameters.

Chemical Characterization by GC/MS of *Artemisia herba-Alba* Essential Oil from an Arid Region.

Zineb BOURAKNA^{1,2*}, Soumaya HACHANI³, Reguia OTMANI⁴, Fatiha ASSIA², Kada RIGHI²

¹ Faculty of Sciences, Agricultural Sciences Department, Laghouat University, Algeria.

² Biology Systems and Geomatics Laboratory, Faculty of Natural Sciences and Life, Agronomy Department, Mascara University, Algeria

³ Research Unit on Medicinal Plants (URPM, 3000, Laghouat), Biotechnology Research Center (CRBt, 2500, Constantine), Algeria.

⁴ Laboratoire des Mathématiques et des Sciences Appliquées, Université de Ghardaia B.P 455, Ghardaia 47000, Algérie.

**Corresponding author e-mail: zi.bourakna@lagh-univ.dz

ABSTRACT:

Essential oils include a wide range of highly aromatic plant oils. They are now the most widely used in the food, perfume, cosmetic, and pharmaceutical industries, as well as in medicine. The genus *Artemisia* is one of the medicinal plants due to the importance of its essential oil and extracts in these areas. Our work aims to evaluate the essential oil yield of the aerial part of the *Artemisia herba alba* species from the Laghouat region, as well as to analyze its chemical composition by gas chromatography/mass spectrometry (GC/MS). The yield of essential oil was $0.39 \pm 0.07\%$. A total of 47 compounds were identified. Among which the major constituents were Davanone and Eucalyptol with proportions were 22.03% and 20.99% respectively. The results obtained show that this essential oil of *Artemisia* genus is rich in oxygenated monoterpenes followed by oxygenated sesquiterpenes.

Keywords: *Artemisia herba alba*, essential oil, GC/MS, Chemical Composition, Laghouat

Phytochemical characterization of *Cistanche tinctoria* extracts from the Adrar region in southern Algeria.

KARDJA L, TEHAMI W, MLOUKI A, BOUCHAKOUR S, NANI A

Saharan Natural Resources Laboratory, University of Adrar

**Corresponding author e-mail: kar.lahcene@univ-adrar.edu.dz

ABSTRACT:

Phytochemical characterization of plants with pharmacological interest has significantly advanced in recent years. This progress has enabled the scientific validation of many medicinal properties that were previously considered empirical, particularly through advanced methods of bioactive compound extraction. In this context, our study focused on the phytochemical analysis of *Cistanche tinctoria* a parasitic plant endemic to the arid ecosystems of southern Algeria's Adrar region. The species plays a crucial ecological role in its habitat, contributing to biodiversity and local ecosystem functioning. Extraction of the bioactive compounds was performed by cold maceration using a mixture of polar solvents (methanol-acetone-water). Subsequently, fractionation was conducted using solvents of increasing polarity (chloroform, hexane, ethyl A, n-butanol). The various extracts obtained were subjected to quantitative determinations of phenolic compounds. These analyses revealed the total polyphenol contents of (23.70 ± 1.63 GAE mg /g DM) and flavonoid contents of (13.54 ± 1.41 CE mg /g DM). The antioxidant capacity evaluation showed an (IC50 value of 0.09 ± 0.06 mg/ml). These findings highlight the richness of phenolic compounds in *Cistanche tinctoria*, and its strong antioxidant potential. Given the ecological importance and the pharmacological promise of this species, our results support the implementation of both in situ and ex situ conservation strategies to ensure the sustainable use and preservation of this valuable plant within its fragile arid ecosystem.

Keywords: Pharmacological, *Cistanche tinctoria*, Bioactive compounds, Fractionation,Préservation.

Evaluation Of The In Vitro Antioxidant And Anti-Inflammatory Activities Of Methanolic *Rosmarinus Officinalis* L. Extracts Collected In Two Different Seasons.

Fatma Zohra GUIBADJ ^{1*}, Sarah BOUKHALKHAL ¹, Amar DJERIDANE ¹, Mohamed YOUSFI ¹.

¹ Ammar Telidji Laghouat University, Laboratory of Fundamental Sciences, University Amar Telidji Laghouat- Algérie.

**Corresponding author e-mail: fz.guibadj@lagh-univ.dz

ABSTRACT:

The study of medicinal plants occupies an important place in current scientific research, due to their richness in natural compounds beneficial for human health, particularly in the quest for new therapeutic agents. Current scientific research focuses on the evaluation of traditional remedies of plant origin, highlighting their richness in secondary metabolite compounds such as polyphenols, terpenoids, alkaloids... etc. In this study, we are interested in determining the antioxidant, anti-inflammatory activity of methanolic extracts of *Rosmarinus Officinalis* L. from two seasons. First, we prepared the extracts in a methanol-water solvent system (80%-20%), then we measured the total phenols and evaluated the antioxidant activity by DPPH test and anti-inflammatory by lip-oxygenase inhibition. The content of phenolic compounds varies from 71.33 0.71 to 694.21 8.70 mg EAG/ g MS. The antioxidant activity values range from 37.83 0.65 to 498.11 29.98 µg EAA/mg MS. 0.032 0.015 to 156.06 8.21 µg DK/ mg MS. These results show that rosemary is rich in phenolic compounds known for their antioxidant activity with remarkable anti-inflammatory activity, which encourages its exploitation in the agri-food industry.

Keywords: *Rosmarinus Officinalis* L.1, phenolic compounds 2, antioxidant activity 3, anti-inflammatory activity 4.

In Vitro Investigation of *Cistus Creticus L* and *Plantago Ciliata Desf* Phenolic Extracts as Natural Antioxidant and Anti-Inflammatory Agents

Hicham BOUAKKAZ ^{1,2*}, Amar DJERIDANE ¹, Reguia MAHFOUDI ^{1,2}, Fatima Zohra GUIBADJ ¹, Alaeddine KAOUKA ², Mohamed YOUSFI ¹

¹ Laboratory of Fundamental Sciences, Amar Telidji University, PB 37G, 03000 Laghouat, Algeria.

² Laboratory of Applied Sciences and Didactic, Higher Normal School, Laghouat, Algeria.

**Corresponding author e-mail: bkz.hicham@gmail.com

ABSTRACT:

Oxidative stress and chronic inflammation are key contributors to the pathogenesis of cancer, diabetes, and cardiovascular diseases, which has intensified the search for safe and effective natural therapeutics. This study evaluated the antioxidant and anti-inflammatory potential of *Cistus creticus* and *Plantago ciliata*, two medicinal plants traditionally used in North Africa. UHPLC-MS profiling revealed a richness in phenolic compounds, notably quinic acid and gallic acid, known for their strong bioactivity. Acetone extracts demonstrated potent radical scavenging capacity in DPPH and ABTS assays ($EC_{50} < 15 \mu\text{g/mL}$), showing antioxidant effects comparable to vitamin C. In terms of anti-inflammatory activity, the aqueous extract of *Cistus creticus* exhibited significant lipoxygenase inhibition ($IC_{50} = 14.2 \mu\text{g/mL}$), surpassing the standard drug diclofenac, while its acetone extract showed remarkable efficiency in stabilizing proteins against denaturation. The results highlight that the observed biological activities are closely associated with the presence of phenolic compounds and flavonoids, which play a crucial role in modulating oxidative stress and inflammatory pathways. Collectively, these findings provide scientific validation for the traditional use of *Cistus creticus* and *Plantago ciliata* and underline their potential as promising sources of antioxidant and anti-inflammatory agents, supporting their application in the prevention and management of diseases linked to oxidative damage and chronic inflammation.

Keywords: Antioxidant activity, Anti-inflammatory activity, Phenolic compound, Flavonoids, UHPLC-MS.

Immunomodulatory Potential of a Pectin-Like Extracted from *Plantago ciliata Desf*. Leaves: Evaluation of Anti-Complement Activity.

Noura ADDOUN ^{1*}, Zakaria BOUAL ^{2,3}, Cédric DELATTRE ^{4,5}, Toufik CHOUANA ², Christine GARDARIN ⁴, Pascal DUBES-SAY ⁴, Fatima BENAOUN ², Seddik ADDAOU ², Mohamed Didi OULD ELHADJ ², Philippe MICHAUD ⁴ and Guillaume PIERRE ⁴

¹Ghardaia University, Faculty of Natural and Life Science sand Earth Sciences, Department of biology, Ghardaia, Algeria.

²Laboratoire de Protection des Ecosystèmes en Zones Arides et Semi-Arides, Université Kasdi Merbah, Ouargla 30000, Algeria.

³Laboratoire de Biologie Médicales IBNROCHD, Rue Khemisti, Ghardaia 47000, Algeria.

⁴Université Clermont Auvergne, CNRS, SIGMA Clermont, Institut Pascal, F-63000 Clermont-Ferrand, France.

⁵Institut Universitaire de France (IUF), 1Rue Descartes, 75005 Paris, France.

**Corresponding author e-mail: Addoun.noura@univ-ghardaia.edu.dz

ABSTRACT:

Plantago ciliata, belonging to the Plantaginaceae family, is a well-known traditional medicinal plant commonly found in Ghardaia province (Northeastern Algerian Sahara). Hot aqueous extraction was used to isolate a water-soluble polysaccharide fraction from the leaves (PcPs-L), yielding approximately 4.60% (w/w). This fraction is mainly composed of 66.6% (by weight) of total carbohydrates and contains a high proportion of uronic acids at 24.0% by weight. Protein contamination is low, at 2.3% (w/w) and Phenolic compounds are present in negligible amounts, indicating a high level of purity. Fourier-transform infrared spectroscopy (FTIR) results suggest that PcPs-L fraction is likely to exhibit a pectin-like structure. Biologically, PcPs-L fraction showed notable in vitro human complement-fixing activity, exhibiting an IC_{50} value of $216.7 \mu\text{g/mL}$, which is considerably lower than that of sodium heparin, the positive control, with an IC_{50} of approximately $443 \mu\text{g/mL}$. These findings underscore the immunomodulatory potential of *Plantago ciliata* and support further investigation into its pharmaceutical and biomedical applications.

Keywords: *Plantago ciliata*, Water-soluble polysaccharide, Immunomodulatory potential, Anti-complement activity, Northeastern Algerian Sahara, Ghardaia province.

Assessment allelopathic activity of *Retama reatam* (Forssk.) Webb & Berthel in their natural habitat: case of M'sila region

Samah Nouioui^{1,2**}, Hafida Trabels^{1,2i}, Nasrine Salhi^{1,2}

¹ Ouargla University, Faculty of Natural and Life Sciences, Department of biology, Ouargla, Algeria.

² Laboratoire de Bio-Ressources Sahariennes : Préservation et valorisation. Ouargla, Algeria. "BRS

**Corresponding author e-mail: samahnouioui@gmail.com

ABSTRACT:

The stability of ecosystems and biodiversity is threatened by land degradation in dry regions, underscoring the need for innovative restoration techniques. *Retama raetam*, a crucial drought tolerant phanerophyte improves microhabitat conditions in arid environments, thereby facilitating plants development. This study explores the allelopathic role of this ecologically significant shrub within its native arid habitat, focusing on its function as a nurse plant and assessing its influence on vegetation structure and key microhabitat conditions, particularly soil moisture and salinity. To determine facilitative or inhibitory interactions between *R. raetam* and neighboring perennial species, the study evaluated two-stage approach a bio-germination assay and allelopathic tests. Results showed that *R. raetam* significantly enhancing soil moisture and reducing salinity, thereby promoting the germination and establishment of selected sympatric species. Positive facilitative effects were particularly evident with native perennials such as *Astragalus armatus* and *Anabasis articulata*, while competitive or inhibitory responses were noted with *Stipagrostis pungens*. Multivariate discriminant factor analysis confirmed the significant impact of *R. raetam* on local vegetation assemblages, underscoring its pivotal ecological function as a nurse shrub in arid ecosystems. These results offer new insights into the role of *R. raetam* in determining plant community composition and microhabitats conditions in arid environments. From a restoration and management perspective, it is essential to acknowledge both the beneficial effects of *R. raetam* and the potential risk of favoring invasive or undesirable species in order to preserve biodiversity and ecosystem resilience. This knowledge supports targeted strategies for restoring degraded arid landscapes while preserving ecological integrity.

Keywords: Allelopathy, *Retama raetam*, germination responses, arid land, biodiversity conservation, vegetation structure.

Floristic Diversity of Some Wwadis in the Northern Algerian Sahara: Case of the Ghardaia Region.

BEN SEMAOUNE Youcef^{1**}, SENOUSI Abdelhakim²

¹ Ghardaia University, Faculty of Natural and Life Sciences and Earth Sciences, Department of biology, Ghardaia, Algeria.

² Laboratory of Saharan Bio-Resources: Preservation and Valorization (BRS), Department of Agronomy, Faculty of Natural, Life, Earth and Universe Sciences, Kasdi Merbah University of Ouargla, 30000, Algeria

**Corresponding author e-mail: youcefbensem@yahoo.com

ABSTRACT:

The flora of the northern Sahara is relatively homogeneous; however, the influence of climatic conditions makes this region one of the richest areas of the Sahara. Indeed, 162 endemic species have been recorded in the northern Sahara. Wadi beds (dry river channels) support a vegetation cover that is richer than that of other desert habitats. Plant communities offering the most favorable conditions—namely adequate humidity and suitable soil quality—for the survival of spontaneous flora develop primarily on sandy or sandy–stony wadi beds. Floristic surveys covering an area of 100 m² were conducted at the Oued Eddrine station, located in the commune of Metlili, during the years 2016, 2017, 2019, 2022, and 2023. The results revealed significant floristic diversity, with 38 species recorded, belonging to 18 botanical families. Temporal fluctuations were observed in species richness according to the survey years and biological types. The mean vegetation cover was estimated at 47.27 m², while the relative frequency of species ranged from 83% for *Pergularia tomentosa* to 2.22% for *Retama retam*, *Moricandia arvensis*, and *Reseda villosa*. Species density varied from 70 individuals for *Cleome arabica* to a single individual for *Cymbopogon schoenanthus*. These variations are attributed to edaphic, climatic, and site-specific conditions. The disturbance index, estimated at 33.33%, indicates a moderate level of vegetation disturbance resulting from anthropogenic activities and livestock grazing.

Keywords: Vegetation; Floristic diversity; Oued Eddrine; Ghardaia region; Northern Sahara.

Invasive yet adaptive: Can *Gleditsia triacanthos* L. be a sustainable tool against desertification in Algeria?

GRANDI M.^{1,2,**} and HIRCHE A.^{2,*}

¹Blida University, Faculty of Natural and Life Sciences, Department of Biology,

P.O. Box 270, Soumâa Road, Blida 09000, Algeria.

²USTHB, Faculty of Biological Sciences, Laboratory of Plant Ecology and Environment.

Algiers, Algeria

****Corresponding author e-mail:** grandim6@gmail.com

ABSTRACT:

Climatic drought and desertification are major environmental challenges, transforming lands into degraded landscapes with poor vegetation and skeletal soils. Algeria's steppe ecosystems, particularly in the southwest, illustrate this decline due to prolonged aridity, rising temperatures, reduced rainfall, and increased soil salinity. These factors worsen land degradation and severely limit plant growth. Water availability is crucial for plant survival, governing physiological functions. Under water stress, plants activate adaptive metabolic and morphological mechanisms, often at the cost of inhibited growth, reduced photosynthesis, and lower biomass. Algeria's native species possess significant potential due to their adaptations to dry conditions, such as drought tolerance and salinity resistance. Yet, these resources remain underutilized in agriculture and research. Among them, *Gleditsia triacanthos* L., a North American tree introduced for fodder and windbreaks, shows remarkable drought resistance through rapid growth and dehydration tolerance mechanisms. However, these traits also make it potentially invasive, raising ecological concerns. This study aims to first evaluate the impact of water deficit on the physiology and growth of young *Gleditsia triacanthos*, and second, assess its invasive risks. A thorough understanding of its adaptation and ecological impact is essential before considering its use in rehabilitating Algeria's degraded arid and semi-arid regions.

Keywords: *Gleditsia triacanthos* L., Desertification, Water stress, Invasive potential, Arid land

Functional Trait Variability of *Ziziphus lotus* (L.) Desf. in the Pre-Saharan ecosystem (Selmana, Djelfa)

Nermine TAOURIRT^{1,**}, KDYEM Fazia², Rachda BERRACHED^{1,3}, Noria SAADOU¹, Sergio Rasmann⁴

¹ University of Mouloud Mammeri of Tizi-Ouzou, Faculty of Biological and Agronomic Sciences, Natural Resources Laboratory, Tizi-Ouzou, Algeria

² University of Mouloud Mammeri of Tizi-Ouzou, Faculty of Biological and Agronomic Sciences, Department of Ecology and Environment, Tizi-Ouzou, Algeria

³ University of Sciences and Technology Houari Boumediene, Faculty of Biological Sciences, Laboratory of Plant Ecology and Environment, Algiers, Algeria

⁴ University of Neuchâtel, Faculty of Science, Institute of Biology, Laboratory of Functional Ecology, Neuchâtel, Switzerland

****Corresponding author e-mail:** nermine.taourirt@ummto.dz

ABSTRACT:

Current climate change, marked by rising temperatures and decreasing rainfall, accelerates aridification in Mediterranean and Saharan transition zones, with major implications for vegetation functioning. Besides increasing aridity, local condition such as biotic and abiotic factors may significantly affect plants fitness. With this study, we aim to evaluate whether local conditions were more effective in shaping plants traits than the global bioclimate. *Ziziphus lotus* (L.) Desf., a drought-tolerant shrub widely distributed in the pre-Saharan ecosystem of Algeria, was selected as a model species to assess functional trait variability across three different populations, namely Dayat El Zerga, Dayat Oum Khechab and Oued El Khoua. For each population, six functional traits were measured: canopy width, plant height, leaf area, leaf thickness, Specific Leaf Area (SLA), and Leaf Dry Matter Content (LDMC). Descriptive statistics, analyses of variances with pairwise comparisons, and correlation matrix were performed to evaluate variability and trade-offs. Results revealed highly significant differences between populations for all traits ($p < 0.001$), particularly marked for SLA and leaf area. Correlation analyses highlighted consistent trade-offs among traits, reflecting coordinated strategies for resource use and water conservation. These confirm that local conditions such as microclimate and soil proprieties strongly influence the functional profile of *Z. lotus*, even though populations are located in the same lower-arid bioclimate. Our findings demonstrate the adaptive plasticity of *Z. lotus*, underlining its ecological role in soil stabilization and biodiversity maintenance, and emphasizing the relevance of functional traits as indicators of plant adaptation to local conditions in Mediterranean and Saharan ecosystems.

Keywords: *Ziziphus lotus*, Functional traits, Climate changes, Aridity, Algeria.

The efficacy of the deferred-grazing technique in restoring biodiversity in an area of the northern Sahara of Algeria.

BOUMAKHLEB Abdallah^{1**}, AYADA Slimane Ahmed Benmchih², KOUILI Aïcha³, MAZOUZ Massouda³, BOURAGBA Nacira³ and HEDROUG Merouan³.

¹ Centre de Recherche en Agropastoralisme (CRAPast). Djelfa, Alegria.

² Institut National de la Recherche Agronomique (INRAA). Adrar, Alegria.

³ Haut Commissariat au Développement de la Steppe (HCDS). Djelfa, Alegria.

^{**}Corresponding author e-mail: boumakhle1@gmail.com

ABSTRACT:

The rangelands of Algeria's arid regions are suffering from severe degradation due to poor management and overexploitation. The Algerian government has implemented development programs to restore these range-lands, with the HCDS responsible for carrying out these programs. Given their ecological and pastoral importance, we have attempted in this study to assess the floristic diversity in a deferred grazing area in an arid region of the northern Sahara named Deldoul southern of Algiers. Floristic surveys were carried out during two seasons, autumn and spring, to verify the impact of the deferred grazing technique on floristic diversity in this region. We recorded 28 species, divided into 19 genera and representing 11 families. The Shannon index results indicate that floristic diversity in autumn averages 2.89 bits. In spring, a value of 2.57 bits was recorded. As for the Simpson index, spring recorded a value of 0.17 bits and autumn recorded a value of 0.29.

Keywords: Deferred-grazing, floristic diversity, Sahara, Arid, HCDS.

BIOcidal effect of *D. stramonium* seed oil on L₅ larvae and adults of *S. gregaria*

Ahmed Ait Aoudia^{1**}, Faredj Chikhi², Abdelraouf Benslama³, Amel Herouini⁴, Zakaria Taibaoui⁵, Abdellah Kemassi⁶.

^{1,5,6}Research Laboratory for Mathematics and Applied Sciences, Faculty of Natural and Life Sciences and Earth Sciences, University of Ghardaia, PO Box 455 Ghardaia, Algeria.

^{2,3,4}Laboratory of Valuation and Conservation of Arid Ecosystems (LVCEA), Department of Biology, Faculty of Sciences Natural and Life, Earth and Universe Sciences, University of Ghardaia, BP455, 47000 Bounoura, Ghardaia, Algeria

⁶Research Laboratory for Ecosystem Protection in Arid and Semi-Arid Zones, Faculty of Natural and Life Sciences, Kasdi Merbah-Ouargla University, PO Box 511 Ouargla, Algeria.

Ghardaia University, Faculty of Natural and Life Science sand Earth Sciences, Department of biology, Ghardaia, Algeria.

Valorization And Conservation of Arid Ecosystems Laboratory. Ghardaia, Algeria. "VCAEL

^{**}Corresponding author e-mail: ahmedaitaoudia87@yahoo.com

ABSTRACT:

In the context of suggesting biological control of L5 larvae and adults of *S. gregaria* and preserving the ecosystem from pollution caused by chemical control, *D. stramonium* seed oil (a spontaneous plant from the Algerian Sahara) was tested on L5 larvae and adults of *S. gregaria*. The method of application of this vegetable oil consists of injecting a dose of *D. stramonium* seed oil into the insect's esophagus using a micropipette. Forced oral injection of a 60 µL dose of *D. stramonium* seed oil into L5 larvae of *S. gregaria* showed a 100% mortality rate after 7 days. Whereas, the imagoes treated with a dose of 120 µl of seed oil obtained a 100% mortality rate after 13 days. However, no mortality was observed in the L5 larvae and the control imagoes of *S. gregaria*. The L5 larvae of *S. gregaria* treated with *D. stramonium* seed oil experienced a blockage of exuvia phenomenon. The L5 larvae and imagoes of *S. gregaria* treated with *D. stramonium* seed oil recorded low values of consumption indices, which implies that this vegetable oil caused digestive disturbances in this locust. Other signs of poisoning were noted in the treated L5 larvae and imagoes of *S. gregaria* such as : weight loss, loss of appetite and decreased locomotion, and diarrhea and others.

Keywords: *Schistocerca gregaria*, Seed oil, *Datura stramonium*, Forced buccal injection, Mortality.

Tocopherol Isomer Profiles and Antiradical Activity of the Unsaponifiable Fractions from Invigor and Zitna Rapeseed (*Brassica Napus L*) Varieties Cultivated in Algeria

Nahla Djeribia ^{1**}, Madjda Benguechoua², Mohamed Yousfi³, Francesco Corrias⁴ and Alberto Angioni⁵

¹²³ Amar Thelidji university, Faculty of sciences, Department of Materials Science, fundamental science laboratory Laghouat, Algeria.

⁴⁵ University of Cagliari, Department of Life and Environmental Sciences, Cagliari, Italy.

^{**}Corresponding author e-mail: n.djeribia@lagh-univ.dz

ABSTRACT:

Oilseeds are a major source of vegetable oils for food, industrial and pharmaceutical use. Rich in fatty acids, phenolic compounds and fat-soluble vitamins, they play an important role in human nutrition and the prevention of various diseases. Among these compounds, tocopherols, have an antioxidant activity that is essential for oil stability and protection against oxidative stress. Rapeseed (*Brassica napus L.*) is one of the world's leading oilseed crops, and its cultivated interest in Algeria has prompted in-depth study of its bioactive compounds. This study aims to characterize individual compounds of the tocopherol family (α , β and γ) as well as to evaluate the free radical scavenging activity unsaponifiable fractions extracted from two varieties of rapeseed (*Brassica napus L.*), Invigor and Zitna grown in Algeria. The unsaponifiable fractions were isolated from simple lipids by reflux saponification with a 1 N KOH solution. tocopherol identification and quantification were carried out by high-performance liquid chromatography. Anti-free radical activity was assessed using the DPPH free radical method. Analyses showed levels of 77.09, 13.91 and 44.19 mg/kg (α , β , γ) in Invigor, and 34.57, 29.11 and 87.67 mg/kg in Zitna. In both varieties, β - and γ -tocopherol are in the majority, and for antiradical activity we recorded values of 136.97 ± 10.63 and 565.62 ± 7.99 μ g VEEAC /g UF in invigor and zitna respectively. Oil extracted from rapeseed grown in Algeria is rich in β - and γ -tocopherols, the two forms of vitamin E known for their strong anti-free radical activity, thus contributing to the oil's oxidative stability.

Keywords: Rapeseed, Tocopherols, antiradical activity, Zitna, Invigor.

Silver Nanoparticles from Algerian Sahara Plant Polysaccharides: Biosynthesis and Antimicrobial Potential.

Ghania BOUZIANE ^{1**}, Abdellah HENNI ¹, M.'hamed BOURICHA ¹, Hakim BELKHALFA ², Mohamed Didi OULD EL HADJ ¹

¹ University of Kasdi Merbah Ouargla. Faculty of Natural and Life Sciences, Department of Biological Sciences, Ouargla, Algeria.

² Scientific and Technical Research Center in Physicochemical Analysis, Tipaza, Algeria. (CRAPC)

^{**}Corresponding author e-mail: bouziiane.ghanialh@gmail.com

ABSTRACT:

Astragalus gombiformis Pamel is an endemic species of the Algerian Sahara, belonging to the Fabaceae family, which is found in arid and semi-arid areas. Plants in these areas typically synthesize a large number of metabolites to adapt to drought stress, making them a promising source of active molecules. In this study, silver nanoparticles (AgNPs) were biosynthesized using polysaccharides extracted from the seeds of *A. gombiformis*. The antimicrobial activity of AgNPs was evaluated by the disc diffusion method against nine pathogenic microorganisms, including *Candida albicans* ATCC10237, four Gram-positive bacteria (*Bacillus subtilis* ATCC6633, *Listeria monocytogenes* ATCC13932, *Staphylococcus aureus* ATCC25923, *Micrococcus luteus* ATCC9314), and four Gram-negative bacteria (*Escherichia coli* ATCC25922, *Klebsiella pneumoniae* ATCC70603, *Salmonella enterica* ATCC6017, *Pseudomonas aeruginosa* ATCC27853). The results demonstrated that AgNPs possessed antimicrobial activity against all tested pathogenic microorganisms. The lowest inhibitory zone (6 ± 0.0 mm at [AgNPs] = 0.1 mg/ml) and the highest inhibitory zone (13 ± 0.0 mm at [AgNPs] = 0.75 and 0.5 mg/ml) were observed in *S. enterica*. Moreover, the inhibition zone diameters increased proportionally with the concentration of AgNPs, indicating a dose-dependent antimicrobial potential. These findings point out the value of Sahara plant polysaccharides as renewable bioresources for the sustainable and eco-friendly synthesis of nanomaterials with promising biomedical, pharmaceutical, and industrial applications.

Keywords: *Astragalus gombiformis*, Endemic, Algerian Sahara, Polysaccharides, Nanoparticles, Antimicrobial.

Evaluation of the Antioxidant Potential of Water-Soluble Polysaccharides from *Balanites aegyptiaca* Del. Fruits Collected in the Algerian Sahara

Malika SEDDIKI^{1,2**}, Ahmed MESSAI MOHAMMED^{3,4}, Mohammed Didi OULD EL HADJ¹

1. Laboratory for the Protection of Ecosystems in Arid and Semi-Arid Zones, Faculty of Natural and Life Sciences, University of Ouargla, Ouargla 30000, Algeria

2. Department of Biological Sciences, Faculty of Natural and Life Sciences and Earth Sciences, University of Ghardaïa, Scientific Zone, Metlili, Ghardaïa, BP 455, 47000, Algeria

3. Scientific and Technical Research Center for Physico-Chemical Analyses (CRAPC), Tipaza 42000, Algeria

4. Laboratory of Valorization and Promotion of Saharan Resources, Faculty of Mathematics and Material Sciences, University of Ouargla, Ouargla 30000, Algeria

5. Ghardaïa University, Faculty of Natural and Life Sciences and Earth Sciences, Department of Biology, Ghardaïa, Algeria

**Corresponding author e-mail: seddikimalika2013@gmail.com

ABSTRACT:

The present study aims to evaluate in vitro the antioxidant activity of water-soluble polysaccharides from the fruits of *Balanites aegyptiaca* Del. (BA) collected in the Tamanrasset region. Preliminary characterization of the extract was performed using colorimetric assays, FT-IR, and GC/MS-EI analyses. The extraction yield obtained by maceration in distilled water at 60 °C was $2.09 \pm 0.12\%$. The extract exhibited a high content of total sugars ($85.77 \pm 0.21\%$) and low levels of proteins ($7.39 \pm 0.06\%$) and polyphenols ($1.34 \pm 0.02\%$). Its FT-IR spectrum showed the characteristic absorption bands of polysaccharides. GC/MS-EI analysis revealed that BA consists of 34.06% galacturonic acid, 27.82% arabinose, 15.63% galactose, 9.71% glucose, 7.04% xylose, and 5.74% rhamnose. The assessment of the antioxidant activity of the BA extract demonstrated a notable DPPH radical-scavenging capacity (69.32% at 1 mg/mL; $IC_{50} = 0.745 \pm 0.003$ mg/mL). The highest activity against the ABTS radical (89.91%) was obtained at 3.6 mg/mL, with an IC_{50} of 1.390 ± 0.018 mg/mL. Furthermore, BA showed iron-reducing power ($A_{0.5} = 4.69 \pm 0.031$ mg/mL) as well as molybdenum-reducing power ($A_{0.5} = 1.89 \pm 0.017$ mg/mL). However, the overall antioxidant activity of the extract remains lower than that of vitamin C and BHT.

Keywords: activité antioxydante, polysaccharides, *Balanites aegyptiaca*, FT-IR, GC/SM-EI

Floristic Approach and Biodiversity of Medicinal Plants in Adrar (Southwest of Algeria)

Youssef ABISMAIL^{1**}, Amel BERREBBAH ALIOUA², Mazari AIT KACI³

¹ Adrar University Ahmed Draya, Faculty of Natural Sciences and life, Department of Biological Sciences, Adrar, Algeria.

^{1,2,3} Toxicology, Environment and Health Laboratory LATES, Oran University of Science and Technology Mohamed Boudiaf USTO-MB, Faculty of Sciences the Nature and Life, Department of Living and Environment, Oran, Algeria.

**Corresponding author e-mail: abi.youcef@univ-adrar.edu.dz

ABSTRACT:

Medicinal plants remain central to healthcare in Algeria, valued both culturally and therapeutically. Serving as a basis for ethnobotanical studies, they preserve traditional knowledge passed through generations. A recent survey in the Adrar region aimed to document and analyze their local uses and applications. Analysis of 120 surveys conducted in the study area highlights the continued importance of medicinal plants in the rural and agricultural lifestyle of the Saharan population, particularly among individuals aged 30 to 60. Women, especially housewives, are the primary holders of this knowledge, which is largely transmitted through family traditions and experiential learning. Ethnobotanical data revealed 109 species across 48 families, with Asteraceae and Gramineae being the most represented; *Artemisia herba-alba* and *Ammodaucus leucotrichus* emerged as dominant species. Leaves constituted the most frequently utilized plant part (41%), while powders were the predominant form of preparation (43%). The study revealed that most medicinal plants are Therophytes and primarily herbaceous species. Traditional phytotherapy remains widely practiced, reflecting local trust in traditional remedies over modern medicine. These findings underscore the cultural value of ethnobotanical knowledge in Adrar, highlighting the need for broader surveys and scientific validation of identified remedies.

Keywords: Medicinal plant, Ethnobotanical studies, Therophytes, Herbaceous, Traditional phytotherapy.

Biological and anticholinesterase effects of essential oils from *Colocynthis Vulgaris* leaves on *Schistocerca Gregaria*.

HAMID OUDJANA Aicha^{*(1),(2)}, OULD EL HADJ Mohamed Diddi⁽³⁾⁽⁴⁾

¹Ghardaia University, Faculty of Natural and Life Science sand Earth Sciences, Department of biology, Ghardaia, Algeria.

²Valorization And Conservation of Arid Ecosystems Laboratory. Ghardaia, Algeria. VCAEL

³Kasdi Merbah University, Faculty of Natural and Life Science sand Earth Sciences, Department of biology, Ouargla, Algeria.

⁴Protection of Ecosystems in Arid and Semi-Arid Zones Laboratory, Kasdi Merbah University, Ouargla, Algeria. ECO-SYS.

****Corresponding author e-mail:** najah.oudjana2007@yahoo.fr

ABSTRACT:

The study of the toxic effect of essential oils from the leaves of *Colocynthis vulgaris*, a wild plant harvested in the northeastern Sahara of Algeria, focuses on some neurochemical and behavioral parameters in the desert locust *Schistocerca gregaria*. After treatment, the essential oils of the plant species induce, within a time frame of two hours post-treatment, a behavioral imbalance that progresses over time in individuals of this grasshopper species. The shortest mortality time is observed in male individuals treated with the essential oils of *C. vulgaris*, with 133 ± 2.64 minutes. In light of the results, cholinesterase activity shows a decrease in individuals treated with the essential oils from the leaves of *C. vulgaris*. It is 16.34 ± 1.44 nanomoles/min/ml and 8.08 ± 1.94 nanomoles/min/ml for female and male *S. gregaria* respectively. The specific activity decreases in individuals treated with the essential oils of *C. vulgaris* (0.17 ± 0.03 nanomoles/min/mg in males and 0.36 ± 0.036 nanomoles/min/mg in females). The use of essential oils from *C. vulgaris* would not only reduce the use of chemical pesticides harmful to the environment and human health but also enhance the value of plant biodiversity in arid ecosystems, which are often neglected.

Keywords: Toxicity, Wild plants, Acetylcholinesterase, Desert locust, Essential oils.

Functional Strategies Variability of *Ziziphus lotus* (L.) Desf. in a Pre-Saharan Ecosystem (Messâad, Djelfa)

Fazia KDYEM^{1**}, Nermine TAOURIRT², Rachda BERRACHED^{2,3}, Noria SAADOUN², Sergio Rasman⁴

¹University of Mouloud Mammeri of Tizi-Ouzou, Faculty of Biological and Agronomic Sciences, Department of Ecology and Environment, Tizi-Ouzou, Algeria

²University of Mouloud Mammeri of Tizi-Ouzou, Faculty of Biological and Agronomic Sciences, Natural Resources Laboratory, Tizi-Ouzou, Algeria

³University of Sciences and Technology Houari Boumediene, Faculty of Biological Sciences, Laboratory of Plant Ecology and Environment, Algiers, Algeria

⁴University of Neuchâtel, Faculty of Science, Institute of Biology, Laboratory of Functional Ecology, Neuchâtel, Switzerland

****Corresponding author e-mail:** faziakdyem3@gmail.com

ABSTRACT:

Climate changes accentuate aridification phenomena, particularly in Mediterranean ecosystems already subjected to strong environmental variability. This dynamic represents a major challenge for vegetation, especially for woody species that may adjust their functional strategies in order to ensure their survival and functioning. In this context, the study of functional traits constitutes a relevant approach to explore the mechanisms of plants adaptation under these conditions. Here, we aim to understand if *Ziziphus lotus* (L.) Desf., saves or adjusts its morphological and leaf traits in three populations, characterized by the same lower-arid bioclimate, namely Glaiaa, El Koum and Tenief Ifri (Djelfa Department, Algeria). The traits analysed include canopy width, maximum height, leaf area, leaf thickness, specific leaf area (SLA) and leaf dry matter content (LDMC). Results showed significant differences between the different populations. In El Glaiaa and El Koum, *Z. lotus* expresses a conservative strategy with reduced leaves, a low SLA and a high LDMC, reflecting a saving of resources. At Tenief Ifri, leaves were larger with a higher SLA, indicating an acquisitive strategy, which can be related to less constrained conditions. Our results confirm the higher influence exerted by local conditions, such as abiotic conditions -soil proprieties- and biotic conditions -rooting system- on functional traits than the bioclimate of the pre-Saharan ecosystems. These highlight the considerable adaptive plasticity of *Z. lotus* when constrained by environmental stressors in the Mediterranean environment.

Keywords: *Ziziphus lotus*, Functional traits, SLA, LDMC, Conservative and acquisitive strategies.

Contribution to the phytochemical and biological study of an aqueous extract of a spontaneous *Retama raetam* plant on the barley *Hordrum vulgare*.

Menna HADJMOUSSA**, Lamia TIRICHINE, Aicha HAMID OUDJANA

Ghardaia University, Faculty of Natural and Life Science sand Earth Sciences, Department of biology, Ghardaia, Algeria.

Valorization And Conservation of Arid Ecosystems Laboratory. Ghardaia, Algeria. "VCAEL

**Corresponding author e-mail: hadjmoussamenna@gmail.com

ABSTRACT:

Barley plays a vital role in the diets of many regions of the world. It is evident that chemical fertilizers are being misused in the oasis in an unplanned, excessive, and unmeasured way. In this context, and with the goal of recognizing and using the saharienn floor's potential from an agronomic and commercial perspective. The ecological impacts of an aqueous extract of *Retama raetam*, a spontaneous plant that thrives in Oued Nsa (Ghardaia district), are examined in this study. The plant goes through a drying, broying, and reflux extraction process at various concentrations (0, 20%, 40%, 60%, 80%, and 100%) to create extract drying. A phytochemical analysis revealed a large number of secondary metabolites, which were then evaluated on the barley (*Hordeum vulgare*). At the 20% concentration, it has made it possible to assess its effects on physiological indicators like water content ($83,75 \pm 6,87\%$) and biochemical indicators like protein content ($241,60 \pm 0,0027$; $\mu\text{m}/100\text{g MS}$) at the same concentration (20%), and sugar content ($7,06 \pm 0,0028$; $\text{g}/100\text{g MS}$) in 100% of concentration. According to the findings, the extract of *Retama raetam* has an advantageous impact on the development of the barley and the physiological and biochemical parameters studied.

Keywords: Plant spontaneous, Effect, Barley, Physiological indicators, Biochemical indicators.

Toxic activity of the Chemical Components of *Coriaria myrtifolia* on the Survival of *Drosophila melanogaster*.

ASLOUM Abdelmadjid Yagoub **, HEDJOULI Zakaria ¹, BOUNADJI Siham ¹, BENHISSEN Saliha ^{1,2}, HABBACHI Wafa ², REB-

BAS Khellaf ^{2,3}.

¹ Department of Natural and Life Sciences, Faculty of Sciences, University of M'sila, University Pole, road Bourdj Bou Arreiridj, M'sila 28000, Algeria.

² Laboratory of Applied Neuroendocrinology, Department of Biology, Faculty of Science, Badji Mokhtar University, BP 12, 23000 Annaba Algérie.

³ Laboratoire d'Agro-Biotechnologie et de nutrition en zones arides et semi arides/ Equipe de recherche de gestion des ressources naturelles et environnement, Université Ibn Khaldoun, Tiaret, Algérie.

**Corresponding author e-mail: abdelmadjid-yagoub.asloum@univ-msila.dz

ABSTRACT:

Drosophila melanogaster (fruit fly) is one of the most pervasive pests in urban ecosystems, known for its rapid reproduction and invasiveness. Traditional control methods, such as chemical insecticides and physical barriers, pose risks to human health and the environment. To address this challenge, the scientific community is exploring eco-friendly bioinsecticides as sustainable alternatives. This work investigates potential biological solutions to manage *D. melanogaster* populations effectively while minimizing ecological harm. This study investigates the insecticidal potential of *Coriaria myrtifolia* ethanolic extract by testing its effects on the adults *Drosophila melanogaster* longevity. The results demonstrated that the ethanolic extract of *Coriaria myrtifolia* leaves exhibited lethal effects on fruit flies, with marked differences between males and females. For males, the maximum effect occurred at 1% concentration after two days of exposure, whereas females showed higher sensitivity at the same concentration but within the first day. Analysis of lethal dose (LD50) and lethal time (LT50) revealed greater extract efficacy against females, particularly at medium and high concentrations. These findings suggest the potential of this extract as a natural insecticide, while highlighting the importance of considering sexual dimorphism in response patterns. This study confirms the efficacy of *Coriaria myrtifolia* ethanolic extract in controlling fruit flies, while revealing significant sex-specific variations in its insecticidal effects. The findings pave the way for developing novel plant-based insecticides, particularly in regions where *Drosophila* species pose significant threats as agricultural pests or disease vectors.

Keywords: *Drosophila melanogaster*; *Coriaria myrtifolia*; urban ecosystems; ethanolic extract.

Biotopes of the Desert Locust (*Schistocerca gregaria*): Study of the Plant Cover in Tamanrasset

CHETTAH Boutheyna^{1**}, ABDALLAH Karima¹, GUIRAA Fayçal¹, ZERGOUN Youcef¹, BENRIMA Atika¹, BACI Soundes²

¹Laboratory of Mathematics and Applied Sciences, SNVST, Ghardaia, 47000, Ghardaia, Algeria.

²Chadli Benjdid University, El Tarf, SNV, Laboratory of Biodiversity and Pollution of Ecosystems

^{**}Corresponding author e-mail: chettah.boutheyna@univ-ghardaia.edu.dz

ABSTRACT:

Since antiquity, the desert locust (*Schistocerca gregaria*) has been recognized as one of the most destructive insects, with its invasions significantly affecting the Algerian Sahara, particularly its southern regions, following summer rainfall that fosters the development of diverse vegetation cover. Field surveys were conducted in the Tamanrasset region to assess floristic diversity, characterize the biogeographic and biomorphological types of plant species, and evaluate the ecological significance of vegetation for this insect. The findings documented 57 plant species from 27 botanical families, classified into diverse biogeographic and biomorphological categories. The Asteraceae family was the most prevalent, accounting for 14%, followed by Zygophyllaceae (12%) and Brassicaceae (9%). Among biogeographic types, therophytes (23 species) were the most dominant in the studied biotopes, while Saharo-Sindian species (37 species) predominated. These plants play a critical ecological role for the desert locust: 41% serve as preferred food sources and shelters, 38% function solely as shelters, and the remaining 21% are unused.

Keywords: Desert Locust, Biotopes, Biogeographic types, Biomorphological types, Tamanrasset, Ecological role.

Floristic diversity of desert locust biotopes in the central Algerian Sahara (case of the In Salah region)

Karima ABDALLAH^{1**}, Bouthayena CHETTAH¹, Fayçal GUIRAA¹, M'hammed BOUALLALA² Atika GUENDOZ-BENRIMA³,

Abdelkrim ARAR⁴

¹University of Ghardaia, Faculty of Natural and Life Sciences and Earth Sciences, Department of biology, Laboratory of Mathematics and Applied Sciences, SNVST, Ghardaia, 47000, Ghardaia, Algeria;

²Higher School of Saharan Agriculture, 01000 Adrar, Algeria;

³University of Ghardaia, Faculty of Natural and Life Sciences and Earth Sciences, Department of biology, 47000 Ghardaia, Algeria;

⁴El Hadj Lakhdar University, Faculty of Sciences, Department of Natural and Life Sciences

^{**}Corresponding author e-mail: Abdallah.karima@univ-ghardaiaedu.dz

ABSTRACT:

Plant species in the Saharan environment play an important role in the life of the desert locust (*Schistocerca gregaria* Forskål). This species is a pest that causes damage to plant resources and threatens the food security of populations in arid areas. The objective of this work is to study the floristic diversity in some Saharan biotopes of the desert locust. To this end, around ten floristic surveys were carried out in the In Salah region in order to determine the importance of plant diversity in the biotopes studied on the (i) biological and (ii) biogeographical levels. The results obtained allowed us to identify 18 plant species belonging to 11 botanical families, the most represented of which are the Asteraceae and the Fabaceae (16.67 for each family). The spectrum of life forms shows the strong representation of perennial species in the studied biotopes (72.22%) and the biological spectrum shows a good representation of chamaephytes (50%) compared to other biological types. The biogeographic spectrum shows the dominance of the Saharan-Arabian element (72.22 %) which adapts well to the Saharan environment. In conclusion, the study of plant biodiversity in ecosystems is a necessary step to monitor the evolution of Saharan bioresources and to control the dynamics of desert locust populations.

Keywords: Biodiversity, Biotope, Desert Locust, In Salah, Algerian Sahara.

Impact of Protection on the Restoration of steppe Rangelands (Case of Mankeb Ben Hamed)

AYADA Slimane Ahmed Benmchih ^{1**}, BOUMAKHLEB Abdallah ², KOUILI Aïcha³, MAZOUZ Massouda³, BOURAGBA Nacira³,

and HEDROUG Merouan³

¹ National Algerian Institute of Agronomic research (INRAA). Adrar, Alegria.

² Research Center of Agropastoralisme (CRAPast). Djelfa, Alegria.

³High Commissionership of steppe Development (HCDS). Djelfa, Alegria.

^{**}Corresponding author e-mail: sliman_ayada@yahoo.com.

ABSTRACT:

Rangelands in Algeria's semi-arid to arid regions are suffering from serious degradation due to poor management and overexploitation. The Algerian government has implemented development programs aimed at restoring these regions, the implementation of which has been entrusted to the High Commissionership of steppe Development (HCDS). Given their ecological and pastoral importance, we attempted in this study to assess the floristic diversity in a protected area in the semi-arid region of Ben Hamed south of Algiers (Djelfa). Floristic surveys were carried out during autumn and spring of 2018, in order to clarify the impact of the protection technique on floristic diversity in this region. We identified 34 species, divided into 28 genera and representing 14 families. The Shannon index results indicate that the floristic diversity in autumn is on average 2.61 bits. In spring, a value of 1.86 bits was recorded. As for the Simpson index, it recorded a value of 0.37 bits in spring and 0.23 in autumn.

Keywords: Steppe, Restoration, Rangelands, Semi-arid, Arid, HCDS.

Floristic Biodiversity and Phototherapeutic Potential of *Urtica dioica* L. : A Local Medicinal Plant for Sustainable Conservation.

MECHATTAH NOURELHOUDA ^{1,2 **}, MECHRAOUI OMAR ²

¹University of Laghouat , Faculty of technology , Department of process engineering , laghouat , Algeria.

² Laboratory of process engineering , Laghouat, Algeria .“VCAEL

^{**}Corresponding author e-mail: mechatahouda@gmail.com

ABSTRACT:

Floristic biodiversity is a key element in preserving ecological balance, particularly in arid and fragile ecosystems. Indigenous medicinal plants represent an important component of this biodiversity, providing both ecological value and potential health benefits. *Urtica dioica* L., widely used in traditional medicine, is considered a promising source of bioactive compounds. This work aims to highlight the phytotherapeutic importance of this local species and its role in the conservation of floristic biodiversity. The study emphasizes the relevance of exploring medicinal plants for sustainable development and the preservation of degraded habitats.

Keywords: Floristic Biodiversity, *Urtica Dioica* L., Medicinal Plants, Conservation, Sustainability.

Eco-Friendly Pest Control Revolution: Acetylcholinesterase Inhibitory Potential of *Euphorbia guyoniana* extracts.

BENCHEIKH Manel **⁽¹⁾, TELLi Alia⁽²⁾, IDDER-IGHILI Hakima⁽¹⁾

¹ Laboratory of Phoeniculture Research "Phoenix", Faculty of Nature and Life Sciences, University of Kasdi Merbah, PB 511 Ghardaïa road, Ouargla 30000, Algeria.

² Laboratory of preservation of ecosystems in arid and semi-arid area, Faculty of nature and life sciences, University of Kasdi Merbah, PB 511 Ghardaïa road, Ouargla 30000, Algeria.

**Corresponding author e-mail: bencheikh.manel24@gmail.com

ABSTRACT:

Euphorbia guyoniana is an endemic medicinal plant from Algeria, which mainly occurs in the pre-desertic sandy Algerian land and the northern sector of the Sahara. Its latex has been used medicinally by local populations. The present work investigates the biological and insecticidal properties of *E. guyoniana*, based on the analysis of different fractions separated from its hydromethanolic extract, regarding acetylcholinesterase (AChE) inhibitory activity and the content of secondary metabolites. The butanol-1 fraction had the highest contents of phenolic compound (10.16 ± 0.36 mg GAE/g), flavonoid (5.46 ± 0.38 mg RE/g), alkaloid (0.92 ± 0.03 mg AE/g), and saponin (1.89 ± 0.12 mg AE/g) among the tested fractions, also with the most notable AChE inhibition activity ($IC_{50} = 28.88 \pm 1.38$ μ g/ml). Both are also reported to interfere with neural processes in insects, suggesting potential for their use as insecticides. Results The results highlight the potential of *E. guyoniana* as a biological insecticide, while further studies will be needed to validate its effectiveness and in vivo application.

Keywords: *Euphorbia guyoniana*, Hydromethanolic extract, Secondary metabolites, Acetylcholinesterase (AChE) inhibitory activity, Insecticide.

Valorization of plant extracts in the protection of foodstuffs.

BENSANIA Wafa^{1**}, ROUARI Linda², Lakhdari Nesrine¹, Mohammedi Manal¹,

⁽¹⁾ Département biologie, Faculté des Sciences de la Nature et de la Vie et Sciences de la terre, Université de Ghardaïa, Ghardaïa, Algeria, Algeria ;

⁽²⁾ Laboratoire Valorisation et Conservation des Ecosystèmes Arides (LVCEA). Faculté des Sciences de la Nature et de la Vie et Sciences de la terre, Université de Ghardaïa, Ghardaïa, Algeria, Algeria;

**Corresponding author e-mail: bsaniawafa.bio@gmail.com

ABSTRACT:

Insect damage to grain and pulse stocks has been widely studied in Africa. The interest of this work is the biological control of a more well-known pest of stored cereals and legumes, *Tribolium castaneum*, using extracts from the aerial part of the plant "Ruta graveolens" from the Ghardaïa region and the evaluation of the insecticidal power of these extracts by contact treatment. The aerial part of the plant was subjected to extraction by maceration in acetone. The qualitative analysis carried out by phytochemical screening determined the presence of flavonoids, coumarins, saponosides and alkaloids. The quantitative analysis determined by a spectrophotometric assay showed the richness of the leaves by the phenolic compounds namely total phenols, flavonoids and tannins. The results under laboratory conditions showed that the tested extracts have a very strong insecticidal power. This efficacy is represented by calculated toxicological parameters, which in turn are LD 50 and LD 90. The sensitivity of adults was variable and even higher with increasing extract concentrations and with exposure time. In the context of biological control, the application of this insecticide product could be very effective against pests and for the protection of stocks of cereals and legumes.

Keywords: Biological control, *Tribolium castaneum*, *Ruta graveolens*, Insecticidal activity.

Contribution to the phytochemical and biological study of an aqueous extract of a spontaneous *Retama raetam* plant on the barley *Hordrum vulgare*

Menna HADJMOUSSA, Lamia TIRICHINE, Aicha HAMID OUDJANA

¹Ghardaia University, Faculty of Natural and Life Science sand Earth Sciences, Department of biology, Ghardaia, Algeria.

Valorization And Conservation of Arid Ecosystems Laboratory. Ghardaia, Algeria. "VCAEL

**Corresponding author e-mail: hadjmoussamenna@gmail.com

ABSTRACT:

Barley plays a vital role in the diets of many regions of the world. It is evident that chemical fertilizers are being misused in the oasis in an unplanned, excessive, and unmeasured way. In this context, and with the goal of recognizing and using the saharienn floor's potential from an agronomic and commercial perspective. The ecological impacts of an aqueous extract of *Retama raetam*, a spontaneous plant that thrives in Oued Nsa (Ghardaia district), are examined in this study. The plant goes through a drying, broying, and reflux extraction process at various concentrations (0, 20%, 40%, 60%, 80%, and 100%) to create extract drying. A phytochemical analysis revealed a large number of secondary metabolites, which were then evaluated on the barley (*Hordeum vulgare*). At the 20% concentration, it has made it possible to assess its effects on physiological indicators like water content ($83,75 \pm 6,87\%$) and biochemical indicators like protein content ($241,60 \pm 0,0027$; $\mu\text{m}/100\text{g MS}$) at the same concentration (20%), and sugar content ($7,06 \pm 0,0028$; $\text{g}/100\text{g MS}$) in 100% of concentration. According to the findings, the extract of *Retama raetam* has an advantageous impact on the development of the barley and the physiological and biochemical parameters studied.

Keywords: Plant spontaneous, Effect, Barley, Physiological indicators, Biochemical indicators.

Evaluation of the Antioxidant and Antidiabetic Activity of Date Extracts.

Mohammed Habib BELHACHEMI ^{(1,2)**}, Aissa ABDELAZIZ ⁽¹⁾,

Nacer ABISMAIL HEDJOUDJA⁽¹⁾, Salah BENKHEARA⁽³⁾ et Sara BELMIR ⁽²⁾

⁽¹⁾ Faculté des sciences de la nature et de la vie et des sciences de la terre, Département de Biologie, Université de Ghardaia, Zone scientifique, BP 455Ghardaia, 47000, Algérie.

⁽²⁾ Laboratoire Antibiotiques Antifongiques : physico-chimie, synthèse et activité biologique, Département de Biologie, Faculté des Sciences de la Nature et de la Vie, des Sciences de la Terre et de l'Univers, Université Aboubekr-Belkaid Tlemcen.

⁽³⁾ Université de Ghardaia, Faculté des Sciences de la Nature et de la Vie et Sciences de la Terre, Laboratoire de Valorisation et Conservtion des Écosystèmes Arides (LVCEA), BP455, Ghardaia 47000

**Corresponding author e-mail: belhachemi@univ-ghardaia.edu.dz

ABSTRACT:

The richness of dates in bioactive compounds makes them a valuable natural source of molecules with therapeutic potential, particularly in the prevention and management of metabolic diseases such as type 2 diabetes. This study evaluated the antioxidant and antidiabetic activities of aqueous extracts (EAT, EAO) and polysaccharide extracts (EPT, EPO) from two local date varieties from Ghardaia, T'dalet and Ouarous. Antioxidant activity, assessed using DPPH and FRAP assays, showed that polysaccharide extracts generally exhibited higher antioxidant power than aqueous extracts, with lower IC_{50} values ($1.65 \pm 0.13 \text{ mg/mL}$ for EPT and $2.34 \pm 0.37 \text{ mg/mL}$ for EPO in the DPPH test; 1.48 ± 0.06 and $1.53 \pm 0.14 \text{ mg/mL}$ in the FRAP test), although still lower than the efficacy of vitamin C (0.0027 mg/mL). Regarding antidiabetic activity, measured by $\text{I}\text{-}\alpha\text{-amylase}$ inhibition, the extracts showed IC_{50} values ranging from 0.57 to 1.07 mg/mL , indicating significant enzyme inhibition. These values were compared with acarbose, the reference drug, whose IC_{50} values reported in the literature generally range between 0.1 and 0.5 mg/mL . These findings suggest that local dates represent a promising source of natural compounds with antioxidant and antidiabetic potential, which may serve as a basis for developing dietary supplements or functional ingredients for the prevention and management of type 2 diabetes.

Keywords: T'dalet, Ouarous, polysaccharide extract, aqueous extract, antioxidant, antidiabetic.

Phytoecological Assessment of the Kef Doukhane Wetland Vegetation in the Ghardaïa Region, Algeria.

Radhia BIAD^{**1,2}, Khoudir KHELLAF^{1,2}, Choayb BOUNAB^{1,2}, Moussa HOUHAMDI³

¹ Ghardaia University, Faculty of Natural and Life Science sand Earth Sciences, Department of biology, Ghardaia, Algeria.

² Valorization And Conservation of Arid Ecosystems Laboratory. Ghardaia, Algeria. "VCAEL

³Laboratoire Biologie, Eau et Environnement (LBEE), Département des Sciences de la Nature et de la Vie, Faculté SNV-STU, Université 8

Mai 1945 Guelma (Algérie),

^{**}Corresponding author e-mail: biad.radia@gmail.com

ABSTRACT:

This study focuses on the inventory and phytoecological analysis of the vegetation in the Kef Doukhane wetland, located in the Ghardaïa region of southern Algeria. Two sampling campaigns were conducted in spring 2022 and spring 2024. In 2022, a total of 30 species belonging to 22 families were recorded, including 23 perennials and 7 annuals, with a relatively low disturbance index (26.66%). Phragmites was identified as the most abundant species. In 2024, the floristic survey revealed 36 species distributed across 23 families, composed of 61% perennials and 39% annuals. By season, 20 species (16 families) were identified in 2022 and 33 species (21 families) in 2024. These findings highlight the notable floristic richness and the overall good state of conservation of the studied area.

Keywords: Phytoecological study, Saharan flora, Wetlands, Ghardaïa, Algeria.

Chemical composition, antioxidant and antibacterial activities of essential oils from *Cymbopogon schoenanthus* (L.) Spreng.

Faiza BAALI^a, Hanane BENZETTA^b, Nadjette DJEMOUAI^{b,c}, Sofia AYARI-GUENTRI^{d,e}, Somia SAAD^a, Kathia BELAID^f

and Elyes KELAI^{g,a}

^aDépartement de Biologie, Faculté des Sciences de la Nature et de la Vie et Sciences de la Terre, Université de Ghardaia, Ghardaïa, Algeria;

^bCentre de Recherche Scientifique et Technique sur les Régions Arides (CRSTRA), Biskra, Algeria;

^cLaboratoire de Biologie des Systèmes Microbiens (LBSM), Ecole Normale Supérieure Cheikh Mohamed El Bachir El Ibrahimi, Algiers, Algeria; ^dFaculté des Sciences, Département des Sciences de la Nature et de la Vie, Université d'Alger 1, Benyoucef Benkhedda, Algiers, Algeria;

^eLaboratoire de Recherche sur les Zones Arides (LRZA), Faculté des Sciences Biologiques, Université des Sciences et de la Technologie Houari Boumediene (USTHB), Algiers, Algeria;

^fUniversité des Sciences et de la Technologie Houari Boumediene, Laboratoire de Biologie et Physiologie des Organismes (LBPO), Algiers, Algeria;

^gCentre de Recherche Scientifique et Technique en Analyse Physico-Chimique (C.R.A.P.C), Ouargla, Algeria

^{**}Corresponding author e-mail: baali.faiza@univ-ghardaia.dz

ABSTRACT:

Cymbopogon schoenanthus (L.) Spreng., a plant widely used in traditional medicine and known as "El Lamad". The essential oils (EOs) of *Cymbopogon schoenanthus* (L.) Spreng. Collected from Ghardaïa Province were analyzed for their chemical composition by GC-MS analysis. The results showed fifty-one identified compounds representing 94.34% of the whole EOs, with β -eudesmol (11.35%) and β -elemol (10.84%) as major compounds. The antioxidant evaluation revealed moderate activities in the TAC, DPPH, and FRAP assays, while the β -carotene bleaching test showed a notable inhibition of $63.54 \pm 2.41\%$. Regarding antibacterial potential, gentamicin exhibited an inhibition zone of 21.66 ± 0.57 mm, and *Bacillus cereus* was found to be the most sensitive strain, with an inhibition zone of 20.75 ± 0.50 mm. Our results show that *C. schoenanthus* is a source of many bioactive compounds with well-known antioxidant, antibacterial properties.

Keywords: *Cymbopogon schoenanthus* (L.) Spreng., essential oils, antioxidant activity, antibacterial activity.

Chemical composition and antioxidant activity of n-hexane extract from *Orobanche aegyptiaca Pers.*

Zineb LOUAIL¹ · Faiza BAALI² · Nadjette DJEMOUAI^{2,3} · Sofia AYARI-GUENTRI^{4,5}

¹Laboratoire d'ethnobotanique et substances naturelles, Ecole Normale Supérieure de Kouba, B.P.92, 16050 Kouba, Algiers, Algeria

²Département de Biologie, Faculté des Sciences de la Nature et de la Vie et Sciences de la Terre, Université de Ghardaïa, BP 455, Ghardaïa 47000, Algeria

³Laboratoire de Biologie des Systèmes Microbiens (LBSM), Ecole Normale Supérieure de Kouba, B.P. 92, 16 050 Kouba, Algiers, Algeria

⁴Département des Sciences de la Nature et de la Vie, Faculté des Sciences, Université d'Alger 1, Benyoucef Benkhedda, 02. Didouche Mourad, Algiers, Algeria.

⁵Laboratoire de Recherche sur les Zones Arides (LRZA), Faculté des Sciences Biologiques, Université des Sciences et de la Technologie Houari Boumediene (USTHB), BP32 El-Alia, 16111 Bab Ezzouar, Algiers, Algeria.

**Corresponding author e-mail: baali.faiza@univ-ghardaia.dz

ABSTRACT:

Orobanche aegyptiaca Pers., a plant widely used in traditional medicine to treat infectious diseases, skin occlusion, psoriasis and wound healing. In the present study, the n-hexane extract of *Orobanche aegyptiaca Pers.* was analyzed to investigate its phytochemical profile and antioxidant potential. The extraction yield was found to be $1.30 \pm 0.13\%$. The chemical composition of the extract was characterized using gas chromatography–mass spectrometry (GC–MS), which led to the identification of thirty-one compounds representing the major chemical classes of fatty acids, sterols, alcohols, and terpenoids. Among these, β -sitosterol was the predominant compound, accounting for 41.62% of the total extract. Other significant components included 9,12-octadecadienoic acid (Z,Z)-, 2-hydroxy-1-(hydroxymethyl) ethyl ester (8.88%), vitamin E (6.66%), stigmasterol (5.85%), stigmastera-5,24(28)-dien-3-ol (3 β ,24Z)- (3.3%). The antioxidant activity of the n-hexane extract was evaluated using the 1,1-diphenyl-2-picrylhydrazyl (DPPH) free radical scavenging assay. The extract demonstrated a notable antioxidant effect, with an IC_{50} value of $1654.45 \pm 17.29 \mu\text{g/mL}$, reflecting its capacity to neutralize free radicals in a concentration-dependent manner. Although the activity was moderate compared with standard antioxidants, it confirms the presence of bioactive molecules capable of contributing to the plant's overall antioxidant potential. Many of the identified phytochemicals possess significant biological activities and could serve as promising lead compounds for the development of new therapeutic agents against various diseases.

Keywords: *Orobanche aegyptiaca* , n-hexane extract , GC-MS analysis, antioxidant activity.

Valorization of Saharan Medicinal Plants used by indigouns knowledge in the Ghardaïa Region

Rekia CHERIF^{1,2}, Abdellah KEMASSI³ & Mohamed Didi OULED ELHADJ³

¹University of Ghardaïa, Faculty of Natural and Life Sciences and Earth Sciences, Ghardaïa, Algeria.

²Laboratory for the Valorization and Conservation of Arid Ecosystems (LVCA), University of Ghardaïa, Scientific Zone, BP 455, Ghardaïa 47000, Algeria.

³Laboratory for the Protection of Ecosystems in Arid and Semi-Arid Zones, Kasdi Merbah University, Ouargla, BP 511, Ouargla 30000, Algeria

**Corresponding author e-mail: rekia.eco@gmail.com

ABSTRACT:

The region of Ghardaïa, located in the northern part of the Algerian Sahara, is characterized by remarkable floristic biodiversity despite its arid climatic conditions. It includes a variety of microhabitats that support the growth of numerous spontaneous and endemic plant species. This ecological diversity has favored the adaptation of plants with exceptional physiological and biochemical mechanisms. Many of these species possess significant medicinal and aromatic properties, traditionally exploited by local communities for therapeutic, nutritional, and agricultural purposes. This research focuses on ethno pharmacological study, conducted in the Ghardaïa region (North Sahara, Algeria), aimed to document and valorize spontaneous plants with hypoglycemic potential traditionally used by local communities. Through structured interviews with herbalists, physicians, pharmacists, and traditional healers, a total of 34 plant species belonging to 19 botanical families were recorded. These species are involved in the formulation of 20 traditional therapeutic preparations used in the local pharmacopoeia for the management of diabetes. The Lamiaceae family was predominant with seven species, followed by Asteraceae (five species). The results highlight the remarkable diversity of Saharan medicinal flora and the enduring relevance of traditional knowledge in developing natural alternatives for diabetes management. This work contributes to the valorization and conservation of phyto-genetic resources in arid ecosystems, emphasizing their potential in future pharmacological and biotechnological applications.

Keywords: Valorization, Spontaneous Plants, Hypoglycemic character, local population, Ghardaïa.

Study of the antioxidant activity of some traditional date vinegar from the indigenous knowledge of the M'Zab valley populations (north-eastern Algerian Sahara)

Zohra BENHAMMADI^{1,2}, Mohammed Didi OULD EL HADJ¹, Amar EDDOUD³,

¹Laboratory for the Protection of Ecosystems in Arid and Semi-Arid Zones, Faculty of Natural and Life Sciences, University of Ouargla, 30000 Ouargla, Algeria

²Faculty of Natural and Life Sciences and Earth Sciences, University of Ghardaïa, 47000 Ghardaïa, Algeria

³Laboratory of Saharan Bioresources Preservation and Valorization, Faculty of Natural and Life Sciences, University of Ouargla, 30000 Ouargla, Algeria

**Corresponding author e-mail: zohra_a@ymail.com

ABSTRACT:

This study focuses on the physicochemical characterization and biological activities of some traditional date vinegars from the indigenous knowledge populations of the M'Zab valley (north-eastern Algerian Sahara). These are four types of vinegar made from different varieties of dates, including Temdjohoret-Tafezwine-Ghars (TTG), Ghars-Tafezwine-Azerza (GAT), H'Chef Deglet Noor (D1), and Ghars-Tafezwine-Azerza-Deglet Noor (ND). The analysis results show that the date vinegar samples studied are characterized by an acidic pH (3.15 ± 0.02 – 3.62 ± 0.00), high dry matter contents (3.98 ± 0.17 – $8.47 \pm 0.06\%$), insoluble solids rate (8.1 ± 0.06 – 15.05 ± 0.03), in electrical conductivity (3.36 ± 0.01 – 6.11 ± 0.01 ms/cm), and total acidity contents ranging from 14.17 ± 2.40 for GAT to 39.8 ± 0.92 g/l for TTG. The residual alcohol rates are $1 \pm 0.00\%$ for the TTG sample to $4.9 \pm 0.00\%$ for GAT. However, total sugar contents ($0.88 \pm 0.1\%$ – $7.36 \pm 0.57\%$) are more or less high in samples of traditional date vinegar, which gives a sweetness to some date vinegar samples. The protein contents (0.43 ± 0.007 – 0.79 ± 0.002) of the various date vinegar samples are low. Statistical analyses show that each type of traditional date vinegar has a distinct profile, influenced by the chemical characteristics of the cultivars used. The antioxidant activities of traditional date vinegar samples show their high antioxidant capacity for all types of radicals. Each sample of vinegar has significant antioxidant activities, although their activities are always lower than those of ascorbic acid (vitamin C) or Trolox. For each type of traditional date vinegar sample, it should be noted that the radical inhibition rates (FRAP, DPPH, and ABTS) are dose-dependent. The sample with the highest antioxidant power remains Ghars-Tafezwine-Azerza (GAT), with $IC_{50} = 0.0538$ mg product/ml distilled water for the DPPH test and $IC_{50} = 0.0125$ mg product/ml distilled water for the ABTS test. For a high reduction capacity by the FRAP test, it is 484.16 ± 8.66 μ M/ml equivalent Trolox.

Keywords: Sahara, Dates, Indigenous, Vinegars, Physicochemical, Antioxidant activity.

Effet des conditions environnementales contrastées sur la chlorophylle, l'azote et la proline de *Limoniastrum guyonianum* (Plumbaginaceae) dans le Sahara septentrional Algérien.

Abdelmalek Rouari^{1*}, Hafida Trabelsi¹, Mohammed Elhafed Kherraze²

¹Laboratoire Bioressources Sahariennes : Valorisation et Préservation. Université KASDI Merbah-Ouargla, Ouargla 30000, Algeria.

²Centre de recherche scientifique et technique sur les régions arides. CRSTRA, station milieu biophysique Touggourt, Algeria.

**Corresponding author e-mail: rouari_abdelmalek@yahoo.com

ABSTRACT:

Limoniastrum guyonianum, a halophytic shrub endemic to the northern Sahara, exhibits remarkable physiological mechanisms that enable it to tolerate arid and saline conditions, notably through the accumulation of compatible solutes. This species, of economic, medicinal, and pastoral interest, was studied in two contrasting regions of Algeria: Djamaa (Sebkha) and El-Menia (sand dunes). Chlorophyll measurements were performed using a portable chlorophyll meter (SPAD-503 Minolta) on mature and healthy leaves. The highest SPAD values were recorded at Djamaa (71.68 ± 27.68), compared to 41.77 ± 9.59 at El-Menia. Similarly, foliar nitrogen contents were significantly higher at Djamaa (31.49 ± 12.46 μ mol/g¹) than at El-Menia (8.27 ± 8.04), confirming the positive relationship between nitrogen and chlorophyll. Proline analysis also revealed notable differences between sites. At Djamaa (EC = 7705.08 μ S/cm), proline concentrations were particularly elevated, especially in the upper parts of the plant, reflecting an adaptive response to high salinity. At El-Menia (EC = 3421.90 μ S/cm), proline levels were generally lower, indicating a reduced saline stress. These findings highlight the importance of nitrogen and proline as indicators of the physiological adaptation of *L. guyonianum* to environmental constraints. They also underline the role of these mechanisms in maintaining photosynthesis and tolerance to salt stress, with implications for ecological conservation and agricultural practices in arid and saline environments.

Keywords: Adaptation, Conservation, Osmoregulator, Endemic, Physiology, Sahara.

Biodiversity and Agronomic Potential of Algerian Oases Wheat Landraces under Sub-Humid Conditions: Implications for Climate Change Adaptation.

Asma BENKARA¹, Mouad BOULACEL¹, Nabila SOUILAH², Ghania CHAIB¹ & Siham BEZZEZ¹

¹Laboratory of Development and Valorization of Phytogenetic Resources, Faculty of Natural Sciences and Life, University of Constantine-1- brothers Mentouri. Algeria

² Agronomy department, University 20 Aout 1955, Skikda, Algeria

**Corresponding author e-mail: benkaraasmabio@gmail.com

ABSTRACT:

Saharan wheat landraces, cultivated within the unique ecosystems of oases, constitute promising genetic resources for improving tolerance to abiotic stresses. Over centuries, these landraces have adapted to extreme environmental conditions, acquiring remarkable resilience to drought, heat, and salinity. This study evaluated bread wheats (*Triticum aestivum* L.) landraces collected from Saharan oases (In Emguel, Adrar, Tamanrasset, and Oued Righ) using a completely randomized block design. The objective was to assess their morphological, physiological, and agronomic performance, and to estimate genetic variability under sub-humid conditions in the Constantine region during the 2023/2024 growing season. The collected data were subjected to statistical analyses, including ANOVA, correlation coefficients, and principal component analysis (PCA). The results revealed highly significant variability across all traits. Substantial genetic diversity was observed for grain yield, yield components, and several morphological traits, notably plant height, peduncle length, spike length, number of nodes, and flag leaf area. Correlation analysis indicated that grain yield was significantly associated with yield components, chlorophyll content, and key phenological stages, including first leaf appearance, booting, and heading. Multivariate analyses provided a comprehensive understanding of the interrelationships among traits and facilitated the classification and selection of landraces with high yield potential and strong adaptation to sub-humid conditions. These findings highlight the importance of Saharan wheat landraces as valuable genetic resources for breeding programs targeting resilience to abiotic stresses under climate change.

Keywords: Oasis wheat, Biodiversity, Phenology, Agronomic traits, Climate change.

Synergistic Antimicrobial Activities of Combinations of Essential Oils of *Rosmarinus officinalis* and *Thymus vulgaris*

LARABI Souad¹, GOURINE Nadir², YOUSFI Mohamed³

¹ Laghouat University, Faculty of Sciences, Department of Material Sciences, Laghouat, Algeria.

² Laghouat University, Faculty of Sciences, Department of Material Sciences, Laghouat, Algeria

³ Laghouat University, Faculty of Sciences, Department of Material Sciences, Laghouat, Algeria

**Corresponding author e-mail: souad.larabi@lagh-univ.dz

ABSTRACT:

Nowadays, drug resistance has contributed to the emergence of new infectious diseases and the reemergence of old ones [1]. One promising approach to combat drug-resistant microorganisms is the use of combinations of plant extracts [2]. This study aimed to evaluate the antimicrobial activity of two plant extracts: Thyme and rosemary, and the combination of these EOs against three Gram-positive (*Staphylococcus epidermidis*, *Micrococcus luteus* and *Bacillus cereus*) and three Gram-negative bacteria (*Escherichia coli* and *Salmonella typhi*, *Pseudomonas aeruginosa*), by the method of diffusion disc. The types of interactions in different binary combinations were determined by calculating the fractional inhibitory concentration indexes (FICI). Synergistic interactions were observed against *S. epidermidis* and *S. typhi*, with moderate synergy noted against *E. coli* and *K. pneumoniae*. In contrast, an antagonistic interaction was detected against *P. aeruginosa*.

Keywords: *Rosmarinus officinalis*, *Thymus vulgaris*, Essential oils, Antimicrobial activity, Synergistic.

Ecological and Biogeographical Study of Forest and Pre-forest Formations in the Djebel Amour Region, Saharan Atlas

Mostafa Naceur YUCEFI^{1*}, MOHAMMED ABDELJID BOUMEDDIENE¹, FAYSSAL GHOUGALI¹, ZOHRA HOUYOU², SOU-FYANE BENSOUILAH¹, RABAH ZEBSA³

¹ Department of Biology, Faculty of Sciences, Amar Telidji Laghouat University, Laghouat, Algeria.

² Laghouat University-Mechanics Laboratory, P.O. Box 37, Laghouat 03000, Algeria

³ Laboratoire Biologie, Eau & Environnement (LBEE), Faculty of SNVSTU, University of 8 May 1945, 24000 Guelma, Algeria

**Corresponding author e-mail: medbenyou2014@gmail.com

ABSTRACT:

This study investigates the vegetation of the Djebel Amour region using a combined ecological and biogeographical approach. At the landscape scale, a supervised cartographic analysis was carried out to characterize the spatial distribution of forest and pre-forest formations. At the local scale, a plot-based survey was conducted to analyze species composition and structural patterns within stands. Nine mountain stations were selected, where environmental variables (primarily topographic) and vegetation data were recorded. Phytogeographical assessment shows that the region is dominated by pre-forest formations expressed mainly as high maquis. Aleppo pine constitutes the principal arboreal element, persisting primarily in central mountain zones where it is sheltered from Saharan climatic influence, particularly at Kef El-Guelta, Gaadet Madna and Gaadet Anfous. Holm oak forms only scattered and often regrowth-derived clumps, whereas Atlas pistachio occurs sparsely, especially on rocky substrates. Thirty 20 m × 20 m plots were sampled to evaluate vegetation structure and topographic gradients. Vegetation cover and species richness were found to vary markedly across slope positions. Lower slopes host most species and exhibit higher cover, whereas steep mid- and upper-slope zones display reduced vegetation (36.98%) associated with pronounced erosion and extensive rock outcrops (66.5–83.1%). Elevation, rock outcrop extent, and slope gradient were identified as the principal topographic factors influencing species distribution, explaining 26–83% of variance through linear modeling. Four vegetation species groups were distinguished according to topographic context. These findings emphasize the need to consider topographic suitability when restoring degraded semi-arid matorral landscapes in the region.

Keywords: Djebel Amour, vegetation ecology, biogeography, semi-arid matorral, topographic gradients.

Floristic diversity of weeds in some cereal perimeters of the Ghardaïa region.

SEBIHI Abdelhafid¹, BOUTEITEL Hamza²

¹Lab. Bio-Ressour. Sahar., Univ. Kasdi Merbah, Ouargla, Algérie

² Ghardaia University, Faculty of Natural and Life Science sand Earth Sciences, Department of biology, Ghardaia, Algeria

**Corresponding author e-mail: sebihiabdelhafid@gmail.com

ABSTRACT:

This study was carried out on the determination and identification and census of the weed flora population (weeds) in a few cereal areas in the Ghardaïa region (case of Sebseb) during the 2020/2021 agricultural campaign. The study is carried out on two farms on seven durum wheat hubs during the period (February-June). The floristic analysis and the systematics of the various associated weed species have shown us a floristic richness that includes 35 weed species. Cotyledons are dominant with 24 species of which the Asteraceae are the majority with five species. Monocots have 11 species mainly represented by Poaceae that alone have seven species. The listed species are divided into 22 genera and 08 botanical families. The biological type of Annual plants (therophytes) is clearly dominant representing 33 species while perennials are represented by only 08 species. However, Biennial plants appeared rare at the level of the sites studied.

Keywords: Flora, weeds, Cereals, Ghardaïa, Sebseb.

Inventory and Analysis of Plant Biodiversity in the Ghardaïa Region.

OUICI Houria^{1,2*} DOUDOU Brahim^{1,2}, ARDJOUN Safia³, CHALANE Fatiha⁴.

¹ Faculty of Natural and Life Sciences and Earth Sciences, University of Ghardaïa, BP 455 Ghardaïa 47000, Algeria ,

² Laboratories of Valorization and Conservation of Ecosystems Arids (LVCEA), Faculty of Natural Sciences and Life, University of Ghardaïa, Algeria.

³Djilali LIABES University, Faculty of Natural and Life Sciences

*Corresponding author e-mail address: ouici.houria@univ-ghardaia.dz

ABSTRACT:

To better understand the spontaneous and desert plants of the Ghardaïa region, particularly in the Oued Metlili and Numérate areas, and to examine the effects of soil characteristics on the distribution of dominant plants, we conducted a study involving an inventory and analysis of plant biodiversity across four different stations in the region. The floral inventory in the Numérate area identified 10 species belonging to 10 genera and 6 families. In Oued Metlili 1, 10 species were recorded, distributed across 10 genera and 8 families, while in Oued Metlili 2, 11 species were identified, corresponding to 11 genera and 8 families. These results indicate that the number of plant species in these areas is relatively low.

Keywords: *Pistacia Atlantica*, Semi-Arid Ecosystem, Species Diversity, Facilitation, Tébessa, Algeria.

Floristic analysis and structuring of plant communities in the Ghardaïa region

DOUDOU Brahim^{1,2**}, Ouici Houria^{1,2}

¹ Ghardaia University, Faculty of Natural and Life Science sand Earth Sciences, Department of biology, Ghardaia, Algeria.

² Valorization And Conservation of Arid Ecosystems Laboratory. Ghardaia, Algeria. "VCAEL"

**Corresponding author e-mail: doudou.brahim@univ-ghardaia.dz

ABSTRACT:

Our work consists of inventorying and analyzing the vegetation of the Ghardaia region. The inventory conducted allowed us to establish a floristic list presented by 105 species, distributed among 27 families dominated by the Asteraceae (19 species). Regarding biological types, the species inventoried in the Ghardaia region show the dominance of Therophytes with 36 species followed by Chamephytes with 32 species. The flora includes a balanced vegetative type: 46% perennial plants and 41% annual plants. It is noted that the majority of species belong to the Dicotyledons group (89%). The frequency of the species inventoried shows a dominance of *Anabasis articulata*, followed by the following species: *Retama raetam*, *Anabasis aphylla*, *Pergularia tomentosa* L., *Peganum harmala* L., and *Zilla spinosa*. The species analysis shows a dominance of the Saharo-Sindian element with 31 species, or 29.52%, and the Global Endemic element with 16 species, or 15.24%, followed by the Mediterranean element with 15 species, or 14.29%, followed by the Cosmopolitan element with 12 species, or 11.43%. Note that the proportions of the other taxa: Saharo-Mediterranean and Mediterranean-Saharo-Mediterranean, which are roughly equivalent at 1.90 to 3.81%, and the remaining taxa are low at 0.95%. This region is characterized by significant plant diversity and a relatively high rate of endemism.

Keywords: Inventory, plant biodiversity, biological type, Ghardaia, ecology, floral richness.

Les modifications du cortège floristique par l'effet anthropique sur les plants spontanés arborés tels que le Pistachier de l'Atlas, au Sahara septentrional - Ghardaïa

BELHIRI Sami^{1**}, BOUZID Abdehakim¹, Hammina¹

Laboratory of Saharan Bioresources: Preservation and Valorization, Kasdi Merbah University – Ouargla

^{**}Corresponding author e-mail: belkhirisami05@gmail.com

Abstract:

The Atlas Pistachio, commonly known as Betoum, is a noble species with rapid growth, capable of reaching up to 20 meters in height under favorable conditions. Its crown is generally hemispherical and large, covering more than 150 m². In the northern Sahara, particularly in the Ghardaïa region, naturally developing stands of this species are very rare. This study aims to understand how the natural structure of *Pistacia atlantica* populations has been modified by anthropogenic effects, including agricultural expansion and various types of cultivated plantations, in the context of biodiversity changes and agricultural evolution. Our work consists of studying, during winter and summer seasons, three different stations in the commune of Berriane: Oued Soudane, Oued El Kabch, and Oued N'ssa. The objective is to assess the current state of *Pistacia atlantica* stands, both in natural form and mixed with cultivated plantations, within an agricultural domain and a protected area. The results show that the natural floristic composition of *Pistacia atlantica* in Oued N'ssa and Oued El Kabch differs from that of Oued Soudane, as do the vegetation cover and dendrometric measurements recorded in the three stations.

Keywords: *Atlas Pistachio*, anthropogenic impact, agriculture, northern Sahara.

Ecobiological Study and Microclimatic Role of Lake Sidi Mohamed Benali in the Arid Zones of Northwestern Algeria.

Mohamed Samir MEHTOUGUI^{1*}, Ardjoum Safia¹, Mehtougui Farouk¹, Kerfouf Ahmed¹

¹ Djilali LIABES University, Faculty of Natural and Life Sciences

Corresponding author email: mehsam22@yahoo.fr

Abstract.

Lake Sidi Mohamed Benali, located in western Algeria, is considered one of the most important natural reserves in the region. Covering an area of 26 hectares, with a storage capacity of 3 million m³ and a depth reaching 15 m, this aquatic ecosystem plays a key role not only in ecology and recreation but also in regulating the local microclimate. Its presence mitigates extreme temperatures, increases ambient humidity, and contributes to maintaining biodiversity, particularly in surrounding arid and semi-arid zones. However, growing anthropogenic pressure and resource exploitation have led to significant ecosystem degradation, including water pollution, biodiversity loss, and threats to several species. Physico-chemical and bacteriological analyses conducted on samples collected from multiple littoral stations have provided an assessment of the lake's ecological deterioration. In parallel, an inventory of aquatic and riparian fauna and flora was carried out to document the species present. Although the diagnosis reveals an alarming degradation, it also highlights the crucial role of this lake in local climate regulation. Therefore, urgent conservation, restoration, and sustainable management measures are required to preserve its ecological, climatic, and socio-economic functions in the medium and long term.

Cheese whey for cost-efficient cultivation of indigenous microalga *Chlorella sp.* for biodiesel production.

Ghobrini Djillali^{1,2 *}, Zakaria Ghobrini² and Kebbab Leila³

1 *Unité de Recherche Appliquée en Energies Renouvelables, URAER, Centre de Développement des Energies Renouvelables, CDER, 47133, Ghardaïa, Algeria*

2 *Department of Biotechnology, University of Chemistry and Technology Prague, Technická 5, 166 28 Prague, Czechia*

3 *Département de Biologie, Faculté des Sciences de la Nature et de la Vie et des Sciences de la Terre, Université de Ghardaïa, 47133, Ghardaïa, Algeria*

ghdjillali@yahoo.fr

Abstract.

The aim of this study was to find a sustainable and less expensive growing media to replace artificial media in order to produce low-cost vegetable oils from wet algal biomasse for the biodiesel market

Thus, an indigenous green strain *Chlorella sp.*, was isolated in the oasis of Metlili in the Northern Algerian Sahara and has been evaluated for its ability to grow in cheese whey wastewaters (CWW) under heterotrophic conditions. Microalgal growth in CWW was tested in shake flasks, with the addition of various salts, and the results were to those obtained with an artificial modified basic medium (MBM). Additionally, wet lipids extraction process was applied and the pure algal lipids were converted into fatty acid methyl esters (FAMES) through acid transesterification for biodiesel production. The results show that the use of cheese whey wastewater (CWW) alone cannot compete with an artificial modified basic medium (MBM). However, when salts (N, P, and Mg) were added to the cheese whey (MCWW), the productivity increased from $0,04 \text{ g.L}^{-1} \text{ h}^{-1}$ to $0,086 \text{ g.L}^{-1} \text{ h}^{-1}$. Furthermore, the variation in the content of pure lipids obtained in the MCWW culture remains statistically insignificant compared to those obtained in MBM and it represents, respectively, $10.58 \pm 2.164 \%$ and $16.21 \pm 1.35 \%$ of the dry algal biomass produced. In addition, the total biodiesel content was 18.55%, which corresponds to a conversion of 4.78 % g FAMES/g of dry microalgal cells into biodiesel.

A simple adjustment of the mineral composition of the cheese whey wastewater can be considered for cost-efficient cultivation of the indigenous microalga *Chlorella sp.* for biodiesel production.

Keywords: *Chlorella sp.*, cheese whey, biomass, productivity, algal biofuel.



TOPIC



Oral presentation

**FAUNISTIC
BIODIVERSITY**



Oral presentation

Distribution Pattern Of Waterbirds In The Sahar Wetlands Of Algeria And Impact Of Climate Changes On Its Hydrological Fluctuations

Ettayib BENSACI ^{1**}, Asma ZOUBIR¹, Hadjer KERIA¹, Yacine NOUIDJEM¹ & Moussa HOUHAMDI²

¹ *Department of Natural and Life Sciences, University of M'sila, M'sila, Algeria.*

² *Department of Biology, University of Guelma, Guelma, Algeria.*

****Corresponding author e-mail:** tayeb.bensaci@univ-msila.dz .

ABSTRACT:

Avian diversity is used to assess the functionality of the wetland complex in the northern Sahara of Algeria. Several environmental parameters of these wetlands can affect the richness and distribution of aquatic avifauna from one site to another. Analysis of the status of aquatic bird species found in these ecosystems reveals a remarkable variety in phenological status, biogeographic origin, trophic category, and protection status. The avifauna of this important part of the country exhibits a biogeographic affinity with the Western Palearctic, depending on the dominant fauna types. Although this complex contains five wetlands classified as being of international importance by the RAMSAR convention and is home to several species protected at national and international levels, no protection measures have been taken by the authorities, and any management plan has been put in place, particularly for species classified as threatened and vulnerable on the IUCN Red List (Marbled Teal *Marmaronetta angustirostris*, Ferruginous Duck *Aythya nyroca*).

The results of the analysis of climate data of these wetlands in relation to the hydrological dynamics over 40 years reveal clear negative impacts, including increased drought levels and vegetation degradation. Environmental indicators, such as NDVI, EVI and NDWI, demonstrate the close relationship between climatic conditions and plant growth, highlighting the need to develop effective strategies to preserve these sensitive ecosystems. Understanding these dynamics is an essential step in strengthening the sustainability of ecosystems and addressing the challenges posed by climate change.

Keywords: Wetland, Waterbirds, Sahara, Diversity, Climate Changes, Algeria .

Scorpions recently discovered in Algeria (2010-2025)

Salah Eddine SADINE^{1,2*}

¹ Faculty of Natural and Life Sciences and Earth Sciences, University of Ghardaïa, BP 455 Ghardaïa 47000, Algeria ,

² Laboratories of Valorization and Conservation of Ecosystems Arids (LVCEA), Faculty of Natural Sciences and Life, University of Ghardaia, Algeria.

*Corresponding author e-mail address: sse.scorpion@yhoo.fr

ABSTRACT:

The scorpion fauna of Algeria is considered to be both homogeneous and indigenous. In the last fifteen years (2010-2025), 28 species are added to Algerian scorpion fauna. All these species are morphologically identified, except *Scorpio atlasensis* was identified and genetically confirmed.

This scorpions list is divided into 10 genera, belonging to two families: Buthidae with 25 species and Scorpionidae with 3 species. We note a dominance of *Buthacus* and *Buthus* with 7 species of each. *Lissothus* and *scorpio* are presented by 3 species. *Cicileus* and *Orthochirus* included 2 species. While the other genera are presented by one species.

The number of the confirmed scorpion species in Algeria is raised to 59, which attests a very important diversity with more than 50% of endemism. These findings show the presence of three distinct hot spot according to scorpion diversity: the Hoggar massif (8 species), Chebka du Mzab (6 species) and the Tassili n'Ajjer (5 species).

Keywords: Scorpions, species, endemic, Algeria.

Contribution To The Inventory Of Parasitic Nematofauna In Crops Within The Oasis Agrosystem Of The M'zab Valley

Saïda CHEHMA^{1 **}, **Djamel SMAHA**²,

¹Ghardaia University, Faculty of Natural and Life Science sand Earth Sciences, Department of agronomy, Ghardaia, Algeria.

² National Institute for Plant Protection Algiers. Algeria

**Corresponding author e-mail: schehma@gmail.com

ABSTRACT:

The inventory of the existing plant-parasitic nematofauna in the oases of the Oued Mzab valley was carried out in the oases of four different municipalities (El-Atteuf, Bounoura, Daya Ben Dahoua, and Ghardaïa). Soil samples for analysis were taken at two times of the year, in December and in March. Nematological analysis revealed the presence of 455 individual plant-parasitic nematodes and identified 17 nematode genera belonging to 11 families. These belong to two orders: Tylenchida, representing 81%, and Dorylaimida, with 19%. The inventoried plant-parasitic nematodes were classified according to their parasitic mode. Ectoparasites were the most prevalent (53%) with 9 genera, followed by semi-endoparasites at 23% with 4 genera. Sedentary and migratory endoparasites accounted for 12% of the inventoried plant-parasitic nematodes.

Keywords: Inventory Nematofauna Oases Oued mzab valley Plant-parasitic Nematodes

Invasive Bird Species in North Africa

Mohamed. Attia. ISSA

Harmful Animals Research Department - Plant Protection Research Institute - Agricultural Research Center, Egypt.

Corresponding author e-mail: mohamedissa011@gmail.com

ABSTRACT:

Invasive bird species are defined as non-native birds that cause significant ecological and economic harm. It poses a major threat to the biodiversity. These species successfully establish and spread by outcompeting native birds for resources, preying on them, altering habitats, and transmitting diseases. This can lead to a degradation of ecosystem services, substantial agricultural losses, and even the extinction of native species.

Climate change exacerbates this case, where rising temperatures facilitate the expansion of invasive birds into previously unreachable areas, while simultaneously forcing native species to shift their geographic ranges. Consequently, it's crucial to conduct an early-detection surveys and predictive mapping of these invasive alien species (IAS) to develop effective strategies for their control, eradication, and prevention. Some of the most problematic invasive birds which established in North Africa include Common Myna (*Acridotheres tristis* Linnaeus, 1766), Rose-Ringed Parakeet (*Alexandrinus krameri* Scopoli, 1769) and House Crow (*Corvus splendens* Vieillot, 1817).

Two of the most problematic invasive bird species in North Africa are the Common Myna (*Acridotheres tristis*) and the Rose-Ringed Parakeet (*Alexandrinus krameri*), spreading globally through the pet trade and established across North Africa in Egypt, Libya, Tunisia, Algeria and Morocco. Its aggressive species who has multifaceted impacts. The Common Myna, listed among the world's worst invasive species, it poses a severe threat through aggressive competition with native cavity-nesting birds, predation on eggs and chicks, as well as its role as an agricultural pest and potential vector for human diseases.

The Rose-Ringed Parakeet is spread globally via the pet trade, it causes a serious economic damage to agriculture, as well as disrupting the native biodiversity by outcompetes and even kills native wildlife for nesting sites, fundamentally altering local ecosystems.

Together, these species prove the significant economic or ecological challenges posed by invasive avifauna and highlighting the urgent need for targeted management across in the region.

Keywords: Invasive, Bird, Threat, North Africa, Common Myna, Rose-Ringed Parakeet, House Crow.

First Data On Forensically Necrophagous Insect's Diversity In The Tiaret Region (North-Western Algeria)

Mounira BELKHARCHOUCHE ^{1,2}, Bouchra ALLOUCHE ¹, Amal AOUNALLAH¹, Djedouani BRAHIM³, Ammar TEBOUL³,

Moussa TOUMI³

¹ Faculty of Nature & Life Sciences Ibn Khaldoun University. Tiaret 1400. Algeria

² Laboratory of biosystematics and ecology of arthropods. University of Frères Mentouri Constantine 1. 2500. Algeria.

³ National Institute of Criminalistics and Criminology of the National Gendarmerie (INCC/GN). Forensic entomology and corpse laboratory. Algiers 1600. Algeria.

Corresponding author e-mail : mimibel7425@gmail.com

ABSTRACT:

The objectives of this study were: i) To identify the necrophagous species diversity in the Tiaret region; ii) To document the decomposition process of cadavers; and iii) To estimate the post-mortem interval (PMI) using necrophagous insects. A study was conducted on the necrophagous entomofauna associated with rabbit cadavers placed on the campus of the Faculty of Natural and Life Sciences (SNV) at the University of Tiaret during the spring season (March 2024). Insect samples at various developmental stages were collected daily. Larvae were reared, and the collected specimens were identified in the entomology laboratory of the National Institute of Criminalistics and Criminology of the National Gendarmerie in Bouchaoui, Algiers. A total of 302 specimens were collected, including seven dipteran species identified as: *Calliphora vicina*, *Lucilia silvarum*, *Lucilia sericata*, *Calliphora vomitoria*, *Sarcophaga* sp., *Musca* sp., and *Fannidae* sp., belonging to four different families. As for coleopterans, two species were identified: *Dermestes frischii* and *Saprinus semistriatus*, belonging to two families. In terms of abundance, the dipterans from the Calliphoridae family *Calliphora vicina* and *Lucilia sericata* were the most dominant. The post-mortem interval (PMI) was estimated using the accumulated degree days (ADD) method, through which the time since death was determined.

Keywords: Forensic entomology, Cadavers, Necrophagous diptera, Post-mortem interval (PMI), Tiaret, Algeria.

Posters

Chironomid Diversity In The Tassili n'Ajjer Region (Algeria)

Khaled KOULALI ^{1 2 3 **}, Abdelhakim BOUZID ^{1 2 3}, Isslam CHERGUI ^{1 2 3}, Boudjéma SAMRAOUI ^{2 4}, Angela BOGGERO ⁵

¹Laboratoire de bio-ressources sahariennes : préservation et valorisation, Faculté des sciences de la nature et de la vie, Ouargla, Algeria

²Laboratoire de Conservation des Zones Humides, Université 8 mai 1945 Guelma, Guelma, Algeria

³Département des Sciences Biologiques, Université de Ouargla, Ouargla, Algeria

⁴Department of Biology, University Badji Mokhtar Annaba, Annaba, Algeria

⁵ Italian National Research Council Verbania Pallanza, Italy angela.boggero@irsa.cnr.it

****Corresponding author e-mail:** koulalikhaledcoa@gmail.com

ABSTRACT:

This study provides a first contribution to the knowledge of Chironomidae from the Tassili n'Ajjer, a little-explored Saharan region in southeastern Algeria. Sampling was conducted over two consecutive years, targeting different types of aquatic habitats (temporary and permanent water bodies, lotic and lentic environments). Fifteen representative sites were systematically surveyed.

The results allowed the establishment of the first local checklist of Chironomidae from the Tassili n'Ajjer, comprising twelve species distributed among three subfamilies. This study offers new insights into the diversity of chironomids in the extreme south of Algeria and serves as a baseline for future research on Chironomidae inhabiting extreme environments.

Keywords: Diversity, Central Sahara, Algeria, Diptera, Wetlands

Fluctuating Asymmetry And Environmental Stress On A Specie Of Lizard *Scincus Scincus* In The Arid Region Of El Oued.

Hayat LAOUFI^{1,2**}, MEHAOUA Mohamed Seghir², Merabti Brahim²

¹El Oued University, Faculty of Natural and Life Science, Department cellular and molecular biology, El Oued, Algeria.

²Laboratory of Diversity of Ecosystems and Dynamics of Agricultural Production Systems in Arid Zones (DEDSPAZA), University of Biskra, Biskra, Algeria

**Corresponding author e-mail: laoufi-hayat@univ-eloued.dz

ABSTRACT:

The intensive use of pesticides in agricultural environments can have dramatic impacts on wildlife. We analyzed the fluctuating asymmetry of 6 morphological traits and the body condition index in *scincus scincus* lizards, where the total number of samples was 111 individuals carried out in the region of El Oued on three different stations, two stations with agricultural character (El Raqiba and El Rabah), and a non-agricultural station (Douar El Ma). This study recorded high levels of fluctuating asymmetry for individuals from the three agricultural stations with significant results ($p = 0.0014$) for females for all three regions and ($p = 0.0000$) for males for all three regions. The integrated evaluation of several measures of developmental instability at different levels, which in this case provided uneven results, can be a powerful methodological guide for future studies, as it improves the detection of environmental perturbations on phenotypic variation and facilitates the biological interpretation of the results.

Keywords: *Scincus scincus*, Pesticides, El Oued, Morphological variability, Fluctuating asymmetry (FA).

Hematologic Reference Intervals in Barb Horses from Algeria: Effect of Age and Sex.

Mira CHIKHAOUI^{1,2**}, Fadhéla SMAÏL^{1,2} and Souad AICHE³

¹-Department of Animal Health, Veterinary Sciences Institute, Ibn Khaldoun University, Tiaret 14000, Algeria

²-Laboratory of Research on Local Animal Products

³-Department of Veterinary Sciences, Faculty of Sciences, University of Laghouat, Algeria

**Corresponding author e-mail: chikhaoui.mira7@gmail.com

ABSTRACT :

The Barb horse, emblematic of Maghreb heritage and a symbol of Berber pride, holds a significant place in Algerian history, culture, and tradition. Renowned for its adaptability to diverse environments, the breed exhibits variations across its native regions. This study aimed to establish reference hematologic values specific to Barb horses raised at the national stud farm "Chaou-Chaoua" in Tiaret, Algeria, while assessing the influence of age and sex. Forty animals were divided into eight groups: four female groups (A: 1–2 years; B: 3–5 years; C: 5–10 years; D: 11–23 years) and four male groups (E: 2–3 years; F: 5–7 years; G: 10 years; H: 11–25 years), with five horses per group. Blood samples were collected to determine standard hematologic parameters, including : erythrocytes (RBC), hematocrit (Ht), hemoglobin (Hb), mean cell volume (MCV), mean corpuscular hemoglobin concentration (MCHC), mean hemoglobin content (MHC), white blood cells (WBC), neutrophils, eosinophils, basophils, lymphocytes, monocytes, platelets, total number of platelets (PLT) and mean platelet volume (MPV). Results revealed that the Barb horse values fall within the general range reported for other hot-blooded breeds but tend toward the lower reference limits for RBC, Hb, Ht, WBC, and lymphocytes. Statistically significant differences ($P < 0.05$) were noted among female groups for PLT, and MPV, and among male groups for lymphocytes and platelets. Overall, hematologic parameters appear weak, near lower reference thresholds, and age or sex does not exert a major influence on the Barb horse profile. These findings provide baseline data essential for the clinical assessment and health monitoring of this culturally important breed.

Keywords: Barb horse, Hematological parameters, Hematology, Age, Sex.

NEW DATA of Diet and Global Distribution of Chiropterological Species in Algeria: Case Study of the Maghrebian mouse eared-bat *Myotis punicus*, Highland region, Bouira.

Tahar MEFTAH ^{1 2*}, Mourad AHMIM ^{1 2}, Nacera BOUTERA ³, Sabah TIGHLIT ^{1 2}, Ouissal BENZEBOUCHI ⁴

¹Département des Science biologiques et de l'environnement, Faculté des Sciences de la Nature et de la Vie, Université Abderrahmane MIRA Bejaia.

²Laboratoire de recherche d'écologie et environnement LREE, Université Abderrahmane MIRA- Béjaïa, 06000.

³Département des Sciences de la Nature et de la Vie, Faculté des Sciences, Université Mohamed Boudiaf, M'Sila.

⁴Département de Biologie, Faculté des Sciences de la Nature et de la Vie, Université Chadli Benjedid-El Tarf, Laboratoire de Biodiversité et pollution des écosystèmes

*Corresponding author e-mail: Tahar.meftah@univ-bejaia.dz

ABSTRACT:

Due to its vast area in Africa and worldwide, Algeria is one of the countries rich in flora and fauna, which is reflected in its diverse ecosystems. Chiropterans hold a valued position among vertebrates due to their ecological importance and implications for public health. They are represented by 27 species belonging to seven families; these mammals remain poorly known, having been the subject of very few studies, and are also underrepresented in the work of naturalists.

The study of the various chiropteran species was conducted in the Highland region of Algeria between June 2021 and June 2024. Two inventory methods were employed: capture and direct observation in their habitats. The data collected to date appear to confirm the rarity of certain species and, in particular, our study model: the Maghrebian mouse eared-bat myotis (*Myotis punicus*), which is listed on the IUCN Red List as a data-deficient species. This insectivorous bat species provides essential ecosystem services by preying on insects that are pests to agriculture, forest ecosystem and public health.

The investigation of dietary patterns represents the first reported data on chiropteran fauna in the Algerian Highland region of Bouira, based on guano sample analysis. The 15 *Myotis punicus* guano samples analyzed contained 771 prey fragments. The results indicate that this species consumes prey belonging to three arthropod groups in the study area: Insecta (frequency: 96.06%), Chilopoda (2.82%), and Araneae (1.12%).

Keywords: Chiroptera ; Biodiversity ; Algeria ; Diet ; *Myotis punicus* ; Highland region.

Inventory Of Beetles Associated With Aleppo Pine In Two Forest Biotopes Natural And Reforested (Semi-Arid Region -Djelfa).

SBA BENTELHEDDI^{1**}, BENRIMA ATIKA ².

¹ Djelfa University, Faculty of Natural and Life Science sand Earth Sciences, Department of Agronomy, Djelfa, Algeria.

² Ghardaia University, Faculty of Natural and Life Science sand Earth Sciences, Department of biology, Ghardaia, Algeria

b.sba@univ-djelfa.dz , atiguen@yahoo.fr.

Abstract :

The objective of this research is to evaluate the behavior of Coleoptera species encountering different species in two environments, a natural forest of Senalba and a reforestation of Ain Maâbed (the forest), generally dominated by *Pinus halepensis*, and to compare insect biodiversity. In this context, an inventory of Beetle species was carried out during the year 2022 with the use of Berber pots. The sampling allowed identifying 22 species distributed over the 8 families. The most numerous families of species and individuals are the Curculionidae with 6 species followed by the two families, the Tenebrionidae and the Carabidae with 4 species. The Scarabaeidae, The Chrysomilidae, The Buperstidae, are represented by two species for each, and finally the Elateridae, the Coccinellidae are represented by a single species. The Shannon index has an average of 3,594 bits; the maximum value is in the reforested environment Ain Maabed with 3,095 bits. The equitability is average 0,760 bits; the highest value is noted in reforestation with 0,842 bits.

Keywords: Beetles, Forest, Reforestation, Biodiversity, semi-arid, Djelfa.

The Desert Environment and Scorpion Biodiversity in the Oued Righ Region and the Impact of Environmental Changes on It

MENACER Nadia ¹, SELMANE Mehdi¹

⁽¹⁾Laboratory Biology, Environment and Health, Department of Biology ,

Faculty of Natural Sciences and Life, El Oued University, Algeria

nadia-menacer@univ-eloued.dz

ABSTRACT:

Algeria's diverse ecosystems, ranging from arid deserts to high-altitude regions, contribute to a rich and varied scorpion biodiversity. Numerous studies have focused on documenting and understanding the distribution patterns of scorpion species, as well as the influence of environmental factors on their occurrence and diversity. The Oued Righ area (M'rara region) in the Algerian desert presents a valuable opportunity for further exploration and discovery regarding scorpion ecology in harsh desert environments. The aim of this study is to investigate scorpion diversity, identify the species present, and assess their activity patterns. To this end, field surveys were conducted in 2024 using subjective sampling methods. Our results revealed the presence of two scorpion sub-species in the M'rara region: *Androctonus australis* (agricultural fields and farms), *Androctonus aeneas* (residential houses). Each subspecies occupies a distinct ecological niche within the region. Quantitative analysis showed that *A. aeneas* was the predominant species, comprising about 60% of captures, followed by *A. australis* at 45%. Both *A. australis* and *A. aeneas* exhibited peak activity from June to August. Overall, scorpion activity was highest during the warmer months from May to August and significantly reduced during the colder months of January, February, November, and December. The biodiversity and distribution of scorpions in the Oued Righ region are strongly influenced by arid climatic conditions, habitat heterogeneity, and the geographic characteristics of the area.

This study highlights the need for further research to comprehensively document and understand the scorpion fauna of the region. Such efforts are essential to develop effective conservation strategies for these species and to preserve the overall ecosystem.

Keywords: Oued Righ, Scorpion, *Androctonus australis*, *Androctonus aeneas*, Biodiversity, Algeria

Landscape Structure Effects on Dove Distribution and Abundance along an Urban–Rural Gradient in Southeastern Algeria

Nasrine SAAD ^{1**}, Nacerddine MATALLAH², Kamilia FARHI¹, Maroua ALLALOU¹, Amel Siham TAHER³,

¹Laboratory Promotion of Innovation in Agriculture in Arid Regions, Mohamed Khider University, Biskra, Algeria

²National Plant Protection Institute, 12 Avenue of the brothers Quadek Hacem Badi, BP 80, El Harrach, Alger, Algeria.

³National School of Food Sciences and Agri-Food Industries, ESSAIA, Alger, Algeria.

****Corresponding author e-mail:** saad.nesrine@yahoo.com

matallah.nasro@gmail.com

k.farhi@univ-biskra.dz

allalou.maroua@gmail.com

tahar.amel1999@gmail.com

ABSTRACT:

Our study underscores the pivotal role of urban and rural landscape heterogeneity in shaping the distribution and abundance of three sympatric columbids species within the Biskra region. A key objective was to identify the species most sensitive to potential future land-use changes. To address this, we quantified the influence of specific landscape components along an urban–rural gradient on species occurrence and relative abundance. Field surveys were conducted during the peak breeding season of columbids using a vehicle-based point count protocol. Six transects of 12 km each were randomly selected, encompassing a total of 450 georeferenced observation points. All turtle detected visually or acoustically within a 250 m radius at each point were recorded and identified to species level. The results indicate that the abundance of the Eurasian collared dove is positively correlated with built-up area coverage (t-value = 10.400). In contrast, the European turtle dove (t-value = -4.748) and the laughing dove (t-value = -3.993) are more abundant in less urbanized areas. For each species, the three best explanatory models of abundance were identified. These findings emphasize the importance of preserving landscape diversity in the Biskra region to maintain the coexistence of these three sympatric species. They also highlight the need to integrate habitat management into land-use planning policies to mitigate the impact of increasing urbanization on local biodiversity.

Keywords: Urban and rural landscape, Columbids, Breeding season, Preserving, Diversity, Habitat management

Adaptation And Resilience Of Sheep Farming Systems In The Algerian Steppe: Diversity Of Strategies Between Birine (In The North) And Messaâd (In The South) (Djelfa).

Aissa BENHAMIDA ^{1**}, Abdelhakim SENOUSSE ², Brahim GUIT ³, Mohamed LAHOUEL ³, Boudjemâa SAHEL ³.

1: Hamma Lakhdar University Faculty of Natural and Life Science Department of agronomy- El Oued;

2: Kasdi Merbah University Faculty of Natural and Life Science Department of agronomy - Ouargla;

3: Ziane Achour University Faculty of Natural and Life Science Department of agronomy – Djelfa

**Corresponding author e-mail: benhamida-aissa@univ-eloued.dz

ABSTRACT:

The Algerian steppe, extending over nearly 20 million hectares and supporting more than 17 million sheep, is facing accelerated rangeland degradation due to the combined effects of climate change, sedentarization, and demographic pressure (Le Houérou, 1959; Pouget, 1980; H.C.D.S., 2008; Nedjraoui & Bédrani, 2008). Sheep farming, a key economic and social activity in the Djelfa region, is directly affected by this scarcity of resources (M.A.D.R., 2014; Kanoun et al., 2016). Surveys conducted with 66 farms in Birine and Messaâd, analyzed through Principal Component Analysis (PCA), identified four farmer profiles: intensive (Messaâd, heavy use of inputs), extensive (Birine, relying on natural rangelands), mixed (grazing combined with supplementary feeding), and marginalized (small-scale, weakly integrated into markets). Two adaptation models stand out: Birine: an intensified agro-pastoral system integrating agriculture and livestock, with diversified forage (green barley, alfalfa) and large flocks (>150 head) (Nedjraoui & Bédrani, 2008; Bourbouze, 2006; Hadbaoui, 2020); Messaâd: a more traditional pastoral system, based on mobility, natural rangelands, and moderate use of concentrates (Huguenin et al., 2015; Bencherif, 2011). Adopted strategies—mobility, feed diversification, and supplementation—illustrate resilience, but vulnerabilities persist: growing dependence on inputs, unequal access to water and land, and increasing pressure on rangelands (Hadeid et al., 2015; Hourizi et al., 2017). Recommendations highlight the need to rehabilitate rangelands, regulate pastoral mobility, support forage diversification, improve access to water and inputs, and promote mixed systems as resilient models. The inclusion of marginalized farmers in public policies also remains a priority (Bourbouze, 2016; Nedjraoui & Bédrani, 2008).

Keywords: Change, Adaptation, Resilience, Livestock, Sheep, Djelfa.

Faunistic And Epidemiological Characterization Of Scorpion Envenomation In The Algerian Sahara: Case Of The Province Of El Oued.

Hamza SAADI ^{1**}, Aicha MOUANE ², Hanine BELKACEMI ³, Manar FETHIZA ALI ⁴, Nacira RAMDANI ⁵, Maria CHIKHA ⁶,

Fares MOHAMED AMINE ⁷, Massaoud GUEDDOUL ⁸, Salah Eddine Sadine ⁹

1 Laboratory of Biodiversity and Application of Biotechnology in Agricultural Field (BABDA). Department of Cellular and Molecular Biology; Faculty of Natural Science and Life. El Oued University, Algeria 39000.

2,8 Department of Biology, Faculty of Nature and Life Sciences, University of El Oued, 39000 El-Oued, Algeria.

3,4,5 Department of Cellular and Molecular Biology; Faculty of Natural Science and Life. El Oued University, Algeria 39000.

6 Management of Animal Health and Productions Laboratory, Institute of Veterinary Sciences, University of Frères Mentouri Constantine 1, Constantine, Algeria.

7 Mohamed Cherif Messaadia University, Institute of Agricultural and Veterinary Sciences, laboratory of Science and Techniques for Living, BP 41000 Souk Ahras, Algeria.

9 Laboratory for the Valorization and Conservation of Arid Ecosystems (LVCEA). Faculty of Natural and Life Sciences and Earth Sciences, University of Ghardaïa, Ghardaïa, Algeria.

**Corresponding author e-mail: saadi-hamza@univ-eloued.dz

ABSTRACT:

Our study is a contribution to characterize the epidemiological situation of scorpion envenomation in the province of El Oued (Algeria), by an exhaustive search for the causal species and an analysis of the epidemiological data of this region. During the study, we sampled a large number of scorpions belonging to ten scorpion species specialized in this biotope which qualified this region as a red zone, in particular *Androctonus australis* (relative abundance = 48,72%) the most dangerous species in Algeria. Analysis of epidemiological data (2018 to 2024) showed that 34,640 cases of scorpion stings were reported, resulting in 10 deaths. When the morbidity shows an average annual incidence rate of 585.8 per 100,000 inhabitants. The highest incidence rate was reported in 2019, with 694.8 cases per 100,000 inhabitants, and the highest number of stings was recorded in 2020, (6,259 cases). During the seven years of study, the scorpion stings affect more men than women, with a sex ratio of 2.86. This observation is noted for all age groups, the most affected being those aged 15 to 49. However, the scorpion stings are mostly concentrated (41.14%) between 18h and 23h. While, September recorded the highest number of cases of the year with more than 1040. Mortality analysis shows an equal number of deaths between the sexes and the distribution of deaths by age group reveals a predominance among individuals aged 15-49 (40%), noting that the highest case lethality rate in our study was recorded in 2018, at approximately 0.09%, with 5 deaths.

Keywords: Scorpion diversity, Envenomation, Mortality, Lethality, El-Oued province, Algeria

Influence of Zootechnical and Geographical Factors on the Weight of Sahrawi and Tergui Dromedaries in the Northern Algerian Sahara

Fouzia MOUHOUB ^{1**}, Amor OULAD BELKHIR ¹

¹*Ouargla University, Faculty of Natural and Life Sciences, Department of Agronomic Sciences, Ouargla, Algeria.*

¹*Laboratory of Saharan Bioresources: Preservation and Valorization, Ouargla, Algeria*

****Corresponding author e-mail:** mouhoubfouzia590@gmail.com

ABSTRACT:

In the dromedary (*Camelus dromedarius*), live weight represents a key indicator of body condition, growth, and productive potential. This parameter is influenced by various zootechnical and environmental factors, including age, sex, coat color, rearing region, and population type. In the northern Algerian Sahara, the Sahrawi and Tergui populations constitute a valuable camelid heritage, whose scientific characterization remains limited despite their importance within pastoral systems. The present study focused on 219 dromedaries aged between 4 and 22 years: 150 Sahrawi (84 in Ouargla, 26 in Ghardaïa, and 40 in El Oued) and 69 Tergui (20 in Ouargla, 30 in Ghardaïa, and 19 in El Oued). Sixteen biometric measurements were precisely recorded using a simple retractable 5-meter tape, and live weight (LW) was estimated using Boue's barometric formula. Statistical analyses revealed that sex, age, and population type exert a significant influence on live weight. Geographical region significantly affected the weight of Sahrawi dromedaries but not that of the Tergui population. Conversely, coat color had no significant effect in either population. These findings highlight the need for a better understanding of the determinants of body weight in dromedaries in order to optimize husbandry practices and ensure the sustainable valorization of these animal resources in Algeria's desert regions.

Keywords: Live weight, Sahrawi population, Tergui population, Algerian Sahara

The control of scorpions using botanical biopesticides.

Linda ROUARI ^{1,2**}, Abdelmalek ROUARI ³, Zineb SOULEM ^{4,2}, Amel ROUARI ², Nacira BOUKHARI ², et Salah Eddine SA-

DINE ^{1,2}

¹*Valorization And Conservation of Arid Ecosystems Laboratory (VCAEL). Faculty of Natural and Life Science sand Earth Sciences, University of Ghardaia, Ghardaia, Algeria*

²*Faculty of Natural and Life Science sand Earth Sciences, University of Ghardaia, Ghardaia, Algeria*

³*Laboratoire de Bioressources Sahariennes: Préservation et Valorisation, Faculty of Natural and Life Sciences, University of Ouargla, 30000 Ouargla-Algeria.*

⁴*Laboratoire de Mathématiques et Sciences Appliquées (LMSA), Faculté des Sciences et de la Technologie, Université de Ghardaïa, 47000 Ghardaïa, Algeria.*

****Corresponding author e-mail:** rouari.linda@gmail.com

ABSTRACT:

Like other countries in North Africa, the Middle East, and South America, Algeria is severely affected by scorpion envenomations, particularly in desert regions. To combat this threat, residents often resort to chemical pesticides, which harm the environment. This study aims to develop biopesticides derived from plant extracts as a biological control method against scorpions. It focuses on the effectiveness of *Peganum harmala* and *Euphorbia guyoniana* extracts against *Androctonus australis*. The extraction of active compounds was carried out through cold maceration, and chemical testing was used to identify the main plant constituents. Scorpions were exposed to different extract concentrations (10, 15, 20, 25, and 30 mg/ml) via spraying, and their behavior was monitored over a 72-hour period. Results showed that *Euphorbia guyoniana* contained a wide range of chemical compounds, while *Peganum harmala* caused the first mortalities after 24 hours, reaching a maximum mortality rate of 60% at 30 mg/ml. Scorpion mortality rates varied depending on concentration and exposure time, without reaching 100%. Toxicity tests revealed that *Peganum harmala* was more effective after 72 hours, with lower lethal doses compared to *Euphorbia guyoniana*. Analyses also indicated that extracts from both plants show promising potential for biological control of scorpions, with inhibition rates ranging from 20% to 100% after 72 hours of exposure. The study concluded that plant extracts from *Peganum harmala* and *Euphorbia guyoniana* are highly effective and play a crucial role in the biological control of scorpions.

Keywords: *Androctonus australis* Hector, biocontrol, Extract, Ghardaïa

Newly Dromedary Breeding Practices As Sustainable Strategies To Mitigate The Effects Of Environmental Degradation

Hafsia BEDDA ^{1,2**}, Imane HAMDİ ¹ and Yamina BENBESSISSE ^{1,2}

¹ École Normale Supérieure de Ouargla, Algeria. Department of Natural Sciences.

²Saharan Bio-Resources Laboratory: Preservation and Valorization. University Kasdi Merbah, Ouargla, 30000, Algeria.

E-mail : beddahafsia@gmail.com

ABSTRACT:

Dromedary is a vital capital of pastoral and agro-pastoral livelihoods in arid ecosystems, where traditional nomadic livestock farmers have adopted new lifestyles, management methods and husbandry practices to improve their livestock incomes and increase the value of dromedary products. Aiming to evaluate marketing activities of the newly camel husbandry practices, production and reproductive performances and production challenges, household surveys were conducted from September 2020 to March 2021. Thus, formal and informal interviews were carried out in three locations in the Algerian northern Sahara with 11 camel breeders, who held a total of 537 dromedaries. The study identified three types of dromedary farming systems, performed by males, namely: 70% of the farms were peri-urban, semi-intensive dairy farms established to meet the rising demand for camel milk, with significant milk yield (4 – 7 liters), 23% were settled, intensive, peri-urban feedlot farms producing all categories of fattened dromedaries, especially young males and where females produced 7– 15 calves in their lifetime, and 7% were settled, urban, and peri-urban dromedary racing farms dedicated to breeding dromedaries for racing and riding during local festivals, activities anchored in the traditions of the native population. The surveyed farms generated income from the sale of milk and live animals, with manure and wool also contributing to their earnings. The food resources used for dromedaries were natural pastures, crop residues and harvest residues. This intensification of dromedary breeding appears essential to ensure the sustainability of this animal resource as it can improve their productive and reproductive potentials.

Keywords: Dromedary, Milk, Meat, Economic viability, Algeria.

Ecological Survey Of Entomofauna Of Pisum Sativum Subsp. Sativum Cultivated In The Arid Zone Of Algeria.

Rayane SAIFI^{1*}, Hadjer SAIFI², Hysen KOKIÇI³, Ali K. AŞKIN⁴, İzzet AKÇA⁴ & Bekri XHEMALI⁵

¹Research Laboratory of Sciences and Environment: Bioresources, Geochemical-Physics, Legislation and socio-economic development (C1810200), University of Tamanrasset, 11039, Sersouf, 11000, Tamanrasset, Algeria

²Biogeochemistry of Desert Environments Laboratory, Scientific and Technical Research Center in Physi-Cochemical Analysis, Department of Biological Sciences, Route de Ghardaia, Kasdi Merbah University, BP.511, 30000, Ouargla, Algeria.

³Institute of Plant Genetic Resources, Agricultural University of Tirana, Tirana, Albania.

⁴University of Ondokuz Mayıs, Department of Plant Protection, Samsun, Turkey.

⁵Institute of Plant Genetic Resources, Agricultural University of Tirana, Tirana, Albania.

****Corresponding author e-mail:** rayanesaifi2015@gmail.com

ABSTRACT:

Pea (*Pisum sativum subsp. sativum*) is one of the most widespread legumes in the semi-arid and irrigated regions of southern Algeria due to its nutritional value and low cultivation costs. However, despite this nutritional and economic importance, national production is below its potential, mainly due to pressure from pests and diseases. Its agroecosystem is closely linked to the diversity and dynamics of the arthropod fauna, including harmful and beneficial species, which maintain its ecological balance. This study aimed to conduct a qualitative and quantitative inventory of the insect and mite fauna of this pea in the arid region of Sidi Okba (Biskra, Algeria) during the 2018-2019 growing season. Sampling was carried out using several techniques, including yellow sticky traps, pitfall traps, and direct plant inspection. The collected samples were identified to the lowest possible taxonomic level and classified according to their ecological role. The most abundant groups were aphids (Aphididae), thrips (Thysanoptera), leaf miner flies (Agromizidae), and predatory mites (Acari: Phytoseiidae). Variations in species composition and abundance were observed, reflecting the influence of climatic conditions. These results contribute to a better understanding of insect biodiversity in arid agroecosystems and provide a basis for the development of integrated pest management strategies adapted to local conditions.

Keywords: Pea, Arid agroecosystem, Biodiversity, arthropod fauna, Algeria.

Taxonomic Update On Buthacus Scorpions From El-Atteuf (Ghardaia, Algeria)

Yacine BENGAIID ¹, Moussa HOUHAMDI ¹, Salaheddine SADINE ², Haroun ABIDI ¹, Omayma ZOUATINE ²

¹ Laboratoire Biologie, Eau et Environnement (LBEE), Faculté SNV-STU, Université 8 Mai 1945 Guelma. BP. 401 24000 Guelma, Algeria.

² Faculté des Sciences de la Nature et de la Vie et Sciences de la terre, Université de Ghardaïa, BP 455 Ghardaïa 47000, Algeria

Corresponding author e-mail: bengaidyacine@yahoo.com

ABSTRACT:

This study presents a quantitative and qualitative inventory of the scorpion fauna of the genus Buthacus Birula, 1908 (Buthidae) in the El-Atteuf region of Ghardaïa, Algeria. The genus Buthacus, commonly known as sand scorpions, comprises about 35 species worldwide and includes several micro-endemic populations in Algerian sandy deserts. Over a 12-month sampling period in 2022, five species were recorded: Buthacus arenicola (Simon, 1885), B. birulai Lourenço, 2006, B. samiae Lourenço & Sadine, 2015, B. spinatus Lourenço, Bissati & Sadine, 2016, and B. deserticus Sadine, Souilem, Lourenço & Ythier, 2024. These findings represent 42% of all Buthacus species reported in Algeria and 14% of the global diversity of the genus (2022). Most of these species exhibit a strong affinity for erg or sandy habitats, except B. samiae, which shows a broader distribution within the study area and the surrounding reg.

Keywords: Scorpions, Buthacus, Inventory, Sandy habitats, El-Atteuf, Ghardaia

The Pharaoh Eagle-Owl (*Bubo ascalaphus*) as an Apex Predator in Saharan Ecosystems: Implications for Rodent Control.

Yasmine LAKHDARI^{1**}, Abdelhakim BOUZID^{2,3}, Makhlof SEKOUR²

¹Ghardaia University, Faculty of Natural and Life Science sand Earth Sciences, Department of agronomy, Ghardaia, Algeria.

² Laboratory of Saharan Bio-resources: Preservation and Valorisation (BRS), University of Ouargla, Algeria

- sekkmakk@yahoo.fr
- ³Laboratoire de Conservation des Zones Humides (LCZH), Université de Guelma, 24000 Guelma, Algérie
- bouzyd.abdelhakim@univ-ouargla.dz

****Corresponding author e-mail:** yasmine@univ-ghardaia.dz

ABSTRACT:

This study investigates the trophic diet of the Pharaoh Eagle-Owl (*Bubo ascalaphus*) through the examination of regurgitated pellets in the El-Goléa region, located in the central part of the northern Algerian Sahara. Analysis of 53 pellets revealed 28 prey species, with an average of 2.6 ± 1.07 prey species per pellet. Six major prey categories were identified: Arachnida, Insecta, Reptilia, Aves, Rodentia, and Chiroptera. The most frequently consumed prey included *Gerbillus nanus* (AR = 39.3%), followed by an unidentified bat species (AR = 10.8%) and *Mus musculus* (AR = 10.8%). The Shannon-Weaver diversity index (H') for prey species was 3.4 bits, with a maximum diversity (Hmax) of 5 bits across all prey. Additionally, our findings suggest that in El-Goléa, the Pharaoh Eagle-Owl acts as a generalist predator (E = 0.73), exhibiting a moderately diversified diet. These results highlight its potential role in natural rodent control within Saharan ecosystems.

Keywords: Trophic diet, Pharaoh Eagle-Owl, Pellets, Prey, Rodents, El-Goléa.

Effects of Climate on Scorpion Diversity in Arid Ecosystems of the Sahara Desert of Algeria.

Zineb SOUILEM^{1**}, Salah Eddine SADINE², Moussa HOUHAMDI³, Linda ROUARI²

¹ Laboratoire de Mathématiques et Sciences Appliquées (LMSA), Faculté des Sciences et de la Technologie,
Université de Ghardaïa, 47000 Ghardaïa, Algeria

² Laboratoire Valorisation et Conservation des Ecosystèmes Arides (LVCEA), Faculté des Sciences de la
Nature et de la Vie et Sciences de la Terre, Université de Ghardaïa, 47000 Ghardaïa, Algeria

³ Laboratoire Biologie, Eau et Environnement (LBEE), Faculté SNV-STU, Université 8 Mai 1945 Guelma, 401,
24000 Guelma, Algeria

****Corresponding author e-mail:** zinebsouilem294@gmail.com

ABSTRACT:

In desert ecosystems, arthropods such as scorpions are understudied, and sufficient information is still lacking regarding their biodiversity. Specimen collection was carried out over 24 months (2016–2017). This study assessed the phenology, abundance, richness and diversity of scorpion species in arid ecosystems of the Sahara desert of Algeria (Ghardaïa). It examined the potential influence of climate parameters (precipitation, temperature and wind) on activity density, diversity and the phenological distribution of the species among seasons. We identified eight Buthidae species: *Androctonus aeneas*, *Androctonus amoreuxi*, *Androctonus australis*, *Buthacus samiae*, *Buthacus spinatus*, *Buthacus elmenia*, *Buthus saharicus* and *Lissothus chaambi*. *Androctonus amoreuxi* and *Androctonus australis* were the most abundant and omnipresent species, comprising 54.41% and 33.82% of all species found, respectively. Shannon's index and the evenness index demonstrated a very poor diversity of scorpions in this region and a poor balance between the number of sampled species. Seasonal variation and climate parameters, i.e., temperature and wind, influenced the number, distribution, and the diversity of scorpions. The number of species found in Ghardaïa Province represents more than 20% of the scorpion species reported in Algeria.

Keywords: Diversity, Scorpion, Seasonal variation, species, Sahara, Algeria

Characterization of Aquatic Invertebrate Community of the Lower Sahara

Raouf KORICHI⁽¹⁾, Afifa ALMI⁽²⁾ and Ibtissem BEDRA⁽¹⁾

¹-Kasdi Merbah University, Faculty of Nature and Life Sciences, Department of Agronomy, Laboratory for the Protection of Ecosystems in Arid and Semi-Arid Zones, Ouargla 30000, Algeria.

²-Ecole Normale Supérieure, Department of Natural sciences, Laboratory of Saharan Bioresources, Preservation and Conservation, Ouargla 30000, Algeria.

* Corresponding author e-mail : rfkorichi@gmail.com

ABSTRACT:

Under the impact of global changes and harmful human activities, the environment of the wetlands in the Algerian Sahara will be profoundly altered. The conservation of these wetlands, which are islands of biodiversity, requires in-depth knowledge of their living components. This study aims to investigate the complexity of aquatic macroinvertebrates in the wetlands of the El Megheir region (Ain Chikh) from December 2023 to May 2024. Two capture techniques are used (one active trap and two passive traps). It has been found that the pH, EC and salinity values of the water are higher at Lake Oued Khrouf than at Oued Mouillah. The temperature at Lake Oued Khrouf is lower than at Oued Mouillah. Vegetation cover at Lake Oued Khrouf is 39.24%, mainly due to *Halocnemum strobilacem* (19.62%), while at Oued Mouillah the cover rate is 39.22%, with *Zygophyllum album* (15.7%) considered the most abundant. The census reveals the presence of 30 species divided into 16 families and 7 orders within 2 site, with Lake Oued Khrouf being the richest (S=27 species). *Stagnicola palustris* is the most abundant species at Lake Oued Khrouf (23.46%) and Oued Mouillah (23.37%). It is by far the most ubiquitous species, ahead of *Bidesus unistriatus* and *Chironomus thummi* (constant) as well as *Berosus signaticollis*, *Ephyridae* sp. ind. and *Culex pipiens* (regular). Lake Oued Khrouf is more diverse (3.92 bits) than Oued Mouillah (3.24 bits). The evenness index E has a value of 0.82 at Lake Oued Khrouf and 0.73 at Oued Mouillah. There is a fairly high degree of similarity (75%) between the aquatic invertebrate communities at the two sites. The presence of odonates at both sites is a major factor in the preservation of these wetlands. Three species inhabit the waters of both sites: *Crocothemis erythraea*, *Anax parthenope* and *Enallagma deserti*. Their autochthonous nature are verified, as the waters of these sites offer adequate quality for these odonates to reproduce. Thirteen other species of odonata are captured in winged form. It is advisable to protect sites with remarkable diversity and to explore several other sites with different physiognomies in order to acquire in-depth knowledge of the invertebrate fauna of

Keywords: Aquatic invertebrates, El Megheir, Lake, Wady, Sahara, diversity.

Breeding Biology of the House Bunting (*Emberiza sahari*) in the Sebseb Region (Ghardaïa, Algeria)

Fadhila KAFI¹, Soumia HADDAD², El-Yamine² GUERGUEB, Oumayma³ ZOUATINE.

¹Univesity 8 Mai 1945 of Guelma, Faculty of Natural and Life Sciences and Earth Sciences, Laboratory of Health, Water and Environment (LBEE), 24000 Guelma, Algeria

²University of Ghardaïa, Faculty of Natural and Life Sciences and Earth Sciences, Laboratory for the Valorization and Conservation of Arid Ecosystems (LVCEA), 47000 Ghardaïa, Algeria

³Kasdi Merbah University Ouargla, Laboratory of Saharan Bio-Resources, Conservation and Valorization, Faculty of Natural and Life Sciences, , Ouargla 30000, Algeria

[**drsee_shaddad@yahoo.com](mailto:drsee_shaddad@yahoo.com)

ABSTRACT:

In Saharan environments, harsh climatic constraints strongly influence avian reproductive strategies. This study investigates the breeding biology of the House Bunting (*Emberiza sahari*) in the Ghardaïa region (North-central Algerian Sahara) during the 2022–2023 breeding season, aiming to determine how local environmental conditions affect its reproductive success.

Conducted at Sebseb, Ghardaïa, the study describes the breeding chronology, nesting site selection, and main causes of breeding failure. The breeding season extends from late February to May, with a peak of laying activity in April. Clutch size ranged from 3 to 4 eggs, of which 2 to 3 hatched. Nest abandonment and predation were identified as the main causes of failure. These findings highlight the adaptive capacity of the Desert Bunting to the extreme conditions of the Sahara.

Key words: *Emberiza sahari*, breeding biology, reproductive success, Ghardaïa, Sahara Desert.

Urbanization and Avian Diversity in a Saharan City: The Case of Ghardaïa.

Affaf GUERBOUZ^{1,3**}, El-Yamine GUERGUEB^{1,2}, Soumia HADDAD^{1,2}, Choayb BOUNAB^{1,2}

¹Ghardaia University, Faculty of Natural and Life Science sand Earth Sciences, Department of biology, Ghardaia, Algeria.

²Valorization And Conservation of Arid Ecosystems Laboratory. Ghardaia, Algeria. "VCAEL

³Materials, Energy Systems Technology and Environment Laboratory, Ghardaïa, Algeria.

****Corresponding author e-mail:** guerbouz.affaf@univ-ghardaia.dz

ABSTRACT:

In this study, we examined the avian diversity within an urban environment in the northern Algerian Sahara (Ghardaïa city). Bird data were collected using point counts distributed across three habitats along an urban-rural gradient. A one-way analysis of variance (ANOVA) was employed to evaluate the influence of habitat on species richness, the number of families, and species abundance. Throughout the study, 44 bird species were identified, belonging to 10 orders and 23 families. The highest values of the Shannon-Wiener diversity index ($H' = 3.82$), Margalef index ($D = 3.66$), and Simpson index ($D = 0.92$) were recorded in the rural habitat. Significant differences were observed in species number, families, and abundance across the different habitats, with rural habitats on the city outskirts supporting the greatest diversity of bird species and families.

Keywords: Diversity index, Bird communities, Rural-urban gradient, Habitat, Ghardaia city.

Feeding Habit Of The Crested Porcupine *Hystrix Cristata* (Rodentia, Hystricidae) In A Semi-Arid Area Of Its Native North African Range

F. BOUNACEUR^{1**}, BENAMOR N ¹⁻² et LASGAA F ¹

¹ Équipe de Recherche Biologie de la Conservation en Zones Arides et Semi Arides, Laboratoire Agronomie Environnement, Institut des Sciences de la vie et de la Nature Tissemsilt University, Tissemsilt 38000, Algeria.

² Faculté des Sciences de la vie et de la Nature Université de Tiaret 14000, Algeria.

**Corresponding author e-mail: fbounaceur@yahoo.fr

Abstract.

We investigated the feeding ecology of the crested porcupine *Hystrix cristata* in a semi-arid area of its north-western Algerian native range over 8 months (September to April). Our results from micro-histological analysis based on faecal pellets revealed that this strict herbivore ate only 10 plant species, 8 wild and 2 cultivated, belonging to 9 families including Lamiaceae, Palmaceae, Poaceae, Ramnaceae and Fabaceae. The autumn diet was dominated by *Thymus algeriensis*, *Ziziphus lotus*, *Chamaerops humilis* and *Triticum aestivum*, the winter diet by *T. algeriensis* and *C. humilis*, and the spring diet by *Muscari comosum*, with a large amount of *Vicia faba* and *T. aestivum*. We confirm the role of this rodent species as a generalist herbivore which barely feeds on cultivated plants when wild resources are diverse and abundant.

Key words: *Hystrix cristata*, micro-histological analysis, seasonal diet, food selection, rodent, Algeria

Assessment of the Diversity and Spatial Distribution of Birds in the Semi-Arid Steppes of Guelif – Aïn Zitoune (Oum El Bouaghi Province)

Abdelaziz BOUZEGAG ^{1,2}, abderraouf chouaib REBBAH ^{1,2}, Nouredine BOUCHAREB ^{1,3}

¹ Institute of Natural and Life Sciences, Department of Ecology and Environment, Abdelhafid Boussouf University Center, Mila, Algeria

² Laboratory of Functional Ecology and Environment, University of “Larbi Ben M'hidi” Oum El Bouaghi, Algeria

³ Laboratory of Natural Sciences and Materials, Institute of Natural and Life Sciences, Department of Ecology and Environment, Abdelhafid Boussouf University Center, Mila, Algeria

* a.bouzegag@centre-univ-mila.dz

Abstract

The monitoring of avifauna in the steppe formations of the Aïn Zitoune municipality (Guelif sector, Oum El Bouaghi province), conducted over three years with two point abundance index (PAI) surveys per year (a total of six surveys), recorded 72 bird species belonging to 13 orders and 17 families. Among the most frequently observed species were the Eurasian Skylark, Crested Lark, Greater Short-toed Lark, Northern Wheatear, and Corn Bunting.

Species richness varies with vegetation formations: halophilic and shrubland environments show distinct assemblages compared to steppes with *Stipa tenacissima* (alfa grass) and communities of *Artemisia herba-alba*. The vegetation formations encountered include: *Ephedra*, various xerophytic plants (drought-adapted succulents/cacti), alfa steppes and chamaephytic communities on rugged terrain, bushy high-plateau steppe dominated by *Haloxylon articulatum*, halophilic communities with *Salsola vermiculata* and *Atriplex halimus*, as well as steppes with *Stipa tenacissima* and white wormwood (*Artemisia herba-alba*).

The relative abundance of species is heterogeneous among formations: some species (larks) dominate open grasslands and low plateaus, while others are associated with halophilic shrubs or scree. The analyses reveal a positive relationship between vegetation cover (structure and density) and avian richness and abundance, underscoring the importance of maintaining steppe vegetation mosaics for the conservation of local avifauna.

Keywords: Avifauna, semi-arid steppes, Point abundance indices (PAI), richness, spatial distribution, *Haloxylon articulatum*, Oum El Bouaghi

Biodiversity and Conservation of Mammals in the Semi-Arid Region of Oum El Bouaghi (Northeastern Algeria): Inventory, Conservation Status, and Spatial Distribution.

Abderraouf chouaib REBBAH ^{1,2}, Abdelaziz BOUZEGAG ^{1,2}, Nouredine BOUCHAREB ^{1,3}

¹Institute of Natural and Life Sciences, Department of Ecology and Environment, Abdelhafid Boussouf University Center, Mila, Algeria

² Laboratory of Functional Ecology and Environment, University of "Larbi Ben M'hidi" Oum El Bouaghi, Algeria

³ Laboratory of Natural Sciences and Materials, Institute of Natural and Life Sciences, Department of Ecology and Environment, Abdelhafid Boussouf University Center, Mila, Algeria

* a.rebbah@centre-univ-mila.dz

Abstract.

Semi-arid regions of Algeria harbor a remarkable faunal biodiversity but remain among the most vulnerable ecosystems due to increasing anthropogenic pressures and climate change. This preliminary study aims to assess the species diversity and conservation status of mammals in the Oum El Bouaghi province, located in the semi-arid zone of northeastern Algeria. The methodological approach combined direct field observations, bibliographic data analysis, and local community surveys to integrate traditional ecological knowledge.

A total of 21 mammalian species were recorded, belonging to 14 families representing several orders (Carnivora, Rodentia, Lagomorpha, Chiroptera, and Artiodactyla). Among them, six species are protected according to the Algerian Red List (2012), and one species is listed as Near Threatened (NT) on the IUCN Red List. Fourteen species were directly observed, while the presence of four others was confirmed through indirect evidence such as tracks, droppings, feeding sites, and resting areas.

A cartographic analysis using Geographic Information Systems (GIS) was employed to map the spatial distribution of the recorded species and to examine their ecological gradients, including altitude, vegetation type, and proximity to agricultural and water zones. The results revealed a higher concentration of species in the northern and central parts of the province, particularly in steppe and woodland habitats, highlighting the ecological value of these environments for mammalian fauna.

This study underscores the significance of Oum El Bouaghi as an important reservoir of mammalian biodiversity within the semi-arid landscapes of Algeria. It also emphasizes the need to strengthen ecological monitoring programs, raise public awareness, and develop integrated conservation strategies to preserve this fragile natural heritage under growing environmental and anthropogenic pressures

Keywords: Biodiversity – Mammals – Oum El Bouaghi – Conservation – Semi-arid zones

Inventory of Beetles in the Saharan Agroecosystem of the Oued Righ Region

Badreddine DEKKOUMI ^{1**}, Youcef ALIOUA ², Salim MEDDOUR ³.

¹Ghardaia University | Université de Ghardaia, Natural life, and Earth sciences, Agronomy, Mathematics and Applied sciences, Ghardaia, Algeria;

²Université de Ghardaia, Natural life, and Earth sciences, Agronomy, Laboratoire Valorisation et Conservation des Écosystèmes Arides (LVCEA), Ghardaia, Algeria;

³Université de Ghardaia, Natural life, and Earth sciences, Agronomy, Laboratoire Valorisation et Conservation des Écosystèmes Arides (LVCEA, Ghardaia, Algeria;

**Corresponding author e-mail: dekkoumi.b@email.com

ABSTRACT:

This study aims to inventory beetle diversity in the arid region of Oued Righ, Wilaya of El Meghaier, Algeria. Monitoring was carried out over a 12-month period, from November 2022 to October 2023, across five stations with different characteristics: Berkadjia (alfalfa), Chott Merouane (wetland), Berkadjia (cereal cultivation), Ain Chikh, and Messaka. The region, located approximately 550 km southeast of Algiers (33° 57' 02" N, 5° 55' 27" E), is characterized by a mild winter Saharan bioclimatic stage. Climate data for 2023 show an average annual rainfall of 29.71 mm and an average annual temperature of 23.3 °C (Tutiempo, 2025).

Sampling was conducted exclusively using the Barber pitfall trap method. A total of 1157 beetle individuals, belonging to 25 families, were captured. The Berkadjia (alfalfa) station showed the highest richness with 325 individuals distributed across 15 families, followed by Ain Chikh with 232 individuals (13 families) and the Chott Merouane wetland with 200 individuals (10 families). The Messaka and Berkadjia (cereal cultivation) stations showed lower family diversity, with 242 individuals (3 families) and 158 individuals (7 families), respectively. This study highlights the composition and distribution of beetle communities in a Saharan agroecosystem,

Keywords: Coleoptera, Barber trap, Biodiversity, Agro ecosystem, Arid environment, Algeria

Impact of Mobile Telephone Relay Antennas on the Reproduction of the White Stork *Ciconia ciconia ciconia* (Linnaeus 1775) in Northeastern Algeria.

Nadia ZIANE ^{1*}, Dounia SAKRAOUI ², Rym GHALEM ³, Hadia RIZI ⁴, Rachid ROUAG ⁵

^{1,2,3} Laboratoire de biosurveillance environnementale, département de Biologie, faculté des sciences, université Badji Mokhtar 23000 Annaba

^{4,5} Laboratoire de Biodiversité et pollution des écosystèmes, département d'Agronomie, faculté des sciences, université Chadli Bendjedid 36000 El-Tarf

**Corresponding author e-mail: nadia.ziane@univ-annaba.dz

ABSTRACT:

Mobile phone relay antennas have become new nesting supports used by the white stork *Ciconia ciconia ciconia* (Linnaeus, 1775). These antennas are not without danger because they emit electromagnetic waves that can have a major, although insidious, impact on the species. The objective of this work is to evaluate the effects of these electromagnetic waves on the reproduction of the white stork. In northeastern Algeria, particularly in the regions of Annaba and El-Tarf, we monitored the breeding phenology of storks according to the distance of their nests from the relay antennas during two consecutive seasons, 2020 and 2021. The nests were counted and divided into three distinct groups: the first is located on the relay antennas, the second less than 200 m away and the third more than 300 m from the antennas. We calculated the nest occupancy, the number of young in the nest and the number of nests without young. The results show that nests located directly on the antennas have a small clutch size, not exceeding two storks, and a low reproductive success, the majority of nests (51.9%) having remained without young. The number of young storks tends to increase in nests far from the antennas. Broods of 3 and 4 storks are generally those located more than 300 m from the relay antennas.

Keywords: White stork, Northeastern Algeria, Relay antennas, Electromagnetic waves, Breeding phenology.

Analysis of the main threats to the natural population of the North African Gundi (*Ctenodactylus gundi*) in Algeria.

Fatine LASGAA ¹, Naceur BENAMOR ¹⁻², Farid BOUNACEUR ¹, Halima BOUTHELDJA ³, Karima GHIT ⁴

¹Équipe de Recherche Biologie de la Conservation en Zones Arides et Semi Arides, Laboratoire Agronomie Environnement, Institut des Sciences de la vie et de la Nature Tissemsilt University, Tissemsilt 38000, Algeria.

²Faculté des Sciences de la vie et de la Nature Université de Tiaret 14000, Algeria.

³Laboratoire d'écobiologie animale Ecole Normale Supérieure de Kouba Alger.

⁴Université Ferhat Abbas Sétif I- Faculté des sciences de la nature et de la vie, Département d'Écologie et environnement, Laboratoire de valorisation des ressources biologiques naturelles (LVRBN).

Corresponding author e-mail :

Lasgaa Fatine : lasgaafaten@yahoo.fr

ABSTRACT:

This study aims to identify and analyze the main threats facing natural populations of the North African Gundi (*Ctenodactylus gundi*) in Algeria. Field monitoring and surveys were conducted between 2013 and 2017 to assess its ecology and risk factors. The results confirm that *C. gundi* is a social and diurnal species, primarily inhabiting natural (cliffs, scree slopes) or artificial (ruins) rocky shelters, without digging burrows. Natural threats include predation by raptors, canids (jackal, fox), the North African cobra, and felids (including the domestic cat). A significant anthropogenic threat is hunting by groups of adolescents, motivated by capture for domestication or consumption, and by habitat modification. In terms of health, mange and mite infestations have been frequently reported. This synthesis of threats provides essential foundations for the development of conservation strategies for this species in Algeria.

Keywords: Threats, *Ctenodactylus gundi*, Conservation, Algeria.

Evaluation Of Aquatic Ecosystem Health Via Benthic Macroinvertebrates And Physicochemical Parameters In Northern Sahara, Algeria.

Fayssal GHOUGALI ^{1**}, Chérif GHAZI ², Sofiane BENSOUILAH ¹, Mohamed Naceur YUCEFI ¹, Mohammed Abdelmadjid BOUMEDDIENE ¹ and Zohra HOUYOU ¹

¹ Université Amar Telidji Laghouat, Faculté des sciences, Département de Biologie, 37G Route de Ghardaia, Laghouat, 03000, Algérie

² Université Mostefa Benboulaïd Batna 2, Faculté des sciences de la nature et de la vie, Département écologie et environnement, 53 route de Constantine Fesdis, Batna 05078, Algérie.

****Corresponding author e-mail:** f.ghougali@lagh-univ.dz

ABSTRACT:

This study aims to assess the ecological integrity of water habitats in the northern Sahara of Algeria, utilizing a multiparametric approach focused on the ecology of benthic macroinvertebrates. To monitor the water quality, benthic macroinvertebrates and physicochemical parameters were analyzed monthly from August 2015 to November 2017 throughout five aquatic ecosystems: Z'mor Wadi, Ithel Wadi, Djedi Wadi, Ayata lake, and Megarine lake. The physicochemical analysis results indicate that the pH values at the research sites ranged from mildly alkaline to alkaline. Turbidity and suspended solids were markedly increased in Djedi wadi and Z'mor wadi. The mean BOD₅ values across all examined aquatic systems demonstrated moderate organic pollution levels, with the highest amounts recorded in Djedi wadi, Ithel wadi, and Megarine lake. In terms of salinity, Djedi wadi exhibited slightly brackish conditions, whereas the remaining sites ranged from brackish to highly brackish. The recorded fauna included 995 individuals, representing 55 genera/taxa across 8 orders and 29 families. The most diverse taxa were Coleoptera (24 taxa), Diptera (14 taxa), and Hemiptera (10 taxa), with Diptera and Coleoptera being the most dominant. Z'mor and Ithel wadi had the highest biodiversity, with a total richness of 35 taxa and a Shannon score over 2.50. PCA-Biplot and cluster analysis identified three groups, indicating the significance of site typology and environmental factors on the distribution of benthic macroinvertebrate communities. The IBGN evaluation classified the hydrobiological quality of water as poor in Djedi wadi, Ithel wadi, Megarine lake, and Ayata lake, but Z'mor wadi demonstrated moderate water quality.

Keywords: Benthic Macrofauna, Physicochemical parameters, Diversity indices, Northern Sahara, Algeria

Trends To Adaptation Of The Sahara Frog (*Pelophylax Saharicus*) Larvae Across An Environmental Gradient

Soufyane BENSOUILAH ^{1**}, Mohammed Abdeldjid BOUMEDDIENE ¹, Fayssal GHOUGALI ¹, Mostafa Naceur YUCEFI ¹, Zohra HOUYOU ², Rabah ZEBSA ³

¹ Department of Biology, Faculty of Sciences, Amar Telidji Laghouat University, Laghouat, Algeria.

² Laghouat University-Mechanics Laboratory, P.O. Box 37, Laghouat 03000, Algeria

³ Laboratoire Biologie, Eau & Environnement (LBEE), Faculty of SNVSTU, University of 8 May 1945, 24000 Guelma, Algeria

****Corresponding author e-mail:** soufyane.bensouilah@lagh-univ.dz

ABSTRACT:

Species adjust their behavior and life-history to adapt to local environmental conditions. Species with a broad ecological niche often show signatures of local adaptations to different environment, particularly in extreme ones. Here, we investigate local adaptation in different populations of the North African Sahara frog (*Pelophylax saharicus*) living in various environmental conditions that vary mostly in temperature, precipitation, and elevation by mean of common garden experiment aiming to estimate the growth rate under two predation treatments (absence or presence of non-lethal cues of dragonfly larvae). First, we found an elevational cline in the reproductive phenology where, from low to high elevation, the reproductive season shifts to later dates, whereas that in arid environment was later than all other populations. We suggest that geographic differences in temperature and rainfall (in arid areas) explain this phenological pattern. Second, hatching success was overall high but showed a slight decline across elevation. Third, growth rate was generally faster in low and intermediate elevation populations, but slower in high elevation and arid environment populations. Populations in low and intermediate elevation responded to predation by reducing growth rate and the size at metamorphosis, but no predatory responses were recorded in high elevation and arid environment populations. Our study shows some life history signatures of local adaptation of *P. saharicus* in Northeast Algeria, which does not go in line with recent genetic analysis showing low population differentiation in the region.

Keywords: Life history; Phenology, Growth, Elevation, Desert, Amphibian.

The wetlands of the Oued M'zab Valley (Ghardaïa) and the diversity of their aquatic birdlife

Choayb BOUNAB^{1,2**}, Radhia BIAD^{1,2} and El-yamine GUERGUEB^{1,2}

¹Ghardaïa University, Faculty of Natural and Life Science sand Earth Sciences, Department of biology, Ghardaïa, Algeria.

²Valorization and Conservation of Arid Ecosystems Laboratory. Ghardaïa, Algeria. "VCAEL

**Corresponding author e-mail: bounab.choayb@univ-ghardaia.edu.dz

ABSTRACT:

El-Goléa is an oasis in the central Algerian Sahara, located 950 km south of Algiers and 280 km southwest of the city of Ghardaïa, the provincial capital. Its geographical coordinates are: altitude 360 m, longitude 02°52' East, and latitude 30°35' North. Its average area is approximately 270 km².

This lake serves as a wintering site for many species of waterbirds, which make up its ecological richness. It also acts as a resting and feeding area for numerous species of Anatidae (10 species), the most abundant of which are: the Northern Shoveler (*Anas clypeata*), the Eurasian Wigeon (*Anas penelope*), the Mallard (*Anas platyrhynchos*), the Gadwall (*Anas strepera*), the Common Teal (*Anas crecca*), and the Ferruginous Duck (*Aythya nyroca*).

In this year-long study, we aim to present an ecological assessment of the wintering ecology of all Anatidae species found at the most important site in the region. The data cover species counts, structure, phenology, and the patterns of spatial and temporal distribution and habitat use by these species in this biotope.

The majority of wintering birds, particularly Anatidae, occupy the central areas of the water body, near stands of bulrush (*Scirpus lacustris*) and among the clumps of narrowleaf cattail (*Typha angustifolia*).

Keywords: Sebket El-Maleh, Anatidae, Aquatic birdlife, Wintering, Algerian Sahara.

Dynamics Of Scorpion Communities In Different Ecosystems Of Eastern Algeria: An Exhaustive Ecological Study.

Haroun ABIDI ¹, Moussa HOUHAMDI ¹, Salaheddine SADINE ², Yacine BENGAIID ¹

¹ Laboratoire Biologie, Eau et Environnement (LBEE), Faculté SNV-STU, Université 8 Mai 1945 Guelma. BP. 401 24000 Guelma, Algeria.

² Faculté des Sciences de la Nature et de la Vie et Sciences de la terre, Université de Ghardaïa, BP 455 Ghardaïa 47000, Algeria

Corresponding author e-mail: abidi.haroun54@gmail.com

ABSTRACT:

The scorpion is a very important taxon for ecological and biogeographical studies. In Algeria, this animal remains understudied. Our work is a pioneering contribution to the study of scorpions in the northeastern part of Algeria, following a climatic gradient in three regions: El-Tarf (Humid), Souk-Ahras (Subhumid), and Tébessa (Semi-arid and Arid). Through random sampling in each region during the period from 2019 to 2020, we identified eight species of scorpions belonging to two families. The family Buthidae is represented by six species: *Androctonus australis* and *Androctonus aenea*, *Buthus aures*, *Buthus tunetanus*, *Buthus paris*, and *Buthus goyffoni*. The second family is Scorpionidae, with two species: *Scorpio punicus* and *Scorpio maurus*. The two *Androctonus* species and *S. punicus* are located in the Semi-arid and Arid climates. Meanwhile, the *Buthus* species showed a gradient according to the climate, with *B. tunetanus* found in the Semi-arid and Arid climates, *B. aures* in the Semi-arid and Subhumid climates, and the two *Buthus* species, *B. paris* and *B. goyffoni*, found in large numbers in the Humid climate. *Scorpio maurus* was found in both the Subhumid and Humid climatic zones. This list of eight species represents only 14% of the total richness reported in Algeria, which suggests a high probability of the existence of other scorpion species that our sampling therefore missed.

Keywords: Scorpion population, Agro-ecosystem, Bioclimatic zones, Eastern Algeria, Buthidae, Scorpionidae.

First Confirmed Breeding Record of the Eastern Olivaceous Warbler (IDUNA PALLIDA REISERI. HILGERT, 1908) in the Ghardaïa Region, Algerian Sahara

Redouane NEDJAR¹, El-Yamine GUERGUEB², Soumia HADDAD², Yassine NOUIDJEM³

¹University of Ghardaïa, Materials Laboratory, Energy Systems Technology and Environment, BP 455 Ghardaïa 47000, Algeria

²University of Ghardaïa, Faculty of Natural and Life Sciences and Earth Sciences, Laboratory for the Valorization and Conservation of Arid Ecosystems (LVCEA), 47000 Ghardaïa, Algeria

³University of M'sila, Faculty of Science, PO box ichebilia, 28000 M'sila, Algeria

nedjar.redouane@univ-ghardaia.dz

ABSTRACT:

We observe the Eastern Olivaceous Warblers (*Iduna pallida reiseri*) breeding for the first time in the Ghardaïa region. It is the first confirmation of its reproduction in the northern Algerian Sahara. This subspecies is specific to the arid environments of North Africa. Our work just confirmed the important role of the Saharan ecosystems for the generation of this bird. This study also indicates that it is a regular breeder in this area.

Key words: arid environment, breeding, North Africa, Saharan ecosystems.

Feeding Ecology, Circadian Activity And Space Use Of The Mongoose (*Herpestes Ichneumon*) In The Djurdjura National Park (Northern Algeria).

Leïla KEBBAB^{1,2}, Messaoud BENSIDHOUM², Djamila ALI AHMED²

¹ Département de Biologie, Faculté des Sciences de la Nature et de la Vie et des Sciences de la Terre, Université de Ghardaïa, 47133, Ghardaïa, Algeria

² Département de Biologie, Faculté des Sciences Biologiques et des Sciences Agronomiques, Université Mouloud Mammeri Tizi-Ouzou, B.P. 17 R.P., Tizi-Ouzou, 15000, Algérie

kebbab.leila@univ-ghardaia.edu.dz

Abstract

The use of space and feeding habits of large gray Mongooses, *Herpestes ichneumon*, were studied in Djurdjura (Forest of Darna), south-eastern Tizi-Ouzou, during 12 months between 2012 and 2013.

The space occupation assigns model to Herpestidae, formed of mosaic landscapes containing a mixture of cultures and scrub. Circadian activity patterns can be crepuscular, and mongoose daily activity time adapts to the activity rhythm of its staple prey.

The diet was studied through the analysis of 360 faeces monthly collected, show the predominance of rodents, particularly wood mice (*Apodemus sylvaticus*), the importance of plants and the regular presence of insects. During summer, the species moves closer to watercourses. This is reflected by a decrease, or even an absence, of faeces on the usual sites, and by a marked increase of faeces near the watercourse. This seasonal change is also accompanied by the appearance of crustaceans in the diet.

Evidences of correlations between the dietary variations and environmental factors emphasized the influence of environmental variable on the space use and feeding ecology of *Herpestes ichneumon*.

Key words: *Herpestes ichneumon*; space occupation; feeding ecology; circadian activity, Djurdjura national park.

Study Of Some Hematological Parameters In Dromedaries

Zahira HARICHE ¹, Donia MAHMOUD ², Wassila Dehbia KOUADRIA ³, Mymouna CHENOURI ⁴, Ahmed AICHOUNI ⁵

^{1,2} Department of Veterinary Sciences, Amar Telidji University of Laghouat, Algeria.

^{3,4,5} Faculty of Science and Technology, Department of Natural and Life Sciences, El Wancharissi University of Tissemsilt, Algeria.

Email: harichezahira.veto@gmail.com

ABSTRACT:

The dromedary, if only because of its unique physiology, should be given special attention because it is an animal particularly adapted to arid climates. Due to its economic and social importance, several works on the blood parameters, anatomy, physiology and pathology of this animal have been carried out, in this context this present work essentially aims to determine the values of some hematological parameters in camels raised in southern Algeria according to sex, age, breed and physiological state and on the other hand contribute to establishing the reference blood parameters in these animals.

This study was carried out at the hematology and biochemistry laboratory of the Institute of Veterinary Sciences of Tiaret on 17 clinically healthy dromedary cases (9 females and 8 males, of three different breeds: Arab, Ouled Naeil and Targui and of different age categories) where we evaluated the hematological parameters, more precisely the red blood count and the white blood count.

According to the results obtained, the average number of RBC, Hb, TCMH, lymphocytes and neutrophils were significantly higher ($p < 0.05$) in the Ouled Naeil breed than the Arab and Tergui breeds. On the other hand, eosinophils were significantly higher ($p < 0.05$) in the Arab breed than the other breeds and the MCV was also significantly ($p < 0.05$) higher in the Tergui breed than the other breeds. A high significant difference ($p < 0.05$) was recorded between the different age categories in old animals less than 3 years for Hb only compared to other parameters which revealed no significant difference. On the other hand, we observed a significantly high difference ($p < 0.05$) of Hb in females than in males. Regarding the physiological state a significantly high difference ($p < 0.05$) was found for TCMH in empty females than in pregnant females and other than that RBC, Ht, Hb and lymphocytes were higher in pregnant females than in empty females.

The study of blood parameters is becoming increasingly important as an indicator of the physiological and clinical state of animals.

Keywords: dromedary, hematological parameters, sex, age, physiological state, breeds.

Therapeutic Applications of Dromedary Hump Fat in the Ouargla Region

Safia MEKKAOUI ^{1**}, Asma GHEDAMSI ¹

¹ Ouargla University, Faculty of Natural and Life Sciences, Department of agricultural sciences. Laboratoire « Bioressources sahariennes. Préservations et valorisation, Algeria

****Corresponding author e-mail:** safiamekk@gmail.com

ABSTRACT:

The Dromedary Is an Emblematic Animal of Arid and Semi-Arid Zones, Where It Holds Significant Economic and Social Importance for Saharan Populations in Algeria. Owing To Its Anatomical and Physiological Characteristics, It is the Species Best Adapted to These Challenging Environments, While Maintaining a Noteworthy Production Capacity. One of Its Main Features Is the Presence of a Hump, Long Regarded as a Water Reservoir, But Which in Reality Serves as A Fat Reserve. This Organ Constitutes a Key Adaptive Mechanism, Enabling the Animal to Mobilize Its Lipid Reserves and Survive for Several Weeks Without Food Intake. The Fat Stored in The Hump Is Traditionally Used in The Preparation of Various Dishes in Several Asian and North African Countries. It Also Holds Particular Importance for Populations in Desert Regions, Not Only as An Energy Source but Also Due To Its Widely Recognized Therapeutic Properties. However, Scientific Studies Dedicated to This Resource Remain Scarce. In This Context, A Study Was Conducted in The Region of Ouargla, Focusing on The Therapeutic Uses of Dromedary Hump Fat, Through A Field Survey Carried Out Among Local Users.

Keywords: Camel , Hump Fat, Therapeutic Effect, Ouargla.

Veterinary Use of Euphorbia Honey for Wound Healing in Animals

Dounya MAHMOUD^{1**}, Zahira HARICHE², Baghdad KHIATI³, Si Ameer ABDELHADI⁴

¹Ghardaia University, Faculty of Natural and Life Science sand Earth Sciences, Department of biology, Ghardaia, Algeria.

²Valorization And Conservation of Arid Ecosystems Laboratory. Ghardaia, Algeria. "VCAEL

Laghoutat University, Faculty of Sciences, Department of veterinary sciences, Laghouat, Algeria ^{1**}

Ibn Khaldoun University of Tiaret, Institute of Veterinary Sciences, Tiaret, Algeria ³⁻⁴

****Corresponding author e-mail:** do.mahmoud@lagh-univ.dz

ABSTRACT:

Honey has long been recognised for its therapeutic properties, particularly in wound management, due to its antimicrobial, antioxidant, osmotic, and immune-modulating effects, as well as its ability to stimulate tissue repair. Among different types, Euphorbia honey—derived from various plant sources—stands out for its high phenolic and flavonoid content, which enhances its antimicrobial and anti-inflammatory activity. This study evaluated the efficacy of Euphorbia honey in promoting wound healing in rabbits. Experimental wounds were treated solely with honey, and the healing process was assessed through macroscopic wound contraction, reduction of inflammation, granulation tissue formation, and prevention of secondary infection. Results showed that Euphorbia honey significantly accelerated wound healing, with complete closure observed within fifteen days. Rapid tissue regeneration combined with the absence of microbial growth supports the hypothesis that Euphorbia honey is an effective, natural, and environmentally friendly alternative for treating animal wounds. These findings highlight the potential of Euphorbia honey in veterinary medicine. Its use could reduce reliance on synthetic drugs, lower treatment costs, improve management of slow-healing wounds, and promote sustainable approaches to animal health. Incorporating Euphorbia honey into veterinary practice may provide a simple and effective strategy for enhancing wound care while maintaining ecological and economic benefits.

Keywords: Euphorbia honey, Wound healing, Veterinary medicine, Antimicrobial activity, Tissue regeneration, Naturel remedy.

Assessing the Constraints of Thermal Stress on Milk Production Efficiency in Dairy Cattle Raised in Arid Regions.

Hanane DJELAILIA ^{1**}, Merouane BENKHELIFA ², Kadri Aymen ³

¹²³ Ouargla University, Faculty of Natural and Life Sciences, Department of Agricultural sciences, Ouargla, Algeria.

¹ Valorization And Conservation of Arid Ecosystems Laboratory. Ghardaia, Algeria. "VCAEL

****Corresponding author e-mail :** djelailia.hanane@univ-ouargla.dz

ABSTRACT:

This study aims to determine the impact of high temperatures and heat stress on the milk production of imported dairy cow breeds in the arid, desert climate of the Ghardaia region, as well as to identify the climatic threshold at which the effects of heat stress begin to appear. To achieve this objective, a longitudinal study was conducted over a period of ten years across three major farms in the region. Daily data on temperature and humidity were collected, from which the Temperature-Humidity Index (THI) was calculated. The results indicate that heat stress in dairy cows begins when THI exceeds 72, which starts from 24th May to 26th September. This extreme thermal exposure led to a marked decline in productivity: A regression analysis confirmed a strong linear relationship, showing that each one-unit increase in THI above 72 corresponded to a 0.52 kg decrease in daily milk yield. The findings also reveal that heat stress adversely affects milk production, particularly in summer. These results call for the urgent adoption of climate-adapted management strategies—including shading, cooling systems, and nutritional adjustments to ensure sustainable dairy production in arid environments.

Keywords: Dairy cattle - Ghardaia - Heat stress - Milk production – Temperature humidity index

Recent records of ocean sunfish *Mola mola* (Linnaeus, 1758) along the Algerian coast.

Yahia Bouslah^{1,6*}, Abdelaali Bencheikh², Yasser Kadri², Raouf Zaidi³, Chouaib SELHK¹, Lotfi BENSILA-TALET⁴, Kais Boumediene HUSSEIN⁴, Noureddine BENAÏSSA⁴, Khalil MELOUAH⁵, Mohammed Bouderbala⁶

¹Department of Biology, Faculty of Nature and Life Sciences, Ahmed Draia-Adrar University, Adrar -01000- Algeria

²Department of Agronomy, Faculty of Nature and Life Sciences, Ahmed Draia-Adrar University, Adrar -01000- Algeria

³Laboratory of Agriculture and functioning of ecosystems, Chadli Benjdid University, EL Tarf

⁴University of Oran-1- Ahmed Ben Bella -31000- Oran, Algeria

⁵Laboratory of Aquatic and Terrestrial Ecosystems, Souk Ahras University

⁶Laboratory of Environmental Monitoring Network, University of Oran-1- Ahmed Ben Bella -31000- Oran, Algeria

Email : yah.bouslah@univ-adrar.edu.dz

Abstract:

Observations of ocean sunfish *Mola mola* in Algerian waters are compiled in this paper. 15 records are mentioned from 2014 to 2021 between observations, bycatch and stranding. 11 specimens were also captured between 2014 and 2018 by "Grine Belkacem" scientific boat (CNRDPA) during pelagic fish resources stocks assessment along Algerian coasts. In total, 8 individuals were taken into photos or videos by divers, 41.67% of specimens were observed in western Algerian waters (Algerian-Moroccan boarder) followed by 33.33% observed in central Algerian waters, whereas less observations were recorded in eastern part of the Algerian waters (Algerian-Tunisian boarder) with only 25% observations. The highest percentage of bycatch was recorded in eastern part of Algerian shoreline (42.86%) followed by western part (35.71%) and central part (21.43%) while four stranding records were exclusively recorded in western waters and measurements made on them are reported in this paper.

Feeding habit of the crested porcupine *Hystrix cristata* (Rodentia, Hystricidae) in a semi-arid area of its native North African range.

F. Bounaceur^{1**}, Benamor N¹⁻² et Lasgaa F¹

1. Équipe de Recherche Biologie de la Conservation en Zones Arides et Semi Arides, Laboratoire Agronomie Environnement, Institut des Sciences de la vie et de la Nature Tissemsilt University, Tissemsilt 38000, Algeria.

2. Faculté des Sciences de la vie et de la Nature Université de Tiaret 14000, Algeria.

**Corresponding author e-mail: fbounaceur@yahoo.fr

Abstract

We investigated the feeding ecology of the crested porcupine *Hystrix cristata* in a semi-arid area of its north-western Algerian native range over 8 months (September to April). Our results from micro-histological analysis based on faecal pellets revealed that this strict herbivore ate only 10 plant species, 8 wild and 2 cultivated, belonging to 9 families including Lamiaceae, Palmaceae, Poaceae, Ramnaceae and Fabaceae. The autumn diet was dominated by *Thymus algeriensis*, *Ziziphus lotus*, *Chamaerops humilis* and *Triticum aestivum*, the winter diet by *T. algeriensis* and *C. humilis*, and the spring diet by *Muscari comosum*, with a large amount of *Vicia faba* and *T. aestivum*. We confirm the role of this rodent species as a generalist herbivore which barely feeds on cultivated plants when wild resources are diverse and abundant.

Key words: *Hystrix cristata*, micro-histological analysis, seasonal diet, food selection, rodent, Algeria

Adaptations to extreme environments of a wild ungulate the vulnerable aoudad (*Ammotragus lervia*, Mammalia: Bovidea) in north- western Sahara: Case of the trophic ecology

F. Bounaceur^{1**}, Benamor N ¹⁻² et Lasgaa F ¹

¹Équipe de Recherche Biologie de la Conservation en Zones Arides et Semi Arides, Laboratoire Agronomie Environnement, Institut des Sciences de la vie et de la Nature Tissemsilt University, Tissemsilt 38000, Algeria.

²Faculté des Sciences de la vie et de la Nature Université de Tiaret 14000, Algeria.

**Corresponding author e-mail: fbounaceur@yahoo.fr

ABSTRACT .

Temporal variation in the spatial distribution of resources can induce changes in animal ranges, to track resources (Benton et al., 2003) whose availability often varies over an animal's life cycle. In this study, we investigated the feeding ecology of free- ranging aoudad in their north- western Algerian Saharan native range where they experience potentially limiting harsh desert conditions. The feeding ecology of the aoudad (*Ammotragus lervia*) was investigated for the first time in north- western Sahara, Djebel Antar (Bechar province, Algeria), from one year (12 months). Microhistological analyses of faeces revealed an annual diet composed of 23 identified taxa belonging to 16 plant families. The highest species diversity was recorded in spring and summer (23 species), despite a marked consumption of two species: *Vachellia tortilis* (17.7%) and *Avena sterilis* (14.0%); diet diversity was lower in autumn and winter (16 species), including mainly *Teucrium polium* (14.7%, 21.0%) and *Gymnocarpos decander* (19.7%, 10.0%). The main plant parts consumed during these seasons were stems (77.7%, 65.3%), while leaves and inflorescences were mostly consumed during spring and summer (54.7%, 52.3%). Forbs dominated the aoudad's diet, with 46.3% average relative abundance, including mainly *T. polium*, *Limoniastrum feei*, and *Chrysanthemum macrocarpum*. Woody plants including mainly *V. tortilis* and *G. decander* accounted for 33.3% (50.0% in autumn), and grasses including *A. sterilis* and *H. murinum* for 20.4% (32.0% in summer). Based on this diet, *A. lervia* can be classified as a "generalist mixed- feeder."

Key words: *Ammotragus lervia*, sahara, Algeria, , native range, seasonal diet, adaptation.





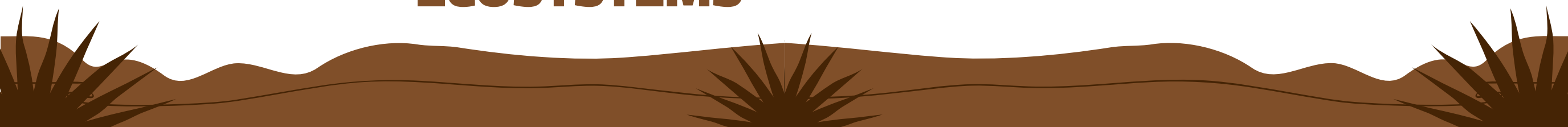
TOPIC



Orale presentations



**MICROBIAL
ECOSYSTEMS**



Exploring Tropical and Temperate Fungi for Potential Biocontrol Agents

Sherif S. EBADA^{1**}, Mohamed S. ELNAGGAR¹, Ahmed M. ELISSAWY¹

¹ Department of Pharmacognosy, Faculty of Pharmacy, Ain Shams University, 11566 Cairo, Egypt.

****Corresponding author e-mail:** sherif_elsayed@pharma.asu.edu.eg

ABSTRACT:

The World's agricultural crops and industries are always susceptible to great losses caused by different insect pests, moths and mites. Globally, these threats result in up to 40% crops shrinkage incurring economic losses of over 470 billion USD a year. Consequently, these outcomes endanger the human right to food imperative including availability, accessibility, adequacy and sustainability of food. The real outcomes are regrettably beyond the economic losses that directly impact worldwide between 638 and 710 million people with hunger threats in 2024 - 1 of 11 people globally and one of five in Africa suffer food inadequacy. Due to their adverse effects on non-target organisms of the ambient ecosystem, chemical pesticides were labelled unfavorable to dangerous impacting biodiversity, food safety and ultimately ourselves as direct or indirect end users through poultry, cattle and dairy products. In addition, the reliance on chemical pesticides was unsustainable due to the emergence of insect resistance leading to recurrent infections at different locations. Therefore, increasing research interests have been directed toward different sources of potential biocontrol agents including marine-derived, endophytic and/or entomopathogenic fungi. In the course of pursuing our research projects to unravel potential secondary metabolites for agrochemical and/or biomedical applications, several tropical and temperate fungal strains have been explored. Herein, we report the attained results from their chemical exploration shedding light on their potential bioactivities for agricultural and/or medical applications.

Keywords: marine fungi; insect pathogen; natural products; pesticide; antimicrobial; cytotoxic.

Actinobacteria Isolated from Arid Soils of Ain Skhoua (Saïda, Algeria): Antifungal, Antibacterial, Antioxidant Activities and Molecular Docking Insights

Mohamed Amine GACEM^{1,2,**}, Badreddine BOUDJEMAA³, Larbi SENOUCI⁴, Aminata OULD EL HADJ-KHELIL⁵,

Joachim WINK¹

¹Department of Microbial Strain Collection, Helmholtz Centre for Infection Research, Inhofenstrasse 7, 38124 Braunschweig, Germany.

²Department of Biology, Faculty of Natural Sciences and Life Sciences, Dr. Tahar Moulay University of Saïda, Laboratory of Biototoxicology, Pharmacognosy, and Biological Valorization of Plants, Ain El Hadjar Campus, Dr. Tahar Moulay University of Saïda, Saïda 20000, Algeria.

³Department of Biology, Faculty of Science, Amar Tlidi University, Laghouat 03000, Algeria.

⁴Scientific and Technical Research Center in Physico-Chemical Analyses, 03000 Laghouat, Algeria.

⁵Department of Biology, Faculty of Natural Sciences and Life Sciences, Kasdi Merbah University Ouargla, Laboratory of Protecting Ecosystems in Arid and Semi-Arid Areas, Ouargla 30000, Algeria.

****Corresponding author e-mail:** biologieamine@yahoo.fr

ABSTRACT:

Arid ecosystems represent unexplored reservoirs of microbial diversity with promising biotechnological potential. In this study, more than 30 actinobacterial strains were isolated from arid soils collected in Ain Skhoua, Saïda (Algeria). The isolates were taxonomically identified using 16S rRNA gene sequencing, revealing a predominance of *Streptomyces* species, alongside other genera adapted to harsh environments. Biological screening of crude extracts demonstrated strong antifungal activity against phytopathogenic fungi, significant antibacterial effects against Gram-positive and Gram-negative bacteria, and remarkable antioxidant properties, as confirmed by radical scavenging assays. To further investigate their metabolic potential, selected active extracts were subjected to LC-MS analysis, which revealed the presence of diverse secondary metabolites, including antibiotics, phenolic compounds, and pigment derivatives known for their bioactivity. In parallel, molecular docking of the detected metabolites against microbial enzymatic targets confirmed high binding affinities, supporting the experimental findings and suggesting potential mechanisms of action. Overall, this study highlights the untapped potential of arid Algerian soils as a source of bioactive actinobacteria producing antimicrobial and antioxidant metabolites. The combination of polyphasic taxonomy (16S rRNA), metabolite profiling (LC-MS), and in silico docking provides an integrated approach to discover novel natural products with applications in agriculture, medicine, and pharmaceutical biotechnology.

Keywords: Actinobacteria, Secondary metabolites, Antifungal activity, Antibacterial activity, Antioxidant activity, Molecular docking.

Two Novel Species Of *Alternaria* From Date Palm In Algeria.

Youssef DJELLID^{1,2**}, Alla Eddine MAHAMED^{1,2}, Akila BERRAF-TEBBAL¹

¹Laboratoire de Biologie des Systèmes Microbiens (LBSM), Ecole Normale Supérieure Cheikh Mohamed El Bachir El Ibrahimi de Kouba, 16308 Vieux-Kouba, Alger, Algeria

²Département de Biologie, Faculté des Sciences de la Nature et de la Vie, et des Sciences de la Terre, Université de Ghardaïa, 47000 Ghardaïa, Algeria.

*Corresponding author e-mail : dyoussefbo@yahoo.com

ABSTRACT:

Date palm (*Phoenix dactylifera* L.) is considered as the primary source article of food and trade in desert areas, extending from the western North of Africa to India as well as in many other desert areas. Nevertheless, date palms is subject to many pathogenic fungi causing severe damages to different date palm parts such as stem, leaves, fruit and root, leading to severe losses and reduction in total yield. During a survey of fungal groups associated with leaf spot and blight of date palm in Algeria, a notable variety of fungal groups where *Alternaria* were the most isolated with the description of two new species, designated as *A. phoenicis* sp. nov. and *A. ouedrighensis* sp. nov., which belong to the *Ulocladioides* and *Embellisia* sections, respectively. The isolates were phylogenetically identified using the key genetic markers of the genus including the large subunit ribosomal DNA (LSU), internal transcribed spacer region of the ribosomal RNA (ITS), glyceraldehyde-3-phosphate dehydrogenase (GAPDH), RNA polymerase II subunit (RPB2), translation elongation factor (TEF1) and plasma membrane (ATPase) genes and illustrated based on the morphological characteristics.

Keywords: Algeria, Date palm, Leaf spot, *Alternaria*, New species.

Climatic Factors Effects on Toxigenic Fungi and Mycotoxins: Impacts on Cereal Production in Arid and Semiarid Regions

Amar RIBA^{1,2}, Hayat KHOUNI^{1,2}, Tiziri BADJI^{1,2}

¹Laboratoire de Recherche sur la Biodiversité, Biotechnologie, Environnement et développement Durable, Boumerdes, Algeria.

²Laboratoire de Biologie des Systèmes Microbiens, Ecole Normale Supérieure de Kouba, Algiers, Algeria.

**Corresponding author e-mail: a.riba@univ-boumerdes.dz ; riba_amar@yahoo.fr

ABSTRACT:

To ensure the quality of cereal crops in arid and semi-arid regions, it is necessary to conduct in-depth studies on the effects of climatic factors on fungal contamination and mycotoxins production. This paper aimed to assess the contamination toxigenic fungi and mycotoxins of wheat collected from different climatic regions of Algeria and examined the effects of climatic factors on mycotoxins contamination and its impact on wheat production in arid and semiarid regions. The results of analysis with UHPLC-MS/MS, revealed high variation in contamination rates during 2008 and 2021. The dominant genus was *Aspergillus* and *Fusarium*, predominantly *A. flavus* and *A. niger*. The other isolated species were *A. ochraceus*, *A. alliaceus*, *A. carbonarius*, *A. terreus*, *A. fumigatus*, *A. candidus* and *Aspergillus spp.* Ochratoxin A, occurred in 30% to 40% of samples at levels ranging from 0.21 to 41.55 µg/kg and *Fusarium* toxins: beauvericin (BEA), deoxynivalenol (DON=1076 µg/kg), fumonisin B1 (FB1), enniatins (ENs), and zearalenone (ZEN), were the most prevalent. The ability of mycotoxigenic fungi to respond to climate variation may induce a shift in their geographical distribution and in the pattern of mycotoxin occurrence. We also highlighted how warmer temperatures are enabling the migration, introduction, and mounting abundance toxigenic fungi species. For example, increasing temperatures and drought stress has led to higher post-harvest losses due to mycotoxins and will favor thermotolerant species, leading to the prevalence of *Aspergillus* over *Penicillium* species.

Keywords: Mycotoxins, Wheat, Cereal, Arid Climate, Fungi, Algeria

Fungal Microbiome of the Atlas Pistachio Tree from The Arid Steppes of Algeria

SAADOUN Noria^{*1}

¹Natural Resources Laboratory, Faculty of Biological Sciences and Agronomical Sciences, Mouloud Mammeri University, Tizi Ouzou.

^{**}Corresponding author e-mail: noria.saadoun@ummto.dz

ABSTRACT:

Living organisms on Earth are remarkably diverse. Among eukaryotes, plants and fungi constantly interact within their biotopes, often establishing mutualistic relationships that facilitate survival. In this presentation, our focus is on the Atlas pistachio: a tree of impressive dimensions in the dayas of the arid regions of our country. This species has been the subject of several studies in our research laboratory. *Pistacia atlantica* forms multiple symbiotic associations with fungi colonizing its roots, leaves, fruits and seeds. Light microscopy observations of rootlets and leaves stained with trypan blue confirmed mycoendophytic colonization. The culture of its organs on PDA medium confirmed the fungal diversity recorded. Root-associated fungi were affiliated with the phyla Glomeromycota, Ascomycota, Mucoromycota, and Basidiomycota, while leaf-associated fungi mainly belonged to Ascomycota, Mucoromycota, and Basidiomycota. Similarly, cultures from fruits and seeds confirmed the presence of fungal symbionts, including Ascomycota and Mucoromycota. The transmission of this fungal microbiome appears to occur through both horizontal and vertical pathways. *Pistacia atlantica* thus meets the definition of a holobiont. In addition to its morphological and anatomical traits, these interactions greatly contribute to its resilience in arid environments.

Keywords: Diversity – Fungal microbiome – *Pistacia atlantica* Desf. – Biological interactions.

Unlocking The Potential of Desert Date Palm Pits: a Natural Resource for Meat Preservation and Sustainable Packaging

Slim SMAOUI

Laboratory of Microbial and Enzymes Biotechnology and Biomolecules (LMEBB), Centre of Biotechnology of Sfax (CBS), University of Sfax-Tunisia, Road of Sidi Mansour Km 6, P. O. Box 1177, 3018, Sfax, Tunisia

ABSTRACT:

Date palm (*Phoenix dactylifera* L.), is a symbolic and vital crop of arid and desert regions, producing pits that have long been considered agro-industrial waste. However, these desert derived by products are now gaining recognition for their rich phytochemical content and remarkable functional potential. Recent research underscores their value in food applications, particularly as natural preservatives and components of smart, eco-friendly packaging systems. This study consolidates multidisciplinary findings focused on the extraction and application of bioactive compounds from date seeds. Optimization via mixture design methodologies has led to extracts with enhanced antibacterial and antioxidant activity. When applied to raw chicken meat, these extracts significantly improve microbial safety, chemical stability, and sensory quality. Furthermore, anthocyanin-rich extracts from desert date pits have been incorporated into pH-sensitive films, enabling real-time colorimetric tracking of meat freshness. Additionally, biodegradable films made from gelatin and sodium alginate enriched with date seed extracts effectively extend the shelf life of raw minced beef. These innovations highlight the transformative potential of desert date palm seeds as low-cost, natural ingredients for functional foods and intelligent packaging contributing to safer food systems and more sustainable solutions in both desert agriculture and global contexts.

Keywords: Date palm pits; bioactive compounds; Meat preservation; intelligent packaging; sustainable materials; pH-sensitive films

Genetic Diversity Of *Diplodia corticola*, The Main Fungal Pathogen Associated With Oak (*Quercus Spp.*) Decline Across The Mediterranean Basin

Alla Eddine MAHAMED^{1,2**}, Alan J. L. PHILLIPS³, Akila BERRAF-TEBBAL²

¹ Ghardaia University, Faculty of Natural and Life Science sand Earth Sciences, Department of Biology, Ghardaia, Algeria.

² Higher Normal School of Cheikh Mohamed El-Bachir El-Ibrahimi-Kouba, Laboratory of Microbial Systems Biology (LBSM), Algiers, Algeria.

³ University of Lisbon, Faculty of Science, Biosystems and Integrative Sciences Institute, Lisbon, Portugal.

**Corresponding author e-mail: aladin1342@yahoo.com

ABSTRACT:

Oak forests (*Quercus spp.*) represent characteristic landscapes of the Mediterranean region. In Algeria, holm oak (*Q. ilex*) and cork oak (*Q. suber*) dominate large forested areas, where they play crucial ecological, climatic, and socio-economic roles. However, in recent decades, these populations have experienced alarming decline. The fungal pathogen *Diplodia corticola* has emerged as the most widespread and aggressive causal agent of oak decline. Notably, this species displays considerable phenotypic and behavioral variability across different geographic regions. To better understand this variability, we investigated the genetic diversity of *D. corticola* associated with oak decline in Algeria and across the Mediterranean basin. A total of 180 isolates from six Mediterranean countries (Algeria, France, Italy, Portugal, Spain and Tunisia) were analyzed using microsatellite-primed PCR (MSP-PCR) fingerprinting. Nine distinct genotypes were identified, six of which occurred in Algeria. However, no clear association was found between genotype distribution and geographic origin.

Keywords: *Diplodia corticola*, Genetic diversity, Oak decline, Mediterranean basin, MSP-PCR.

Genome Mining Uncovers the Biosynthetic Potential of *Streptomyces* sp. nov. MG15 and *Streptomyces* sp. nov. MS1

Fouzia Metidji^{1,2}, Rabiaa Merrouche², Matias Pascali³, Khiera Youysfi², Khaoula Bouznada², Affef Lassami²

1. Departement of Biology, university of Saad Dahleb Blida 01, Blida, Algeria.

2. Laboratory of Microbial Systems Biology (LBSM), Kouba Higher Normal School, Algiers, Algeria.

3. Department of Food, Environmental and Nutritional Sciences, University of Milan, Milan, Italy.

**Corresponding author e-mail: fouziametidji@gmail.com

ABSTRACT:

Streptomyces species are prolific producers of bioactive natural products. Here, we report two novel isolates, *Streptomyces* sp. nov. MG15 and *Streptomyces* sp. nov. MS1, recovered from Algerian vineyard soils. Both strains displayed antimicrobial and enzymatic activity against bacteria and fungi in vitro. Comparative taxonomic analyses (16S rRNA, ANI, dDDH) supported their classification as new *Streptomyces* species. Whole-genome sequencing followed by genome mining (antiSMASH) revealed a wide diversity of biosynthetic gene clusters (BGCs), including polyketides, nonribosomal peptides, terpenes, and siderophores. Several clusters exhibited low similarity to known references, indicating the capacity to produce novel metabolites. These results demonstrate that MG15 and MS1 harbor a rich biosynthetic potential, highlighting Algerian soils as a promising source of new *Streptomyces* species and bioactive compounds.

Keywords: antimicrobial and enzymatic activity, genome mining, *Streptomyces* sp. nov., biosynthetic gene clusters (BGCs), bioactive natural products, Algerian soils.

Traditional Tanning Of Skins In The South Of Algeria And The Impact of its Wastewater On The Quality Of Ground Water, Algeria

Zohra BABAAMER^{1*}, Slimane MATAHRI¹, Farida BOULAGHMEN²

¹Laboratory of Materials, Energy Systems Technology and Environment, Faculty of Science and Technology, Department of Science and Technology University of Ghardaia, Algeria.

² Structures and Rehabilitation of Materials Laboratory (SREML), Amar Telidji University. Laghouat. Algeria, babaamerz@yahoo.fr

ABSTRACT:

The present study presents a definition of the methods and possibilities that should be used in the development of the artisanal tanning activity as well as the fabric performance of units distributed throughout the territory that do not require any external technology. The first materials used are from sheep, goat and camel skins. They came from two kinds, one is from vegetable origin and the other is from chemical origin. The results of the analyses of traditional tanning discharges show that the chosen process does not pose any danger to the environment if a high dilution and abundance of water during cleaning is achieved in tanneries. The biodegradability coefficient < 2 so the natural purification process is effective. The results of industrial tanning rejects also suggest that the concentrations of pollution parameters comply with the standards specified by the Algerian laws. The analyses performed show the absence of microorganisms such as Fecal streptococci, Colstridium sulphide, Vibrio cholrae and Salmonella typhi. This article deals with the quality of the discharges and the potential risks of soil degradation. It relies mainly on the analyze carried out during the last campaigns, but without neglecting the recall of previous results

Keywords: Traditional tanning, Hides and skins, Waste analysis.

Poster

Isolation and Identification of Fungi Contaminating Maize Imported Into Algeria For Animal Feed

Azzedine ABDI^{1**}, Amani SEMMARI¹, Karima BOUTI¹, Nadjet¹ DJEMOUAI^{1,2}, Saliha ZEBIRI¹, Atika MEKLAT¹, Salim

MOKRANE¹

¹ Laboratoire de Biologie des Systèmes Microbiens (LBSM), Ecole Normale Supérieure Cheikh Mohamed El Bachir El Ibrahimi, Kouba, Algiers, Algeria

² Département de Biologie, Faculté des Sciences de la Nature et de la Vie et Sciences de la Terre, Université de Ghardaia, Ghardaïa, Algeria

****Corresponding author e-mail:** azzedine.abdi@g.ens-kouba.dz

ABSTRACT:

Molds commonly contaminate animal feed ingredients, particularly cereals such as maize, during production, storage, or transport. This contamination poses a serious problem for animal health and food safety, as many molds are capable of producing mycotoxins, including aflatoxins. These toxic secondary metabolites can accumulate in feed, leading to a range of adverse effects in livestock and, ultimately, affecting the safety of animal-derived food products. Our work aims to investigate the fungal species contamination of corn samples intended for dairy cow feed in Algeria. A total of 73 corn samples were collected from the National Office of Livestock Feed (ONAB). The fungal flora was isolated and enumerated using the direct method technique on the Dicloran Rose Bengal Chloramphenicol (DRBC) medium. The results showed that all samples were contaminated by different genera of molds, with the genus *Aspergillus* dominating (55.28%), followed by *Fusarium* (27.93%) and *Penicillium* (10.89%). Three different sections of *Aspergillus* were identified, with *Aspergillus* section Flavi being the most dominant. The ability of purified *Aspergillus* section Flavi isolates to produce aflatoxins was tested on Coconut Agar Medium (CAM) and confirmed by Thin Layer Chromatography (TLC). The results showed that 14.06% of the isolates are producers of aflatoxin B1. The dosage of this aflatoxin, among others, is necessary to highlight the presence of aflatoxins in dairy cow feed in Algeria.

Keywords: Corn, Fungi, identification, Aflatoxins, Algeria

Macroscopic and Microscopic Observations of *Fusarium Oxysporum* Treated With Red Algal Extracts

Khouloud AITIALEFF^{1,2**}, Yassine GUENDOUI¹, Aicha DEBIB¹, Assia FODIL¹, Manel MEDJBER¹, Fodil AOULMI¹, and Meriem BOUD-JENOUN⁴

¹ Laboratory Management and Valorization of Agricultural & Aquatic Ecosystems, University Center of Tipaza Morsli Abdallah, Ouad Merzoug 42000, Algeria.

² Department of Agricultural Sciences, Faculty of Sciences, University of Amar Telidji Laghouat,

BP 37 G, Gardaia road, Laghouat 03000, Algeria.

³ Laboratoire de Biologie des Systèmes Microbiens (LBSM), Ecole Normale Supérieure de Kouba, Algiers, Algeria.

⁴ Center for Research in Physico-Chemical Analysis (CRAPC), Bou-Ismaïl, Algeria.

****Corresponding author e-mail:** khouloud84@hotmail.fr

ABSTRACT:

The phytopathogenic fungus *Fusarium oxysporum* is a major causal agent of vascular wilts, leading to significant crop losses worldwide. Conventional control measures rely on chemical fungicides, but their intensive use raises concerns about environmental safety and human health. Marine algae have emerged as natural sources of bioactive compounds with promising antifungal properties. This study focuses on the red alga *Porphyra umbilicalis*, collected from two regions along the Tipaza coast, Algeria. Ethanolic extraction yields ranged from 19% to 13%, depending on the sampling site. Macroscopic evaluations revealed that treatment with algal extracts inhibited the mycelial growth of *F. oxysporum* by 46.42% to 58.03%, accompanied by visible changes in colony morphology such as irregular margins and reduced density. Microscopic observations highlighted structural alterations of fungal hyphae, including deformation, fragmentation, and vacuolization, which reflect a direct inhibitory action of the algal metabolites. Overall, the findings demonstrate that *P. umbilicalis* possesses notable antifungal potential against *F. oxysporum*. By impairing both colony development and hyphal structure, this alga could be considered a promising natural biocontrol agent. Its integration into sustainable plant protection strategies may help reduce dependence on synthetic fungicides while contributing to environmentally friendly crop disease management.

Keywords: *Fusarium oxysporum*, Ethanolic extract, Biocontrol, Marine algae, *Porphyra umbilicalis*.

Evaluation of the *In vitro* Antibacterial Effects of *Pistacia lentiscus* L. and *Cupressus sempervirens* from Chlef, Algeria

Dalila AMOKRANE^{1,3}, Khedidja BOUDOUR^{1,4}, Malika HACHI-ILLOUL^{1,4}, El Hassene LANKRI^{1,4},

Malika MEZIANE AHMED^{2,4}

¹Department of Agronomic Sciences, SNV Faculty, Hassiba Ben Bouali University, Chlef, Algérie

² Department of Food Science, SNV Faculty, Hassiba Ben Bouali University, Chlef

³Laboratory of Crop Production and Protection in the Chlef region, Hassiba Ben Bouali University Chlef

⁴Laboratory of Local Natural Bio-Resources laboratory, University Hassiba Ben Bouali of Chlef

*Corresponding Author E-mail: d.amokrane@univ-chlef.dz

ABSTRACT:

This study is a contribution to the valorization of *Pistacia lentiscus* L. and *Cupressus sempervirens*, which are widespread in North Africa and particularly in Algeria. We were interested in the extraction of oils from the leaves of these two plants, and the yield of EO from *C. sempervirens* was 0.31%, whereas the yield from *C. sempervirens* was 0.17%. Their physicochemical properties are as follows: The refractive index of Lentisque and Cypress are 1.4768 and 1.4781, respectively. The pH obtained indicates that our extracted oils are acidic, i.e., 4.73 for cypress and 4.63 for mastic. The moisture content of lentisque is 44%, and that of cypress is 46.8%, while their densities are 0.872 and 0.861 respectively. Lentisque and cypress EO are of good quality with ester indices of 17.76 and 11.22, respectively. The acid values for lentisque are less than 2, so the EO was well preserved, whereas the cypress acid value is greater than 2 (2.24), so it is less well preserved. The rotatory power for Cypress is 17° and for Mastic is 8.5°. The results of the antibacterial activity showed significant activity for both essences, using the disk diffusion method. The antimicrobial activity was determined on *Escherichia coli* ATCC 70603 and *Staphylococcus aureus* ATCC 43300, The inhibition shown by the extracts on *Escherichia coli* ATCC 70603 is 11.33, 10.16 and *Staphylococcus aureus* ATCC 43300 is 14.33, 9.5 mm, respectively, for Cypress and Lentisque extracts. These two species actively contribute to the enhancement and preservation of arid ecosystems.

Keywords: *Pistacia lentiscus* L., *Cupressus sempervirens*, physico-chemical properties, antimicrobial activity, *in vitro*.

Study Of The Influence Of Multi-Nutritional Blocks Formed From Olive Mill By-Products (Solid And Liquid) On *In Vitro* Rumen Fermentation In Sheep

Abdelhafid AOUADI ^{1*} et Rabah ARHAB²

¹Département de Biologie, Faculté des Sciences Exactes et des Sciences de la Nature et de la Vie, Université Ghardaïa, Algérie. Zone scientifique, BP 455 Ghardaia, 4700, Algérie

² Département de Biologie, Faculté des Sciences Exactes et des Sciences de la Nature et de la Vie, Université Larbi Ben Mhidi, Oum-El-Bouaghi, Algérie

*Corresponding Author E-mail: hafid.aouadi@gmail.com

ABSTRACT:

The objective of this study was to produce multi-nutritional blocks using olive mill by-products, specifically olive pomace (solid form) and olive mill wastewater (liquid form), and to evaluate their physicochemical characteristics. The study also aimed to investigate the effect of these multi-nutritional blocks (BMN) on the *in vitro* ruminal fermentation of triticale hay (*Triticum aestivum*). The results indicate that the multi-nutritional blocks exhibit variable levels of dry matter, organic matter, mineral matter, and total nitrogen, though these differences remain limited, primarily reflecting variations in composition between the formulations. After one week of drying, blocks 3 and 4 stand out for their optimal hardness and cohesion, making them promising candidates for practical use. Olive mill wastewater, whether in paste, liquid, or a combination of both forms, proves particularly suitable for the production of these blocks. It enhances the physical properties by increasing the hardness and cohesion of the components while reducing water requirements during manufacturing. Additionally, its ability to solubilize urea makes it a valuable functional ingredient in block formulation. During *in vitro* incubation of triticale hay, the addition of multi-nutritional blocks 2, 3, and 4 led to a significant increase in total gas production and substrate digestibility, while reducing the protozoan population and decreasing the proportion of methane in the produced gas. These effects were particularly pronounced for blocks 3 and 4, which combine both liquid and paste forms of olive mill wastewater, highlighting their superior efficacy. In conclusion, this study highlights the potential of olive mill wastewater to optimize the production of multi-nutritional blocks, improve their physical and functional properties, and reduce methane emissions during ruminal fermentation. These findings open promising avenues for the sustainable valorization of olive by-products in animal nutrition and environmental management.

Keywords: Ammoniacal nitrogen, Multi-nutritional blocks, Gas, Olive pomace, Olive mill wastewater, Methane, Protozoa.

Bacterial Diversity In *Vigna Unguiculata* Nodules And Their Nodulation Potential

Kathia BELAID^{1,2}, Nadjette DJEMOUAI^{3,4}, Faiza BAALI³, Aissa BAKELLI³, Agnieszka KLONOWSKA⁴, Hassen GHERBI⁴

¹ Equipe Biologie des Sols, Laboratoire de Biologie et Physiologie des Organismes (LBPO), Faculté des Sciences Biologiques, Université des Sciences et de la Technologie Houari Boumediene (USTHB), Bab Ezzouar, BP32, 16111 Alger, Algérie

² Département de Biologie, Faculté des Sciences de la Nature et de la Vie et Sciences de la Terre, Université de Bouira, 10000 Bouira, Algérie

³ Département de Biologie, Faculté des Sciences de la Nature et de la Vie et Sciences de la Terre, Université de Ghardaia, BP 455, 47000 Ghardaïa, Algérie

⁴ Laboratoire de Biologie des Systèmes Microbiens (LBSM), Ecole Normale Supérieure Cheikh Mohamed El Bachir El Ibrahimi, Kouba, BP 92, 16308 Alger, Algérie

⁵ Laboratoire des Symbioses Tropicales et Méditerranéennes (IRD/INRA/CIRAD/Université de Montpellier/Supagro), 34398 Montpellier Cedex 5, France

Correspondant author: belaidkathia@gmail.com

ABSTRACT:

Vigna unguiculata, commonly known as cowpea, establishes symbiotic relationships with rhizobia bacteria that form root nodules enabling biological nitrogen fixation. This study aimed to isolate bacterial strains from the root nodules of *Vigna unguiculata* plants and evaluate their ability to nodulate a *Vigna* variety under controlled conditions. Nodules were collected from field-grown plants in El Golea province, and bacterial isolates were obtained through standard microbiological techniques. The isolates were characterized and identified base on 16S rRNA sequencing. The strains identified as *Bradyrhizobium* sp. were then selected for inoculation assays on *Vigna* seedlings to assess nodulation efficiency. Our results demonstrated a diverse range of bacteria capable of forming functional nodules, with varied effectiveness on plant growth promotion. These findings contribute to understanding the symbiotic diversity in *Vigna* nodules and provide potential candidates for biofertilizer development, promoting sustainable agriculture. Further field evaluations of the promising strains are underway to optimize their application.

Keywords: *Vigna unguiculata*, bacteria, *Bradyrhizobium*, inoculation, nodulation

Extraction Of Anti-*Candida Albicans* Active Compounds From An *Actinomyces* Strain SA18 And Study Of Their Stability

Said BELGHIT^{1**}, Anissa KOUIDRI², Chaima KHENE²

¹ Valorization And Conservation of Arid Ecosystems Laboratory. Ghardaïa University, Algeria. "VCAEL"

² Ghardaïa University, Faculty of Natural and Life Science and Earth Sciences, Department of biology, Ghardaïa, Algeria.

****Corresponding author e-mail:** belghit.said@univ-ghardaia.edu.dz

ABSTRACT:

The objective of this study is to extract the active compounds produced by the *Actinomyces* SA18 strain, which exhibits inhibitory activity against the pathogenic yeast *Candida albicans*, and to evaluate their stability under various physicochemical conditions. Morphological and micromorphological analysis suggested that this strain may belong to the *Streptomyces* genus. The kinetics of active metabolite production, evaluated using the well diffusion method on ISP2 and Bennett liquid media, indicated that the seventh day of incubation corresponds to the maximum antifungal activity against the test strains used. Extraction of these metabolites using dichloromethane and butanol solvents revealed that butanol was the only solvent capable to extracting these compounds, with inhibition zones measuring 15 mm against *C. albicans* S1 and 14 mm against *C. albicans* ATCC 10231. The stability study of the active compounds showed that they remained stable at pH 5 and 9, at a temperature of 50°C, and under light exposure, although with reduced activity compared to the control. Semi-purification of the butanolic extract was performed using thin-layer chromatography (TLC) with two solvent systems. The first system, AM (ethyl acetate: methanol at 100:15, v/v), allowed the detection of a single active spot by bioautography against Ca S1 with an Rf of 0.41, previously visualized under UV light at 365 nm as a green fluorescence. The second system, BAE (butanol, acetic acid: water at 4:3:3, v/v/v), also revealed a single active spot against Ca S1 with an Rf of 0.55, visualized under UV light at 365 nm as a yellow fluorescence.

Keywords: *Candida albicans*, *Actinomyces* SA18, antifungal metabolites, extraction, TLC, stability.

Exploring the Poultry Microbial Ecosystem: A Case Study of Bio-film-Forming Bacteria

Mohammed Samer Djahid BENAMOR^{1*}, Omar MESSAOUDI^{2,3}, Ibrahim BENAMAR^{2,3}, Sirine Ghommid¹

¹Fundamental Sciences Laboratory, Amar Telidji University of Laghouat, Laghouat 3000, Algeria

²Laboratory of microbiology applied to the agri-food industry, University of Tlemcen, Faculty of SNV-STU, Tlemcen 13000, Algeria

³Department of Biology, Faculty of Sciences, Amar Telidji University, 03000 Laghouat, Algeria

**Corresponding author e-mail: mo.benamor@lagh-univ.dz

ABSTRACT:

The poultry production chain represents a complex and dynamic microbial ecosystem where bacterial members, including opportunistic pathogens, interact and persist. This study explores the presence and survival strategies of key Enterobacteriaceae within this ecosystem in the Laghouat region of Algeria. Following an enrichment step using Selenite Cystine broth, bacteria were isolated on Hektoen Enteric agar to characterize the dominant populations. Standard phenotypic and biochemical identification revealed the co-existence of *Salmonella* spp. and *Proteus* spp. among the isolates. A core ecological trait, biofilm formation, was investigated as a mechanism for survival and persistence. The biofilm-forming capacity of the isolates was assessed on both glass and polystyrene surfaces using the crystal violet staining technique. Our findings indicate that these bacterial members of the poultry ecosystem are robust biofilm formers. The ability of these bacteria to establish and maintain biofilms is a critical ecological strategy that facilitates their persistence in the food production environment and enhances their resistance to control measures. This study provides valuable insights into the microbial ecology of food systems and underscores the need to understand these bacterial strategies for effective food safety management.

Keywords: Enterobacteriaceae, Biofilm, Food Safety, Microbial ecology

Antimicrobial Activity of Extracts From *Ruta graveolens*

Wafa BENSANIA^{**1}, Linda ROUARI², Anfal HERMA¹, Manal TALEB AHMED¹

¹Département biologie, Faculté des Sciences de la Nature et de la Vie et Sciences de la terre, Université de Ghardaïa, Ghardaïa, Algeria, Algeria;

²Laboratoire Valorisation et Conservation des Ecosystèmes Arides (LVCEA). Faculté des Sciences de la Nature et de la Vie et Sciences de la terre, Université de Ghardaïa, Ghardaïa, Algeria, Algeria;

**Corresponding author e-mail: bsaniawafa.bio@gmail.com

ABSTRACT:

This study aims to explore new natural antimicrobial agents derived from leaf extracts of *Ruta graveolens* collected from the Zelfana region (Ghardaïa). This plant holds considerable potential for biological activity, largely due to its widely known traditional applications. The extracts were prepared by cold maceration of the leaf powder using the ethanol. Then, the significant yield was noted (12%). Phytochemical screening revealed the presence of bioactive compounds such as tannins and alkaloids. Quantitative analyses indicated the content of 1.94 ± 0.009 mg GAE/g DM for total polyphenols, 0.69 ± 0.046 mg QE/g DM for flavonoids, 0.018 ± 0.004 mg CE/g DM for condensed tannins and 0.102 ± 0.027 mg CAF/g DM for phenolic acids. Antimicrobial activity, evaluated using the disk diffusion method, generally showed no activity against most of the tested bacterial strains. However, a moderate antifungal activity (7 to 9 mm inhibition zones) was observed against *Candida albicans*. These results suggest that *Ruta graveolens* exhibits weak antimicrobial activity under the experimental conditions used, highlighting the need for further analyses to better assess its therapeutic potential and to identify the active compounds responsible.

Keywords: *Ruta graveolens*, phytochemical screening, polyphenols, antimicrobial activity, Zelfana-Ghardaïa.

Environmental study of Lac Ayata: A physico-chemical And bacteriological

approach to water analysis

Leila BOUAGUEL^{1,2}, Soumeiya LAABED³, Imad Eddine SAKER¹, Ines HOUHAMDI², Meriem ABERKANE⁴ & Moussa HOUHAMDI²

¹ University Mohamed Chérif Messaadia, Faculty of Natural and Life Sciences, Souk Ahras, Algeria

² Laboratory Biology, Water and Environment (LBEE), Faculty SNV-STU, University 8 May 1945 Guelma. PO. 401 24000 Guelma, Algeria.

³ University of Echahid Hamma Lakhdar, Faculty of Natural and Life Sciences, El-Oued Algeria

⁴ University Larbi Ben M'Hidi of Oum El-Bouaghi, Faculty of Exact Sciences, Oum El-Bouaghi, Algeria.

**Corresponding author e-mail: l.bouaguel@univ-soukahras.dz

ABSTRACT:

Lac Ayata is a unique and vital Saharan wetland ecosystem with high biodiversity, but it faces ecological degradation due to human activity and climate change. This study aims to assess the lake's ecological status by examining its environmental components, with a particular focus on water quality. Physico-chemical analysis shows significant deterioration in water quality, characterized by high mineralization and substantial organic and chemical pollution. Its water is brackish (salinity 9.2–14.7 PSU) with high conductivity (17.4 mS/cm) and a slightly basic pH (7.3–8.2), while chloride concentrations (3.5–6.1 g/L) exceed standards. Suspended solids (0.6–112.5 mg/L) fluctuate strongly, peaking in December, and BOD₅ and COD indicate significant non-biodegradable organic and chemical pollution. Regarding nutrients, ammonium (0–1.95 mg/L) predominates in October before being converted into nitrates (0.16–6.6 mg/L) at the outlet, while nitrites (0.02–0.8 mg/L) remain low and phosphates (0.04–1.4 mg/L) are scarce. Microbiologically, total and fecal coliforms reach up to 1,400 U/100 mL at the inlet but decrease at the outlet due to the inhibitory effect of salinity and pH. Fecal streptococci and other pathogenic germs are absent. Only salinity, conductivity, and ammonium show significant differences between the inlet and outlet. Overall, water quality deteriorates downstream, despite a partial reduction in bacterial load, highlighting the anthropogenic pressures on the lake and the challenges of its management.

Key words: Lac Ayata, Saharan wetland, Water quality, Physico-chemical analysis, Bacteriology, Organic pollution.

Nouvelle Approche Pour Valoriser L'activité Antibactérienne Du Célécoxib Via Les Mélanges Eutectiques.

Messeouda BOUZIANI^{*1}, Farida ALLAL¹, Boubaker SAIDAT²

¹ Laboratory of Mechanics, University Amar Telidji of Laghouat, Algeria.

² Materials Physics Laboratory, Université Amar Telidji de Laghouat. Algeria.

*Corresponding author e-mail: m.bouziani@lagh-univ.dz

RÉSUMÉ :

La présente étude vise à repositionner un anti-inflammatoire non stéroïdien de la classe des inhibiteurs sélectif de la COX-2, dans la lutte contre les bactéries multirésistantes et à améliorer sa solubilité, selon la stratégie de formation de mélanges eutectiques, par sa combinaison avec des coformeurs. L'agent anti inflammatoire dont il s'agit est le Célécoxib, il a été combiné à cinq coformeurs, à savoir, l'acide salicylique, l'acide maléique, la nicotinamide, l'acide succinique et l'acide cinnamique. Les mélanges eutectiques, synthétisés par broyage humide, ont été caractérisés par DSC, DRX, MEB et FTIR et testés contre trois souches bactériennes, il s'agit de l'Escherichia coli, de la Klebsiella pneumoniae et du Staphylococcus aureus. Les valeurs obtenues des diamètres de zone d'inhibition varient de 8 à 42 mm. Les concentrations minimales d'inhibition sont comprises entre 0.09 et 0.72 mg/ml. Les agents non antibactériens sont bactériostatiques à la concentration minimale inhibitrice (CMI) et bactéricides à une concentration supérieure à la CMI. Les valeurs de solubilité ont montré une augmentation significative de ce paramètre dans les mélanges eutectiques CXB-A.MAL et CXB-NIC.

Mots clés : Célécoxib, Coformeurs, Activité antibactérienne, CMI.

Biological Potential of Traditional Date Vinegar: A Spontaneous Fermentation Product from Date Waste in Ouargla Oasis (Algerian Sahara).

Sara KHELIFA^{1,2**}, Mohamed Didi OULD ELHADJ^{1,2}.

¹Ouargla, University, Faculty of Natural and Life Sciences, Department of biology, Ouargla, 30000, Algeria.

²Ecosystem Protection in Arid and Semi-Arid Zones Laboratory. University of Ouargla, Algeria.

**Corresponding author e-mail: sara.khelifa23@gmail.com

ABSTRACT:

In the Algerian Sahara, date vinegar is a traditional product obtained through the microbiological recovery of date waste via double spontaneous fermentation by naturally occurring germs (*Saccharomyces cerevisiae* and *Acetobacter*). This vinegar is recognized for its notable biological properties, being particularly rich in polyphenols and bioactive compounds with antioxidant potential, which may contribute to the prevention of chronic diseases. The present study focuses on evaluating some biological properties of traditional date vinegar produced under the local environmental conditions of the Ouargla basin (Algerian Sahara). Three varieties of vinegar were analyzed: the acetic acid content was determined by titration, while the polyphenol content was assessed using the Folin-Ciocalteu reagent method. Antimicrobial activity was tested by the disk diffusion method, antioxidant activity by DPPH radical scavenging, and anti-inflammatory activity by the inhibition of BSA protein denaturation. The results showed that the three cultivars had relatively low acetic acid content ($\leq 18.56\text{g/L}$) compared to AFNOR/CEN standards (50g/L), but high polyphenol levels ($\geq 453.33\mu\text{g EAG/mL}$). In terms of biological activities, the vinegars demonstrated antimicrobial effects, with greater activity against *Pseudomonas aeruginosa* ATCC9027 (inhibition zone: 19mm) than against *Escherichia coli* ATCC25922 (14mm). A strong antioxidant activity (81.14%–87.20%) was recorded at 1% concentration compared to ascorbic acid, while the anti-inflammatory effect remained relatively weak at low concentrations ($\leq 0.5\%$) when compared to diclofenac (34.01% inhibition). These findings highlight the microbial and bioactive potential of traditional date vinegar as a valuable local product that deserves further research and valorization in the context of arid ecosystems.

Keywords: Sahara, Fermentation, Date, Vinegar, Acetic bacteria, Biological activities.

Isolation, Taxonomy, and Biotechnological Perspectives of *Bacillota* Associated with Various Environmental Matrices in the Ghardaïa Region.

Mustafa KOUZRITE¹, Ali MOULAY OMAR¹, Said BELGHIT¹, Nouredine BOURAS¹

¹ Valorization and Conservation of Arid Ecosystems Laboratory. Ghardaïa, Algeria. "VCAEL"

**Corresponding author e-mail: kouzrite.mustafa@univ-ghardaia.edu.dz

ABSTRACT:

This study aims to isolate and characterize *Bacillota* strains from 27 diverse environmental matrices in the Ghardaïa region. Samples were collected from the rhizosphere of three local date palm biovars (*Phoenix dactylifera*) with varying resistance to *Fusarium oxysporum* f. sp. *albedinis*, as well as from three spontaneous plants thriving in crude oil-contaminated soil: *Ziziphus lotus*, *Citrullus colocynthis*, and *Cynodon dactylon*. Additional samples included five from wild and domestic animals, seven from local food and feed products, four environmental specimens including compost, and one sample of kohl, a traditional cosmetic preparation made by grinding stibnite (antimony sulfide). Following selective isolation, 43 strains were examined for motility, mannitol fermentation, catalase activity, and respiratory type. Results showed that 96% of the strains were catalase positive and 60% exhibited varying capacities for mannitol fermentation. Respiratory profiling revealed 40% facultative anaerobes, 37% microaerophiles, and 14% strict aerobes. All strains were motile except strain B33. These phenotypic data will be integrated with morphological, physiological, and molecular analyses to confirm precise taxonomic identification. On the biotechnological front, isolated strains are evaluated for enzymatic activities, antimicrobial properties, and their potential to produce secondary metabolites with industrial and pharmaceutical relevance. This research enhances understanding of *Bacillota* biodiversity in Saharan environments and explores their applications in agri-food, health, and environmental management sectors. The findings are expected to contribute significantly to the valorisation of the bacterial heritage of the Ghardaïa region and enrich national and international taxonomic and biotechnological databases.

Keywords: *Bacillota*, Ghardaïa, Isolation, Taxonomy, Biotechnology.

Unveiling Phenotypic Diversity in Rhizobia Associated with Peanut (*Arachis hypogaea* L.) Cultivated In Ghardaia

Bouchra LAOUAR^{1,2*}, Fatima Zohra BENDIB¹, Mohamed KRAIMAT^{1,3}, Hicham BENHAMMOUDA^{1,3}

¹Ghardaia University, Faculty of Natural and Life Science sand Earth Sciences, Department of biology, Ghardaia, Algeria.

²Laboratoire des Matériaux, Technologie des Systèmes Énergétiques et Environnement, Université de Ghardaïa, 47000 Ghardaïa, Algérie

³Laboratoire Valorisation et Conservation des écosystèmes arides (LVCEA), Université de Ghardaïa, 47000 Ghardaïa, Algérie

**Corresponding author e-mail: laouar.bouchra@univ-ghardaia.edu.dz

ABSTRACT:

The present study aimed to isolate as large a number as possible of rhizobial strains from the root nodules of *Arachis hypogaea* L. in order to identify them morphologically and culturally by seeking an enrichment of the bacterial taxonomy of peanut-nodulating rhizobia. Therefore 13 isolates were selected from the nodules of four different regions in the wilaya of Ghardaïa. The isolation was carried out using a medium (YMA). The bacteria isolated are characterized according to their morphological and phenotypic characters, the isolates were thus tested for their PGPR power by studying their capacity to produce siderophores and to solubilize phosphorus. The analysis of their tolerance to salinity, temperatures, acidic and alkaline pH, as well as biochemical analysis have made it possible to demonstrate a wide physiological and biochemical diversity within these rhizospheric bacteria. Most isolates are able to tolerate pHs ranging from 4 to 10, NaCl concentrations from 0.5% to 5%, and temperatures from 4 to 50 ° C. The majority of isolates are found to be oxidase, catalase positive. They are also found to vary between Gram bacilli (negative /positive). Numerical analysis of these phenotypic characteristics shows two large groups with 82% similarity. Based on the traits studied, most of our isolates carry the same phenotypic traits of rhizobia.

Keywords: *Arachis hypogaea* L, Ghardaïa, Rhizobia, Taxonomy, Diversity, PGPR.

Isolement, Taxonomie et Potentiel Biotechnologique des *Actinomycetota* Issus de Diverses Niches Ecologiques dans la Région de Ghardaïa.

Ali MOULAY OMAR^{1**}, Mustafa KOUZRITE¹, Said BELGHIT¹, Nouredine BOURAS¹,

¹ Valorization and Conservation of Arid Ecosystems Laboratory. Ghardaïa, Algeria. "VCAEL"

**Corresponding author e-mail: moulayomar.ali@univ-ghardaia.edu.dz

ABSTRACT :

Cette étude a pour objectif l'isolement et la caractérisation de souches d'*Actinomycetota* provenant de différentes niches écologiques de la région de Ghardaïa, incluant les sols agricoles, rhizosphériques et non rhizosphériques du palmier dattier (*Phoenix dactylifera*) biovar deglette nour, les sols associés aux arachides (*Arachis hypogaea*), Godm (*Randonia afircana*), Guezah (*Pituranthos chloranthus*), et Colocinte (*Citrullus colocynthis*). Par ailleurs, des niches écologiques intestinales de chameaux, chèvres et chauves-souris ont été explorées, ainsi que des produits alimentaires traditionnels tels que Klila et dattes sèches de Deghla, dans leurs variantes blanche et rouge. D'autres prélèvements ont inclus de l'eau et du sol de puits thermaux, un sol contaminé par le pétrole, un échantillon de compost, ainsi que le khôl, une préparation artisanale composée de poudre minérale de sulfure de plomb ou d'antimoine utilisée à des fins cosmétiques ou thérapeutiques. L'isolement a été réalisé par des méthodes sélectives adaptées aux conditions extrêmes locales, suivi d'analyses morphologiques, biochimiques et moléculaires afin de garantir une identification taxonomique précise. Sur le plan biotechnologique, les souches isolées ont été évaluées pour leurs activités enzymatiques, leurs propriétés antimicrobiennes, ainsi que leur capacité à produire des métabolites secondaires à fort intérêt industriel et pharmacologique.

Keywords : *Actinomycetota*, Ghardaïa, Isolement, Taxonomie, Biotechnologie.

Characterization of Actinomycete Strains from Forest Soils with Anti-microbial Potential

Hadjer SAIFI^{1**}, Rayane SAIFI², Messaouda BENABDELKADER³

¹Laboratoire de Biogéochimie des Milieux Désertiques, Faculté des Sciences de la Nature et de la Vie, Université de Kasdi Merbah, Ouargla, Algeria

²Laboratoire de Recherche en Sciences et Environnement : Bioressources, Géochimie-Physique, Législation et Développement Socio-Économique, Département des Sciences Biologiques, Faculté des Sciences et Technologies, Université de Tamanrasset, Tamanrasset, Algeria

³Laboratoire de Microbiologie Appliquée, Université de Sétif, Département d'Environnement et d'Agronomie, Université de Mohamed Seddik Ben Yahia, Jijel

**Corresponding author e-mail: biosaifi@gmail.com

ABSTRACT:

The rapid spread of bacterial resistance reduces the effectiveness of currently available antibiotics and highlights the need to explore new natural sources of bioactive compounds. Actinomycetes, commonly found in forest ecosystems, are considered unexplored reservoirs of metabolites with medical potential. This study aimed to isolate and characterize forest-derived actinomycetes collected from Cavalo Island (Jijel, Algeria), and to evaluate their antimicrobial potential against pathogenic microorganisms. Soil samples were cultured on selective media suitable for actinomycete isolation. The obtained strains were purified and described based on morphological, biochemical, and physiological traits. Their antimicrobial activities were assessed using agar diffusion assays against Gram-positive and Gram-negative bacteria, as well as yeasts. Secondary metabolites were extracted with ethyl acetate to determine their effectiveness. Three representative strains (*Streptomyces* sp. strain PBR11, *Micromonospora fulva* UDF-1, and *Streptomyces* sp. GLD22) were isolated. Their biochemical profiles revealed the ability to degrade a variety of organic substrates. Strain *Streptomyces* sp. strain PBR11 exhibited strong inhibitory activity against Gram-positive bacteria, with inhibition zones exceeding 31 mm against *Staphylococcus aureus* and *Bacillus subtilis*. In contrast, no significant inhibition was observed against Gram-negative bacteria. Ethyl acetate proved to be the most effective solvent for extracting bioactive metabolites. These findings indicate that forest actinomycetes from Cavalo Island represent a promising source of novel antimicrobial compounds, particularly active against Gram-positive pathogens. Their exploitation could contribute to the development of new antibiotics and warrants further in-depth chemical and molecular investigations.

Keywords: Actinomycete, Antibiotic, Cavalo Forest microbiome, Gram-positive pathogens, Morphological and physiological characteristics, Resistance to antibiotics.

Assessment Of The Biological Quality Of The Aquifer Waters Serving The Municipality Of Metlili (Wilaya Of Ghardaïa)

Meriem OULAD HEDDAR^{1**}, Mohamed KRAIMAT², Nourelhouda DJEKAOUA¹, Habiba LAHRECHE¹

¹Département de Biologie, Faculté des Sciences de la Nature et de la Vie et Sciences de la Terre, Université de Ghardaïa, 47000, Algeria.

²Laboratoire de Valorisation et de Conservation des Ecosystèmes Arides, Université de Ghardaïa, 47000, Algeria.

**Corresponding author e-mail: mari90440@gmail.com

ABSTRACT:

This study entails the physical and microbiological analysis of well water in the METLILI region, situated 45 km south of the wilaya of Ghardaia, encompassing an area of 7300 km², aimed to assess the microbiological quality of the well water from this region and the diseases linked to it. The electrical analyses range from 674 to 7700 µS/cm, indicating a significantly elevated salinity of these waters, rendering them non-compliant with WHO regulations, save for specific wells. The microbiological analysis of the water from these wells revealed the presence of pathogenic microorganisms, indicating that these waters pose a risk of waterborne diseases to human health. Additionally, the physicochemical analysis demonstrated that the pH of the water ranges from 6.86 to 7.34, reflecting average values consistent with WHO standards for conductivity.

Keywords: water, well, water-borne disease, microbiological, physical, analysis, Metlili.

From Arid Soils to Biotechnology: *In Silico* Characterization of L-Ectoine Synthase from *Kibdelosporangium aridum*

Rayene AMINI^{1**}, Mahfoud BAKLI²

^{1,2} Ghardaia University, Faculty of Natural and Life Science sand Earth Sciences, Department of biology, Ghardaia, Algeria.

² Valorization And Conservation of Arid Ecosystems Laboratory. Ghardaia, Algeria. VCAEL

****Corresponding author e-mail:** riyeneamini@gmail.com / bakli.mahfoud@univ-ghardaia.edu.dz

ABSTRACT:

L-ectoine synthase (EC 4.2.1.108) catalyzes the final step of the metabolic pathway leading to the synthesis of ectoine, a compatible solute and osmoprotectant. This compound plays a crucial role in protecting microbial cells against environmental stresses. Thanks to its moisturizing, protective, and stabilizing properties, ectoine has found wide applications in cosmetics, pharmaceuticals, and biotechnology, particularly in agriculture in arid regions and for soil conservation. Its protective effects against abiotic stressors make it a valuable asset for enhancing plant resilience and preserving soil health. This study focuses on the bioinformatic characterization of an L-ectoine synthase from *Kibdelosporangium aridum*, an actinomycete thriving in arid environments. The enzyme was analyzed for its physicochemical properties, secondary structure, and structural and functional features. Results indicate that the enzyme is thermostable, hydrophilic, and acidic in nature. Secondary structure prediction (PSIPRED and SOPMA) revealed 6.45% α -helices, 64.52% random coils, and 29.03% β -strands. A 3D model generated by AlphaFold was selected for its high quality and validated by PROCHECK, ERRAT, and Verify3D tools. Functional annotation confirmed the presence of the L-ectoine synthase domain along with additional structural domains, while COFACTOR predicted key residues involved in ligand interaction. This work represents the first comprehensive *in silico* characterization of L-ectoine synthase from *K. aridum*, providing detailed insights into its structural, functional, and catalytic properties. Beyond its molecular description, this study highlights the ecological and biotechnological relevance of ectoine as a metabolite that contributes to microbial survival in arid ecosystems, while offering promising applications in sustainable agriculture and soil conservation.

Keywords: L-ectoine synthase, *Kibdelosporangium aridum*, Physicochemical properties, Functional features, 3D model.

Quantitative and Qualitative Study Of Microscopic Fungi Living In The Soils of The University of Ghardaia Experimental Site (Algerian Central Sahara)

Meriem BAZZINE^{1**}, Imane ROUANE², Imane SMANIA²

¹Kasdi Merbah University, Faculty of Natural and Life Sciences, Department of biology, Ouargla, Algeria. Bio-resources Laboratory. Ouargla, Algeria

²Ghardaia University, Faculty of Natural and Life Science sand Earth Sciences, Department of agronomic sciences, Ghardaia, Algeria

****Corresponding author e-mail:** bazzine.meriem@univ-ouargla.dz

ABSTRACT:

Sahara soils have long been considered sterile, but research into the microbiology of arid soils has revealed the presence of a diverse mycoflora adapted to harsh arid conditions. The objective of this work is to conduct a quantitative study of the fungal species living in the soils of the Ghardaia university experimental site (central Algerian Sahara). To achieve this objective, soil samples were taken from 05 substations. The method used was suspension-dilution and quantification on PDA agar medium. More than 11 species of fungi have been isolated from the soils of Ghardaia university experimental site, the most common of which are: *Phytophthora infestans*, *Fusarium* sp, *Aspergillus niger*, *Penicillium* sp, *Alternaria* sp, and *Mucor* sp. The microbiological analysis reveals the presence of diversified mycoflora living in the studied soils, the fungi number fluctuated between 5x10⁵ and 30 x10⁵ mg/g of soil, the distribution of fungi depends according to soil physical and chemical properties. Other works, to understand the biodiversity of Saharan regions soils, which remains poorly known, must follow this study.

Key words: fungi, soil, Sahara, quantitative study, qualitative study, Ghardaia.

Antifungal Activity of Symbiotic Actinobacteria Isolated from Desert Truffles Against Soil-Borne Phytopathogenic Fungi

Abderrahmane BENADJILA^{1,2}, Khadidja ALLALI^{2,3}, Miyada ZAMOUM^{2,3}, Yacine GOUDJAL^{2,3}, Abdelghani Zitouni³

¹Ziane ACHOUR University of Djelfa, Faculty of Natural and Life Science, Department of Biology, Djelfa, Algeria.

²Microbial Systems Biology Laboratory (LSBM), Higher Normal School of Kouba, Algiers, Algeria;

³Amar Telidji University of Laghouat, Faculty of Science, Department of Agronomy, Laghouat, Algeria.

**Corresponding author e-mail: ab.benadjila@gmail.com

ABSTRACT:

Managing fungal phytopathogens remains a major challenge in sustainable agriculture, prompting the search for eco-friendly biocontrol strategies based on beneficial microorganisms. Symbiotic actinobacteria are emerging as promising candidates thanks to their ability to suppress plant pathogens and promote host growth. To explore this potential, we investigated actinobacteria associated with desert truffles as a novel microbial source. Isolation from sand truffles (*Terfezia leonis* Tul.) yielded seven distinct symbiotic actinobacterial strains. Morphological and chemotaxonomic characterization consistently classified these isolates within the genus *Streptomyces*. The isolates were systematically screened in vitro for antifungal activity, chitinolytic capacity, siderophore production, and the synthesis of plant growth regulators, including indol-3-acetic acid (IAA) and gibberellic acid (GA₃). All *Streptomyces* strains inhibited fungal radial growth, with inhibition levels varying according to the phytopathogen tested. Strains TL7 and TL2 exhibited the strongest antifungal effects ($p < 0.05$). Strains TL4, TL6, and TL7 produced distinct halo zones on CAS agar, confirming siderophore secretion. All strains degraded chitin, indicating chitinolytic potential. Production of plant growth regulators differed markedly among the isolates, ranging from undetectable to high levels ($0 - 117.1 \pm 0.6 \mu\text{g mL}^{-1}$ for IAA and from $0 - 55.3 \pm 0.7 \mu\text{g mL}^{-1}$ for GA₃). Notably, strain TL7 combined strong antifungal activity with robust plant growth-promoting traits, underscoring its potential as an efficient and eco-friendly biocontrol agent for managing soil-borne phytopathogens while supporting sustainable crop productivity.

Keywords: *Terfezia leonis* Tul, Fungal Phytopathogens, *Streptomyces spp*, Plant Growth Regulators, Antifungal Activity,

Production and Molecular Identification of Secondary Metabolites from Actinomycete Strains Isolated from Algerian Sahara Soils

Souad Fatima Zahra BOUZIANI¹, Omar MESSAOUDI²,

Laboratoire de Microbiologie appliquée à l'Agroalimentaire, au Biomédical. Laghouat. University of Laghouat

1 Ghardaia University, Faculty of Natural and Life Science and Earth Sciences, Department of biology, Ghardaia, Algeria.

2 Valorization and Conservation of Arid Ecosystems Laboratory. Ghardaia, Algeria. "VCAEL

**Corresponding author e-mail: sfz.bouziyani@lagh-univ.dz

ABSTRACT:

Arid ecosystems, despite extreme conditions, harbor valuable microbial biodiversity for biotechnology and ecological conservation. With the growing resistance of pathogens to conventional antibiotics, the search for new antimicrobial molecules

has intensified. In this context, forty-five (45) actinobacterial isolates were obtained from five soil samples collected from various arid regions of the Algerian Sahara. Their antimicrobial activity was evaluated using the agar cylinder method against three Gram-positive bacteria (*Staphylococcus aureus*, *Micrococcus luteus*, *Bacillus subtilis*) and three Gram-negative bacteria (*Escherichia coli*, *Pseudomonas aeruginosa*, *Klebsiella pneumoniae*), all frequently associated with soil and water contamination. The results revealed that 20 strains exhibited activity against at least one tested bacterium. Among them, 17 strains showing strong antimicrobial activity were identified through 16S rRNA gene sequencing as belonging to the genus *Streptomyces*, well-known for producing bioactive metabolites. This study highlights the potential of Algerian Sahara arid soils as a rich source of antimicrobial biomaterials, thereby contributing to biotechnological valorization and the conservation of arid ecosystems through the control of environmental pathogens.

Keywords: Isolation, Algerian Sahara, Actinomycetes, Antimicrobial activity, Antibiotic resistance , I'ARNr 16S

Evaluation of The Biological Activity of the Dichloromethane Extract Obtained from the Red Algae *A. armata* from the Algerian Coast

Nala RAI^{1**}, Mohammed Samer Djahid BENAMOR², Ibrahim SIFI³, Hicham GOUZI¹

¹ Biological and Agronomic Sciences Laboratory (LSBA), Faculty of Science, Amar Telidji University, Laghouat, Algeria

² Fundamental Sciences Laboratory, Amar Telidji University, Road of Ghardaïa BP37G, 03000Laghouat, Algeria

³ Fundamental Sciences Laboratory, Amar Telidji University, Road of Ghardaïa BP37G, 03000Laghouat, Algeria

****Corresponding author e-mail:** n.raï@lagh-univ.dz

ABSTRACT:

Urinary infections have become a major public health problem. They are caused mainly by bacteria such as *Escherichia coli*, *Proteus mirabilis* and *Staphylococcus aureus*. These micro-organisms have developed resistance to antibiotics and therefore pose a significant risk to exposed populations. Several efforts have been devoted to finding new anti-infective agents that can be used as new treatments for urinary infections. Several studies have shown that marine algae can inhibit the growth of pathogenic bacteria. This work reports the evaluation of the biological activity of the dichloromethane (DCM) extract of the red algae *A. armata* collected in Algeria, using two types of extraction (cold maceration and ultrasound). In a preliminary evaluation, the DCM extract was tested for antibacterial activity against ten strains of *Escherichia coli*. Following a well-established approach, antibacterial activity was expressed as a zone of inhibition using 96-well microplates. The minimum inhibitory concentration (MIC) was also determined for the ten bacterial strains. The DCM extract of the red algae *A. armata* had a high inhibitory effect against *Escherichia coli* strains isolated from urine cultures. Furthermore, strain 19251 was the most sensitive to the DCM extract with a value of (MIC = 0.43 mg/ml) compared to strain 1703 with a value of (MIC=0.86mg/ml). GC-MS analysis is currently underway to determine the bioactive molecule against urinary infections.

Keywords: Urinary infection, Red algae, *Asparagopsis armata*, Dichloromethane extract, Antibacterial activity, Algerian coast.

Pathological Impact of Opportunistic Fungi On the Decline of *Juniperus Phoenicea* L. At the El Gaâda Station (Madna, Laghouat)

Khedidja SOUFARI¹, Mostapha Naceur YUCEFI², farouk BENACEUR³

¹Department of Biology, Faculty of Science, Amar Thlidji University

² Department of Biology, Faculty of Science, Amar Thlidji University

³Department of Biology, Faculty of Science, Amar Thlidji University

****Corresponding author e-mail:** khe.soufari@lagh-univ.dz

ABSTRACT:

The Phoenician juniper is a bushy shrub or erect shrub 1 to 8 m tall that forms interesting forest massifs in the ranges of the Saharan Atlas (DESPOIS, 1956). There are a variety of factors that can lead to this, such as fungal infections, insect infestations and environmental stress factors such as drought or pollution. A variety of methods are used to diagnose and study this decline (HASNA et al., 2023). The Madna region in the wilaya of Laghouat is characterized by steppe-type plant formations and forest formations based on species much more widespread in the Mediterranean such as: Phoenician juniper, Carob tree, Lentisque, Holm oak and Aleppo pine, etc. (DESPOIS, 1956). This forest landscape is undergoing rapid regressive changes linked to various degradation processes (BONIN and QUEZEL, 1980). Today there are only very open steppes, light Phoenician juniper scrub, light Aleppo pine scrub and holm oak coppice, made up of a series of isolated patches (B.N.E.D.E.R., 2011). BONIN and QUEZEL (1980) mention that it is infinitely probable that this regressive evolution of these ecosystems (steppes, forests, pre-forests and matorrals) is underway and may become irreversible. Given that no study has confirmed the causal agent of *Juniperus Phoenicea* L. dieback in the region, the ecological and pathological study of dieback stands of *Juniperus phoenicea* in the El-Gaada station aims to achieve a global understanding of the factors affecting Juniper health and to provide forestry services with a control and management plan for affected stands.

Key words: Pathology, *Juniperus phoenicea* L., El-Gaada station, Laghouat

Essential Oils of *Artemisia herba-alba*: Compilation of Studies on Chemical Composition and Biological Activities

Khaoula ZEGHIB^{1**}

¹Department of Cellular and Molecular Biology, Faculty of Natural Sciences and Life, University of El-Oued, El-Oued 39000, Algeria.

^{**}Corresponding author e-mail: zeghib-khaoula@univ-eloued.dz

ABSTRACT:

The present review summarizes findings from previous studies on the essential oils of *Artemisia herba-alba*, focusing on their chemical composition and biological activities. Analyses performed using gas chromatography–mass spectrometry (GC–MS) have identified various constituents, with davanan (62.20%), camphor (39.5%), thujane (43.85%), chrysanthenyl (25.12%), and chrysanthenan (47.71%) reported as major components. Biological investigations indicate that *A. herba-alba* essential oils exhibit significant pharmacological potential. They demonstrate antibacterial effects against a range of bacterial strains, strong antioxidant activity confirmed through DPPH and ABTS assays, notable antifungal properties, and antiproliferative effects against acute leukemia cells. In conclusion, essential oils from *Artemisia herba-alba* are characterized by a diverse chemical profile and a broad spectrum of bioactivities, supporting their potential applications in antimicrobial, antioxidant, antifungal, anti-inflammatory, and anticancer therapies.

Keywords: *Artemisia herba-alba*, essential oils, chemical composition, biological activity

Isolation and Biochemical Identification of Halophilic and Extremely Halophilic Strains From Algerian Hypersaline System

Sabah MEDIANI^{1,2**}, GANA Salima KEBBOUCHE¹, Siham AKMOUSSI-TOUMI¹, Souad KHEMILI-TALBI¹, Nesrine SAAD-AOUI-SAMDHI¹

¹ Laboratory of Bioinformatics, Applied Microbiology and Biomolecules, University of Boumerdes

² University of Ahmed DRAIA, Faculty of Natural and Life Sciences, Department of biology, ADRAR

^{**}Corresponding author e-mail: med.sabah01@gmail.com

ABSTRACT:

Saline water is a salty area, Halophilic microorganisms are ubiquitously found in hypersaline environments globally and they are similarly referred to as salt loving microorganisms. Biodiversity in saline ecosystems have unique characteristics for biotechnological applications. In this study, samples were collected from two salt resources in Sahara Desert (southern Algeria). Cultivation was carried out on SG 250g/l medium and SH medium 160g/l to select extremohalophilic and halophilic microorganisms, respectively. 8 halophilic strains were successfully isolated and purified at 40 °C under PH=8. 6 isolates of BD water, five of them were isolated from SG medium. 2 strains were isolated from ADG water, each recovered using a distinct culture medium. Morphological and biochemical identification was performed using fresh state observations, gram staining, catalase and oxidase tests and gallery API 20 E. All isolates presented coccus morphology with diverse pigmentation (red, pink, orange and beige) and some are motile. All catalase tests are negative. While oxydase activity in 70 % are positive of isolates. gram staining indicated 56% of strains to be gram negative and galerie API 20 E results include ONPG tests are positive in 7 isolates. These strains presented a high potential to product enzymes as GEL and Urea activity are positive for all, while ADH and ODC activity are positive for one strain, indeed the LDC activity are negative for all strains. CIT, VP, GLU, MAN and AMY tests showed positivity in one strain. It was observed negativity for all in H₂S and VRE tests. TDA, IND, INO, SOR and SAC tests indicated 75-62.5% of isolates are positive. RAH, MYL and ARA tests in 100 % of isolates are positive. These findings provide the presence of diverse halophilic and extreme halophilic microorganisms in Saharan saline waters and emphasize their adaptability to extreme saline ecosystems and their potential in biotechnological applications, This study present preliminary insight into the microbial biodiversity of Saharan ecosystems and lays the groundwork for future molecular identification and characterization.

Keywords: Biodiversity, Halophilic and extremely halophilic strains, Hypersaline ecosystems, Saline water.

Unlocking the Microbial Potential: Thermophilic Bacteria from Arid Ecosystems as a Novel Source of Exopolysaccharides

Fatima Wiam LEBBOUKH^{1,2**}, Lotfi GHELLAI^{1,2}, Mohammed GHERIB², Abdel-ilah AMROUCHE²

¹ Laboratory of Biotoxicology, Pharmacognosy and Biological Valorization of Plants (LBPVBP), University of Saida, Dr. Moulay Tahar. 20000 Saida - Algeria.

² Laboratory for the Sustainable Management of Natural Resources in Arid and Semi-Arid Areas (GDRN), University Center of Salhi Ahmed. 45000 Naâma - Algeria.

****Corresponding author e-mail:** fatimawiamlebboukh@gmail.com

ABSTRACT:

Extreme environments are ecosystems characterized by conditions that exceed the optimal tolerance limits for most life forms, such as hyperarid, hypersaline, and hyperthermal habitats. These extreme niches can harbor diverse microbial communities known as extremophiles. To survive under such conditions, extremophiles exhibit vast metabolic flexibility combined with extraordinary physiological capabilities that enable them to colonize challenging ecosystems. Exopolysaccharides (EPSs) are among the metabolites secreted by extremophile microorganisms during metabolic pathways. Their structural diversity and functional versatility make these carbohydrate-based biopolymers highly valuable in the biotechnology industry. In the present investigation, the main objective was to prospect for EPS-producing thermophilic bacteria from the Algerian desert environment. Strains were isolated at 55°C, screened for EPSs production, and the selected isolates were characterized by standard microbiological techniques and identified through the API 20^F system. Morphological characterization revealed that the isolates were Gram-positive, endospore-forming bacilli. Among them, 4 isolates were distinguished by their high EPSs production and diverse biochemical traits. These findings underscore the potential of thermophilic bacteria as a valuable source of EPSs with promising biotechnological applications and further suggest that arid environments can host microbial communities of great relevance as sources of bioactive compounds for industrial purposes.

Keywords: Thermophilic bacteria, Exopolysaccharides (EPSs), Algerian desert.

Potato Biotization: Phytoprotection and Growth Promotion

Djamila AMEUR^{1,2**}, Messaoud BENCHABANE²

¹ Laghouat university, Faculty of sciences, Department of agronomic science, Laghouat, Algeria.

² Laboratory of agrobiological resource protection and development (LPvAB), Department of biotechnologies, SNV faculty, Blida, Algeria.

****Corresponding author e-mail:** d.ameur@lagh-univ.dz

ABSTRACT:

Plant Growth-Promoting Rhizobacteria (PGPR), such as *Pseudomonas fluorescens*, enhance plant development through nutrient assimilation, phytohormone production, and protection against phytopathogens. This study investigates the effects of *Pseudomonas fluorescens* strains as Plant Growth Promoting Rhizobacteria (PGPR) inoculation on the development of potato (*Solanum tuberosum* L.) vitro-plants in vitro grown on MS medium. Preliminary tests confirmed satisfactory bacterial growth near roots and improved plant vigor compared with non-inoculated controls. Biotization significantly promoted growth parameters, particularly leaf production and aerial biomass accumulation. At 15- and 30-days' post-transplantation, leaf number increased increases up to 27% and 40%, respectively, while plant height gains reached up to 40% over the control. Root development showed no significant difference, likely due to high variability between replicates. Overall, the results highlight the beneficial role of *P. fluorescens* in enhancing vitro-plant growth, through enhanced nutrient assimilation and phytohormone production. supporting its use as a biotization agent to improve the quality of planting material in potato cultivation.

Keywords: *Pseudomonas fluorescens*, Potato (*Solanum tuberosum*), PGPR, vitro-plants, biotization, plant growth promotion.

Spirulina as a Strategic Phytoplankton for Sustainable Development in Arid Regions

Safia LOUNICI ^{1,2**}, Lynda BOUTEKRABT-BENHADJA³, Amel DOUMANDJI⁴,

¹Laboratory of Biological and Agricultural Sciences, Laghouat, Algeria

²Amar Telidji University, Faculty of Sciences, Department of Agronomic Sciences, Laghouat, Algeria

³National Higher School of Marin Science and Coastal Development, Algiers, Algeria

⁴Laboratory of Science Technology and Sustainable Development Research, Department of Food Sciences, Faculty of Nature and Life Sciences, Saad Dahlab Blida 1 University, Blida, Algeria

****Corresponding author e-mail:** s.lounici@lagh-univ.dz

ABSTRACT:

Microalgae, essential components of phytoplankton, represent a flora particularly well-suited to extreme environments, especially arid regions. Their biodiversity is closely linked to their morphology and the cultivation conditions in which they evolve. Among these microalgae, spirulina stands out for its ability to thrive in alkaline, hot, and water-scarce environments, making it an ideal candidate for arid zones. In 2024, the taxonomy of the spirulina strain native to Algeria was established by Dr. Lounici and collaborators, paving the way for enhanced local valorization. Spirulina cultivation can be carried out either in open-air systems or in photobioreactors. The latter, being more technological and controlled, aligns with environmental sustainability goals while ensuring consistent product quality. Spirulina is renowned for its exceptional protein content (min. 33.33% ± 0.18) and minerals (min. 7.78% ± 0.33). It is widely used as a dietary supplement and has pharmaceutical and medicinal applications. It contributes to improved animal performance and productivity in both animals and in aquaculture, while playing an important ecological role through its ability to produce oxygen and fix nitrogen. A comparative study of open-air cultivation in two distinct media, a local medium and a reference medium, revealed that optimal growth was achieved after 11 days in the local medium. The ideal growth conditions were identified as a temperature of 34 °C and a pH of 9. These findings demonstrate that the Algerian strain of spirulina has a short growth cycle, enabling high yield and rapid production, while exhibiting a lower ecological footprint compared to conventional plant crops.

Keywords: Spirulina, Phytoplankton, Cultivation, Culture medium, Arid Regions.

Effect of Date Extracts to Modulate the Selective Cytotoxicity of a Therapeutic Drug

Sara BELMIR ⁽¹⁾, Zahia BOUCHERIT-OTMANI ⁽¹⁾, Kebir BOUCHERIT ⁽¹⁾ et Mohammed Habib BELHACHEMI ^(1,2)

⁽¹⁾ Laboratoire Antibiotiques Antifongiques : physico-chimie, synthèse et activité biologique, Département de Biologie, Faculté des Sciences de la Nature et de la Vie, des Sciences de la Terre et de l'Univers, Université Aboubekr-Bekaid Tlemcen.

⁽²⁾ Faculté des sciences de la nature et de la vie et des sciences de la terre, Département de Biologie, Université de Ghardaïa, Zone scientifique, BP 455 Ghardaia, 47000, Algérie.

Email (s) de correspondance : sarra.belmir@univ-tlemcen.dz

Abstract :

This work is part of efforts to improve the therapeutic index of amphotericin B, a first-line treatment for systemic and deep mycoses, which represent a significant public health problem worldwide.

Our work focuses on modulating the selective cytotoxicity of new amphotericin B formulations by complexing it with an aqueous extract of 'Ajwa' dates, using a yeast model, *Candida albicans* ATCC10231, and human red blood cells, a universal model for animal cells.

The study examined the effect of the aqueous date extract on the activity of amphotericin B against *Candida albicans* ATCC 10231 and on its cytotoxicity towards human red blood cells. The extract, prepared according to Shraideh (1998), was used at 5%, 20%, and 33% in the culture media, and the growth of *C. albicans* was monitored for 40 hours in the presence or absence of amphotericin B (0.4 µg/ml). In parallel, cytotoxicity towards erythrocytes was assessed by incubating a red blood cell suspension with the aqueous extract, then adding amphotericin B (20 µM); hemolysis was measured by quantifying hemoglobin in the supernatant at 548 nm.

The complexation of amphotericin B with the aqueous extract induced a 27.2% improvement in its efficacy against *Candida albicans* ATCC 10231 and a 16% reduction in its cytotoxicity towards human red blood cells, respectively.

The aqueous date extract enhanced the antifungal activity of amphotericin B while reducing its erythrocytic cytotoxicity. These encouraging results suggest a potential improvement in its therapeutic index through this combination.

Mots clés : Amphotericine B, «Ajwa» Date, Aqueous extract, Antifungal activity , Cytotoxicity.

Effects of Commercial and *Paenibacillus tarimensis* Exopolysaccharides on the Aggregation and the Structural Stability of a Saline Clay Loam Soil

Lynda Smail¹, Nadjette Djemouai^{2,3}, Nadia Boukhelata¹, Nassima Baha¹, Yahia Kaci¹

¹ Equipe Biologie des Sols, Laboratoire de Biologie et Physiologie des Organismes (LBPO), Faculté des Sciences Biologiques, Université des Sciences et de la Technologie Houari Boumediene (USTHB), Bab Ezzouar, BP32, 16111 Alger, Algérie

² Département de Biologie, Faculté des Sciences de la Nature et de la Vie et Sciences de la Terre, Université de Ghardaia, BP 455, 47000 Ghardaïa, Algérie

³ Laboratoire de Biologie des Systèmes Microbiens (LBSM), Ecole Normale Supérieure Cheikh Mohamed El Bachir El Ibrahimy, Kouba, BP 92, 16308 Alger, Algérie

Correspondant author: smail_lynda_usthb@yahoo.fr

ABSTRACT:

The study highlights the impact of the exopolysaccharide EPS-R1 on soil aggregation and stability when compared with selected reference biopolymers. EPS-R1 was secreted by the bacterial strain *Paenibacillus tarimensis* REG 0201M isolated from an extremophilic environment in the Algerian Sahara (Adrar Province). The latter is a levan-type heteropolysaccharide capable of absorbing 1025% of its dry weight in water. EPS-R1 was produced on yeast extract sucrose agar, and then both bacterial cells and EPS were mixed with a silty clay loam and saline soil at three concentrations: 0.2, 0.4, and 0.6% (w/w). The estimation of aggregation was carried out by dry sieving of newly formed aggregates and the structural stability was evaluated using a fast-wetting test followed by calculation of the Mean Weight Diameter (MDW). EPS-R1 enhanced macroaggregation markedly at concentrations as low as 0.2%, achieving up to 86.89% of macroaggregates greater than 2 mm at 0.6%. Aggregate stability also improved, with only 12.8% disintegration at 0.6% EPS-R1. With 0.2% EPS-R1, 36.24% of mesoaggregates (< 2 mm) were converted into macroaggregates (> 2 mm). The proportion of macroaggregates (> 2 mm) increased to 51.28% at 0.4% EPS-R1 and 73.25% at 0.6% EPS-R1, while the 0.25–2 mm fraction decreased accordingly. At 0.2% EPS-R1, the aggregate size distribution was relatively even across size classes. The MWD showed that treatment with EPS-R1 transformed the soil from a very unstable to a highly stable structure. The findings showed the potential of EPS-R1 as an effective bio-structuring soil amendment for arid and degraded salt-affected soils.

Keywords: Soil, Aggregation, Stability, Exopolysaccharides, *Paenibacillus tarimensis*.

The knowledge of the urinary microflora and its influence on the bladder tissues of dromedaries from the Sahraoui population in the region of Ghardaia

Fatima Zohra TAOUTI^{1**}, Baïssa BABELHADJ^{1,2}, Amira REZZAG¹, Mira CHIKHAOUI³

¹ Ouargla Higher Normal School, Algeria

² Research Laboratory on Phoeniculture, Kasdi Merbah University, Ghardaïa Road 30000, Ouargla, Algeria.

³ Institute of Veterinary Sciences, Tiaret University-Algeria, Tiaret, Algeria

**Corresponding author e-mail: enso2020.taouti.fatimaz@gmail.com

ABSTRACT:

The objective of this study is to identify the microbial agents responsible for urinary tract infections in the Arabian dromedary of the Sahrawi population in the Ghardaia region, and to assess their impact on the histological structure of the bladder. This research aims to better understand the pathological alterations caused by these infections and to provide scientific data useful for the prevention and management of urinary diseases in dromedaries. This study examines the urinary microflora of Saharan camels by analyzing 9 cases ranging in age from 1 to 6 years in the region of Ghardaia, as well as the potential impact on bladder tissue. Microbiological analysis of the urine revealed an absence of both commensal and pathogenic bacteria, suggesting that the urine of healthy young camels is naturally sterile despite its alkaline nature. Histopathological examination of the bladder revealed that approximately half of samples (55.55%) were normal, reflecting good structural integrity of the bladder tissue in the studied animals. However, some specific pathological changes were observed, including epithelial desquamation (44.44%), vascular congestion (33.33%), and acute inflammation (22.22%). These findings indicate the presence of moderate pathophysiological processes that may be influenced by environmental or metabolic factors. The camel's ability to adapt to harsh desert conditions may play an important role in its resistance to urinary tract infections.

Keywords: Urinary microflora, camel, bladder, histopathology, Ghardaia, Algeria



TOPIC

Orale communications

**AGROSYSTEM
FUNCTIONING**

Innovative Pathways to Sustainable Agrosystems in Arid and Semi-Arid Regions.

Maghchiche Abdelhak

University Batna2, Department of Pharmacy, Batna, Algeria.

Corresponding author e-mail: amaghchiche@yahoo.fr

ABSTRACT:

Arid and semi-arid regions face significant challenges water scarcity, poor soil nourishment, and deterioration of environmental services, all contribute to significant issues in arid and semi-arid areas that threaten the viability of agricultural systems. This piece of research studies agrosystem structure and sustainability through the interaction of soil, crops, and animals, water efficiency, and the incorporation of biodiversity to increase productivity whilst staying in balance with the ecosystem. Examples of innovative management strategies include the use of technologies such as precision agriculture with remote sensing capabilities and IoT devices for soil moisture measurement, to assist with scheduling water supply in a more optimized manner and accountable use of resources. Other innovative soil amendments like biochar were used with positive effects on soil water availability and retention, as well as in providing soil nutrient availability to plants. Additionally, the use of nanotechnology and nanomaterials is becoming popular as a means of improving soil fertility, nutrient delivery, and soil water retention. Other technology-assisted soil management practices are doing their part in restoring soil structure and resilience. Agroecological systems that incorporate trees in livestock systems, such as silvopastoral systems, also help to improve biodiversity on farms and regulate microclimates. These technologies and practices can be started alongside each other to cultivate and improve resilient, productive and sustainable systems of farming in fragile dryland and semi-arid agro-ecosystems.

Keywords: Sustainable agriculture, Water management, Precision agriculture, Biochar, Nanotechnology, Agroecological practices

Highlighting The Value Of Algerian Durum Wheat Varieties Over European Varieties For Salinity Tolerance

MALLEM HAMIDA^{1,2 *}

¹ Amar Telidji University, Faculty of Sciences , Department of Agronomy, Laghouat, Algeria.

² Mechanics Laboratory. Environment and Natural resources' Team, Laghouat

****Corresponding author e-mail:** h.mallema@lagh-univ.dz

ABSTRACT:

Salinity is a strong inhibitor of plant growth and yield, therefore an important problem in wheat production. Detection of stable markers of salt tolerance is necessary in the improvement of wheat varieties that can grow under salt stress. To describe morpho-physiological, biochemical, and ionic adaptations of wheat to salt stress, we tested a heterogeneous panel of four wheat lines (Simeto, Vitron, Oued el Bared, and Mansoura) at tillering. The plants were grown in Hoagland solution with rising concentrations of NaCl (50, 100, and 150 mM). Oued el Bared possessed the highest shoot and the total fresh weight ratio but Mansoura exhibited high root fresh weight ratios at 150 mM NaCl. Mansoura and Simeto experienced severe biomass loss. Oued el Bared and Vitron had higher leaf relative water content at 150 mM NaCl compared to Mansoura and Simeto. The proline contents were higher in Vitron, Mansoura, and Simeto but lower in Oued el Bared. The salt-sensitive genotypes (Mansoura and Simeto) accumulated higher total chlorophyll synthesis, while Oued el Bared had higher chlorophyll b content. The sodium content was higher in Mansoura than in Oued el Bared, reflecting higher salinity sensitivity. We found positive relationships between leaf and root Na⁺ content, chlorophyll content, relative water content, root K⁺ and K⁺/Na⁺ ratios. According to the salt tolerance index, Oued el Bared was the most salt-tolerant variety, followed by Vitron, Simeto, and Mansoura. All varieties presented specific responses to salt stress, which shows the diversity of mechanisms of salt tolerance in these species.

Keywords: Salinity, tolerance, Durum wheat, varieties.

Quantification of Carbohydrates in Montagneous Honey from Algeria by HPLC-RID: Linking Quality, Nutritional Value, and Ecosystem Conservation.

Abdelkader HASSANI^{1,*}, Samir CHADIL², ATOUI MOHAMED³, Zakaria BOUAL¹, Hakim BELKAHLFA, Yacine MOUSSAOUI^{5,6}

¹Université Kasdi Merbah Ouargla, Laboratoire de Protection des Ecosystèmes en Zones Arides et Semi-Arides, 30000 Ouargla, Algeria.

²Laboratory of Catalytic Materials and Industrial Processes (LMPCI), Department of Hydrocarbons and renewable energies, Faculty of Sciences and Technology, University of Adrar, National Highway No 6, Algeria.

³Radiation and Plasma and Surface Physics Laboratory, University Kasdi Merbah Ouargla, Ouargla, 30000 Algeria.

⁴Scientific and Technical Research Center in Physicochemical Analysis, Bou-Ismaïl, Tipaza, Algeria.

⁵Laboratory of Valorisation and Promotion of Sahariens Ressources (VPRS), université KASDI Merbah (UKMO), Ouargla, Algeria, ⁶Laboratory of Sciences and Technology of Environnement (LSTE), National Polytechnic School (ENP), EL Harrach, Algiers, Algeria.

Corresponding author: abdelkader.hassani@univ-ouargla.dz

ABSTRACT:

The valorization of natural products from arid and semi-arid ecosystems relies on accurate analytical methods to characterize their biochemical composition and support sustainable development. Honey is a key product of ecological and socio-economic importance, reflecting both floral diversity and environmental adaptation of arid and montagneuse regions. In this study, High-Performance Liquid Chromatography with refractive index detection (HPLC-RID) was used to determine the carbohydrate composition of honey collected from the montagneuse area of Chaabet El Aneur (Boumerdès, Algeria). Analyses were performed with a Shim-pack GIST NH₂ column (250 × 4.6 mm, 5 µm) using an isocratic mobile phase of acetonitrile/ultrapure water (80:20, v/v) at 1.0 mL/min. The detector and oven were maintained at 35 °C, with an injection volume of 10 µL. The chromatographic profile revealed four major peaks: water (24.19%), fructose (20.59%), glucose (23.75%), and sucrose (4.09%). The high proportion of reducing sugars (fructose and glucose together ≈ 44%) confirms the nutritional richness and rapid energy potential of the honey, while the relatively low sucrose content (≈ 4%) indicates natural maturity and authenticity. However, the water content (24.19%) is higher than the international recommended standard (<20%), which may affect honey stability and conservation.

These findings underline the efficiency of HPLC-RID for honey characterization and provide valuable insight into the biochemical profile of products from arid and montagneuse ecosystems. Such analytical approaches contribute to both the scientific valorization of local honey and the conservation of ecosystem services that sustain its production.

Keywords: Honey, Arid ecosystems, HPLC, Carbohydrates, Valorization

Saharan agricultural systems and food security in Algeria: dynamics, ecological impacts and sustainability perspectives

Rachid HOUICHITI¹

¹Laboratory of mathematics and applied sciences. University of Ghardaïa. 47035. Algeria

Corresponding author e-mail: houichiti.rachid@univ-ghardaia.edu.dz

/rhouichiti@gmail.com

ABSTRACT:

The agricultural development of Saharan regions in Algeria has become a strategic priority in a context marked by irregular cereal production in the northern part of the country and a heavy dependence on imports. This study examines the role of Saharan agricultural systems – including traditional oases, modern irrigated schemes, and agro-industrial farms – in strengthening national food security while assessing their impacts on the functioning of arid ecosystems. The main objective is to understand how these systems can contribute to stabilising Algeria's food balance, reduce vulnerability to climate variability and global market fluctuations, and at the same time identify environmental constraints related to the exploitation of natural resources (soils, groundwater, biodiversity). The methodology is based on a critical review of scientific and institutional literature (FAO, CIRAD, ICARDA, Algerian universities), combined with an analysis of public programmes and recent agricultural production data in the Sahara. The results indicate that Saharan agriculture already contributes nearly one quarter of national production through the expansion of irrigated areas and the diversification of crops (cereals, forage maize, sugar beet, oilseeds). It also provides a resilience mechanism against recurrent deficits in the northern cereal regions. However, its intensive development generates increasing pressures on fossil aquifers, risks of soil salinisation, and threats to traditional oasis ecosystems. Perspectives highlight the need to reconcile productivity with sustainability through integrated water resource management, the adoption of water- and energy-efficient technologies, the valorisation of local knowledge, and the reinforcement of research and international cooperation.

Keywords: Arid ecosystems, Food security, Groundwater resources, Saharan agriculture, sustainability, Resilience.

Role of Agroecological Systems in Insect Conservation in the Baniane Region (Biskra, Algeria).

Somia Torki^{1,2,3}, Mohammed Tahar MEBARKI⁴, Khaoula Lahlouhi¹, Kaouther Debabeche⁵ Faiza Marniche⁶.

¹ Mohamed Kheider University, Biskra. BP 145 RP, 07000 Biskra, Algeria.

² Laboratory of Genetics, Biotechnology and Bio-Resources Valorization, Department of Agronomic Sciences, University of Biskra, Biskra, Algeria.

³ Laboratory of Saharan Bio-Resources: Conservation and Valorization, 30000 Ouargla, Algeria.

⁴ Faculty of Nature and Life Sciences and Earth Sciences, University of Ghardaïa, 47000, Ghardaïa, Algeria

⁵ Scientific and Technical Research Center on Arid Regions, El Alia Nord, 07000, Biskra, Algeria.

⁶ National Higher School of Veterinary Medicine – Zoology Laboratory, Oued-Smar, 16000 Algeria.

Corresponding: soumia.torki@univ-biskra.dz

ABSTRACT:

To assess the importance of agroecological systems in preserving entomological biodiversity, a six-month study was conducted from August to January on an agricultural farm located in the Baniane region (Biskra). This farm is characterized by a high diversity of plant species, including fruit trees (apricot trees), citrus (lemon trees), olive trees associated with fig trees to naturally control the olive fruit fly, and market garden crops (fava beans, garlic, and onions).

Sampling of the entomofauna was conducted using two complementary methods: Barber pots for ground-dwelling insects and colored traps (yellow and blue) for flying insects. Nine pitfall traps and six colored traps (three yellow and three blue) were installed in each of the three studied plots. The first plot contained apricot trees, the second comprised olive and fig trees, and the third was planted with vegetables.

The results revealed noteworthy entomological richness: in the apricot plot, 148 species were collected with colored traps and 62 species with pitfall traps; in the olive–fig plot, 119 species were recorded with colored traps and 78 species with Barber pots; lastly, in the vegetable plot, 133 species were captured with colored traps and 51 species with pitfall traps. The majority of identified species were beneficial insects, playing a crucial role in the biological regulation of pest populations.

These findings highlight the fundamental role of agroecological practices and plant diversification in sustaining and enhancing entomological biodiversity within agricultural environments.

Keywords: Agroecology, Biodiversity, Entomology, pitfall traps, colored traps (yellow and blue), Baniane.

Integrating Urban and Agricultural Soils for Climate Resilience.

JOSE NAVARRO-PEDREÑO

Department of Agrochemistry and Environment. University Miguel Hernández of Elche (UMH), Elche, Spain.

ABSTRACT:

Land planning must integrate social, economic, and environmental shifts to achieve the core objective of creating healthy living spaces and productive resource areas like agricultural land. This requires leveraging environmental services in both urban and peri-urban zones adapted to the local conditions.

Urban soils are key to city resilience against climate change. Though often altered and ecologically limited, these soils within city limits possess immense potential. Gauging this requires environmental indicators, compelling planners and citizens to acknowledge their value. Key metrics include Public Green Space per Inhabitant and the 3-30-300 Rule (seeing three trees, 30% canopy, and being within 300 meters of a park). Another vital indicator is the natural infiltration capacity, often facilitated by Sustainable Urban Drainage Systems (SuDS), which helps reduce the urban heat island effect.

Beyond the city, agricultural soils are a critical climate ally. Sustainable practices like conservation tillage enable carbon sequestration, storing atmospheric CO₂ as soil organic carbon (SOC)—a vital mitigation strategy. Conversely, poor practices can release potent nitrous oxide. Healthy, organic-rich agricultural soils also resist erosion and store water, enhancing resilience to extreme weather.

A comprehensive, pragmatic set of indicators must govern both urban and agricultural soil management. Embracing the twin roles of all soils will not only mitigate climate change impacts but also foster improved governance and cultivate greener, more productive, and livable spaces.

Keywords: Urban, soils, climate change, cultivate greener, healthy living.

Performance and Agricultural Reuse of Wastewater in Arid Environments: A Comparative Study of the Laghouat and Hassi R'Mel WWTPs.

Mohammed Abdeldjid BOUMEDDIENE^{1**}, Soufyane BENSOUILAH¹, Zohra HOUYOU², Fayssal GHOUGALI¹, Mostafa Naceur YUCEFI¹, Rabah ZEBBA³

¹ Department of Biology, Faculty of Sciences, Amar Telidji Laghouat University, Laghouat, Algeria.

² Laghouat University-Mechanics Laboratory, P.O. Box 37, Laghouat 03000, Algeria

³ Laboratoire Biologie, Eau & Environnement (LBEE), Faculty of SNVSTU, University of 8 May 1945, 24000 Guelma, Algeria

**Corresponding author e-mail: boumeddiene.a@gmail.com

m.boumeddiene@lagh-univ.dz

ABSTRACT:

In arid regions, water scarcity necessitates the recovery and reuse of treated wastewater as an alternative resource for agricultural production. This study compares the performance of two wastewater treatment plants (WWTPs) located in the Laghouat region (Algeria): Hassi R'Mel, operating under a stable functional regime, and Laghouat, recently restarted after a prolonged shutdown. The evaluation is based on the variation of key physico-chemical parameters before and after treatment. Results show that the Hassi R'Mel WWTP achieves high removal efficiencies of suspended solids, biodegradable organic matter (BOD_5), chemical oxygen demand (COD), and reduced nitrogen species (NH_4 , NO_2), reflecting a well-established and active microbial community. Conversely, the Laghouat plant exhibits lower and more variable performance, which is consistent with a progressive reactivation phase of the biomass following operational interruption. Despite these differences, the treated effluents from both plants remain suitable for controlled agricultural reuse, particularly under localized irrigation and with appropriate agronomic monitoring. Reuse of treated wastewater thus represents a key resilience strategy for agroecosystems in arid regions.

Keywords: Wastewater reuse, Arid ecosystems, Activated sludge, Biomass recovery, Agricultural irrigation, Laghouat.

Communications affichées

Valorization Of Potato Wastes For Developing And Optimizing A Biodegradable Bioplastic Using The Response Surface Methodology .

Khadidja ALLALI^{1,2**}, Abderrahmane BENADJILA^{1,3}, Miyada ZAMOUM^{1,2}, Yacine GOUDJAL^{1,2}

¹ Laboratory of Microbial Systems Biology (LBSM), Kouba Teacher Training School, Algiers, Algeria

² Laghouat University, Faculty of Sciences, Department of Agronomic Sciences, Laghouat, Algeria.

³ Djelfa University, Faculty of Natural and Life Sciences. Department of Biology, Djelfa, Algeria

****Corresponding author e-mail:** kha.allali@lagh-univ.dz

ABSTRACT:

Climate change and increased pollution caused by traditional petrochemical plastics made the biodegradable environment-friendly plastic (bioplastic) research more popular. Bioplastics can be manufactured from natural renewable ingredients and used as food packaging material without harming the environment. This work focuses on producing bioplastic films from starch of potato wastes, developing and optimizing a biodegradable bioplastic based on starch from potato wastes using the response surface methodology (RSM) of the central composite design (CCD) approach. Results indicated that the potato waste starch-based bioplastic had been degraded at 51% in the soil. Subsequently, the response surface methodology of the central composite design (RSM-CCD) design was used to optimizing the biodegradability of bioplastic allowed the weight of the bioplastic to be reduced by up to 39.1%. The amount of starch and the amount of glycerol were the most significant factors influencing the biodegradability. The statistical analysis gave R^2 value of 95.59%, showing good and sufficient model. Thereafter, studying some of the chemical and physical properties of the optimized bioplastic including water solubility, opacity index, alcohol solubility and solubility in hydrochloric acid and in sodium hydroxide solution. Results showed that it was insoluble in water, in ethanol, and in hydrochloric acid. Nevertheless, it was partially soluble in sodium hydroxide solution. This study contributes to the field of sustainable materials and waste management by proposing a biodegradable alternative product for packaging while cleaning the environment of waste.

Keywords: Potato Waste, Starch, Bioplastic, Biodegradability, Response Surface Methodology

Analysis of the Spatial Variability of Nitrogen and Phosphorus Contamination in the Shallow Aquifer of Oued M'Zab (Algeria)

Hadjira BENHEDID^{1,4**}, Mansour ACHOUR², Oualid DILMI³, Hadjer GUESSOUM¹, Hamza NEGAIS^{1,5}

¹ Université de Ghardaia, Faculty of Natural and Life Science sand Earth Sciences, Department of biology, Ghardaia, Algeria

² Université d'Oran 2- Mohamed Ben Ahmed, Faculty of Earth and Universe Sciences, Department of Earth Sciences, Laboratory of Geo-Resources, Environment & Natural Risks, Oran, Algeria

³ Université Mohamed El Bachir El Ibrahimi, Faculty of Science and Technology, Department of Materials Science, Laboratory of Physics of Materials and its Applications, Bordj Bou Arréridj, Algeria

⁴ Laboratory of Ecosystem Protection in Arid and Semi Arid Zones, University of Kasdi Merbah, Ouargla, Algeria

⁵ Laboratory of Phoeniculture Research, University of Kasdi Merbah, Ouargla, Algeria

****Corresponding author e-mail:** benhedid.hadjira@univ-ghardaia.edu.dz

ABSTRACT:

Our work focuses on studying the variation of pollution in the waters of the shallow aquifer of the Oued M'Zab, with the aim of determining their suitability for use and identifying the degradation problems involved. The methodological approach adopted consists of conducting a spatial study of the variability of nitrogen and phosphorus pollution, as well as classifying water quality with respect to established standards. Our study reveals significant nitrogen pollution in the valley. Most of the aquifer waters are classified as polluted and non-potable according to WHO standards. The locations of contaminated wells should be marked and prohibited for human consumption. These findings highlight the degradation of groundwater resources due to agricultural and urban activities in the M'Zab valley, which must be addressed urgently.

Keywords: Pollution, Nitrogen, Phosphorus, Shallow aquifer, M'Zab.

Do Asclepiadaceae extracts have a larvicidal effect?

Afifa ALMI^{1*} and Raouf KORICHI²

¹Department of Natural sciences, Ecole Normal Supérieure

²Department of Agricultural Sciences, Kasdi Merbah University, Laboratory for the Protection of Ecosystems in Arid and Semi-Arid Zones, Ouargla 30000, Algeria.

****Corresponding author e-mail:** afifaalmi@gmail.com

ABSTRACT:

The overuse of synthetic pesticides has led to increasing resistance among crop pests, in addition to environmental and health concerns. The date moth (*Ectomyelois ceratoniae*) is one of the most serious pests affecting date palm production in Algeria and other countries, posing a major challenge to date exports. This study evaluates the insecticidal activity of ethanolic extracts of *Pergularia tomentosa*, a spontaneous plant from the northern Sahara, against larvae of *E. ceratoniae*. Fresh aerial parts of *P. tomentosa* were collected from the northern Sahara. The plant material was dried at room temperature, powdered, and subjected to ethanol extraction. The ethanolic extract was concentrated and stored at 4 °C until use. Three extract concentrations (5%, 10%, and 15%) were tested under laboratory and ambient conditions. Larvae were exposed to diets treated with ethanolic extracts of *P. tomentosa*. Treatments were applied immediately after egg hatching. Control groups received untreated diets. Mortality was concentration- and time-dependent. After 7 days, mortality rates reached $55.6 \pm 7.38\%$ for 5% and 10%, while 60–80% mortality was recorded at 15%. The lethal time (LT₅₀) to kill 50% of larvae was 4.62 days. These results demonstrate that *P. tomentosa* extract has promising biolarvicidal potential and could serve as an alternative to chemical pesticides in integrated pest management programs.

Key words: first larval stage, *Pergularia tomentosa*, *Ectomyelois ceratoniae*, hydroalcoholic extraction

Antifungal Effect of the Red Alga *Asparagopsis armata* Harvey Extracts Against *Fusarium oxysporum* f. sp. *albedinis*, the Causal Agent of Bayoud Disease in Date Palm

Leila MAIDI^{1**}, Hicham GOUZI²,

¹Ghardaia University, Faculty of Natural and Life Science and Earth Sciences, Department of biology, Ghardaia, Algeria.

² Laboratory of Biological and Agronomic Sciences (LSBA) – University of Laghouat

****Corresponding author e-mail:** malilabio@yahoo.fr

ABSTRACT:

The date palm (*Phoenix dactylifera* L.) plays a central role in Saharan oasis ecosystems. As an emblematic fruit tree of arid and semi-arid regions, it fulfills essential ecological, economic, social, and cultural functions. Dates represent a major source of energy and nutrition, and the date palm greatly contributes to the sustainability of oasis systems by ensuring food security. However, this vital resource is threatened particularly by Bayoud disease, a vascular wilt caused by *Fusarium oxysporum* f. sp. *albedinis*. This phytopathogenic fungus leads to the gradual disappearance of susceptible varieties, a considerable decrease in production, and a reduction in genetic biodiversity. In this context, marine algae appear as a promising resource due to their diverse biological activities. This study evaluates the antifungal effect of the red alga *Asparagopsis armata* extracts, collected in Salamandre (Mostaganem), on *F. oxysporum* f. sp. *albedinis*. The extracts were prepared by maceration with acetone and dichloromethane as solvents, then tested in vitro on PDA (Potato Dextrose Agar) medium using the direct contact method at different concentrations. The results show a marked antifungal activity, with the acetonic extract causing complete inhibition of fungal growth at 25 mg/ml. These findings confirm the potential of *A. armata* as a natural source of antifungal biomolecules that could be integrated into sustainable biological control strategies against date palm vascular wilt, thus contributing to the preservation of oasis system sustainability.

Keywords: *Phoenix dactylifera*, Bayoud disease, *Fusarium oxysporum* f. sp. *Albedinis*, *Asparagopsis armata*, Antifungal activity.

Hydroclimatic Trends and Vegetation Stress in Arid Environments: Evidence from the Laghouat Region (2017–2024)

Fatma Zohra MOUZAOUÏ ^{1**}, Ahmed BENCHETOUI¹

¹ Université Amar Telidji, Faculté des Sciences, Département des Sciences Agronomiques, Laghouat, Algérie

^{**}Corresponding author e-mail: f.mouzaoui@lagh-univ.dz

ABSTRACT:

Climate change is an urgent global issue, with arid environments being among the most vulnerable ecosystems. This study aims to reveal hydroclimatic signals that can provide useful information about conservation and water management strategies in arid regions. We analyzed March–May (2017–2024) records from sixteen stations in the Laghouat region, integrating remote sensing indices (NDVI, NDWI) with air temperature and precipitation. Mann–Kendall testing, Sen’s slope estimation, and changepoint detection were applied to assess temporal trends. Results show that NDVI exhibited significant declines at most stations, while NDWI generally increased, indicating vegetation stress coupled with altered water availability. Air temperature trended upward, with several breakpoints clustered between 2019 and 2022, while precipitation showed slight but non-significant decreases. The dominant multivariate pattern across the majority of stations combines reduced vegetation greenness, rising water indices, warming, and declining rainfall—an emerging hydroclimatic stress signature consistent with increasing drought risk and shifting resource dynamics. By translating subtle variability into quantified signals, this work highlights the growing fragility of dryland ecosystems under climate change. It further provides actionable evidence for water governance, drought-mitigation planning, and resilient land use, supporting sustainable management in arid regions.

Keywords: Climate change, Hydroclimatic trends, Mann–Kendall, Sen’s slope, Arid regions, Remote sensing.

Potato Tissue Culture *In Vitro* Techniques.

Miloud BERRIHA ^{1**}

¹Ghardaia University, Faculty of Natural and Life Science sand Earth Sciences, Department of biology, Ghardaia, Algeria.

^{**}Corresponding author e-mail: berriha.miloud@univ-ghardaia.edu.dz

ABSTRACT:

Potato callus and cell suspension have been established from potato tubers of two commercial varieties of *S. tuberosum*, Desiree and Maris Piper, and of two wild species, *S. acaule* and *S. spaghazini*, have been established, including plantlets from nodal cuttings; callus derived from stem tuber, and cell suspension cultures from stem and tuber callus. Protoplasts have also been prepared and some properties investigated. Cultured tissues have been introduced into media which can be used to investigate various biotic stresses like salt stress or heat stress at the tissues and cell levels. Plant tissue culture techniques are essential in vitro and fast procedures carried out in aseptic conditions compared with conventional plant breeding. It can be used to study biotic stress physiology at cell level. This Poster presents standardized methods for the culture of potato (*Solanum tuberosum* cv. *Desiree* and *Maris piper* and two wild potato species) including callus induction, cell suspension establishment, protoplast isolation sterilization procedures, and osmotic adjustment calculations using polyethylene glycol (PEG) are described. Viability assays using fluorescein diacetate (FDA) and Evans blue staining can be done to assess protoplast viability and integrity. Calli, cell suspension and protoplasts can be used to for studies on biotic stress and in vitro selection for salt tolerance. By providing clear step-by-step methods, this work serves as a reference for researchers and plant biotechnologists conducting tissue culture and biotic stress physiology and tolerance experiments.

Keywords: Potato, cultured tissues, protoplast, cell suspension, biotic stress.

Design of a micro-irrigation network using treated wastewater: case of the mezdour perimeter, supplied by the wastewater treatment plant of biskra city, biskra province, Algeria.

Messaoud MOKRANI¹, Ahmed Salah Eddine MEDDOUR^{1**}, Farid SOUAS¹, Salim MEDDOUR²

¹LEGHYD Laboratory, Faculty of Civil Engineering, University of Science and Technology Houari Boumediene (USTHB), Bab Ezzouar, Algiers, Algeria.

²Laboratoire Valorisation et Conservation des Ecosystèmes Arides (LVCEA), Faculty of Natural Sciences, Life and Earth sciences, University of Ghardaia

**Corresponding author e-mail: ahmedsalaheddine.medddour@usthb.edu.dz

ABSTRACT:

This paper presents the hydraulic design of a micro-irrigation network for the Mezdoor perimeter (150 ha), located in the Biskra province, using treated wastewater from the local wastewater treatment plant (WWTP). The project aims to address water scarcity in an arid region through the sustainable reuse of non-conventional water resources. The study includes an analysis of crop water requirements, calculation of the necessary flow rates, and the technical planning of the irrigation network (pipes, filters, valves). An economic and environmental assessment confirms the system's viability. This approach provides a replicable model for other regions facing water stress.

Keywords: Micro-irrigation, Treated wastewater, Biskra WWTP, Hydraulic design, Sustainable agriculture, Arid zones.

Techno-ecological assessment of drip irrigation systems in arid zones: case of the ouargla region, Algeria

Farid SOUAS¹, Ahmed Salah Eddine MEDDOUR^{1**}, Salim MEDDOUR²

¹LEGHYD Laboratory, Faculty of Civil Engineering, University of Science and Technology Houari Boumediene (USTHB), Bab Ezzouar, Algiers, Algeria.

²Laboratoire Valorisation et Conservation des Ecosystèmes Arides (LVCEA), Faculty of Natural Sciences, Life and Earth sciences, University of Ghardaia

**Corresponding author e-mail: ahmedsalaheddine.medddour@usthb.edu.dz

ABSTRACT:

In arid regions such as the Ouargla area, optimizing water use is a strategic challenge for sustainable agricultural development. Drip irrigation stands out as an efficient solution that minimizes water losses while maintaining satisfactory agricultural yields. However, the performance of these systems can deteriorate over time due to technical, environmental, and water quality-related factors. This study presents a techno-ecological assessment of drip irrigation systems using two models of pressure-compensating drippers from the "Irritec" brand. The objective is to measure the evolution of the average operational flow rate, assess water distribution uniformity, and identify the main causes of malfunction. The results highlight a gradual decline in dripper flow rates over time and the influence of environmental parameters on overall system performance. Recommendations are proposed to improve the durability, reliability, and efficiency of these systems, thereby contributing to the resilience of agriculture under increasing water stress conditions.

Keywords: Localized irrigation, arid zones, Pressure-compensating drippers, Hydraulic efficiency, Sustainability, Ouargla.

Water Treatment Using Filters Composed of Expanded Polystyrene Beads and Its Influence on the Drip Irrigation System in the Tolga Region, Biskra Province.

Ahmed Salah Eddine MEDDOUR^{1**}, Farid SOUAS¹, Maria MEDDOUR^{1**}, Salim MEDDOUR²

¹LEGHYD Laboratory, Faculty of Civil Engineering, University of Science and Technology Houari Boumediene (USTHB), Bab Ezzouar, Algiers, Algeria.

²Laboratoire Valorisation et Conservation des Ecosystèmes Arides (LVCEA), Faculty of Natural Sciences, Life and Earth sciences, University of Ghardaia

****Corresponding author e-mail:** ahmedsalaheddine.meddour@usthb.edu.dz

ABSTRACT:

This study evaluates the use of filters made from expanded polystyrene beads for the treatment of drip irrigation water in the arid region of Laghrou (Biskra Province). These systems often suffer from emitter clogging caused by the presence of iron and suspended solids. Thanks to its properties (lightweight, durability, and chemical resistance), expanded polystyrene is tested as a cost-effective filtering medium. Field tests demonstrated improved water quality, reduced clogging, lower maintenance requirements, and better irrigation uniformity. This solution could offer a sustainable and accessible alternative for farmers in arid regions.

Keywords: Expanded polystyrene – Water treatment – Drip irrigation – Clogging – Biskra – Tolga – Alternative filtration.

Temporal NDVI-based Assessment of Agrosystem Functioning in Semi-Arid Regions of Souk Ahras, Algeria (2018–2024)

Boutheina KHELIFI^{1,2,3}, Tahar MEFTAH⁴

¹Mouhamed Cherif Messadia University, Ecology Department, Souk-Ahras, Algeria

²Environmental Research Center, Annaba (CRE), Algeria

³Laboratory of Organic and Interdisciplinary Chemistry, Souk Ahras, Algeria.

⁴Abderrahmane Mira University, Biological and Environmental Sciences Department, Bejaia, Algeria

****Corresponding author e-mail:** b.khelifi@univ-soukahras.dz

ABSTRACT:

The valorization and conservation of arid ecosystems hinge on accurate monitoring of their agricultural health and degradation. Google earth engine platform and multi-annual NDVI (Normalized difference vegetation index) satellite data (2018–2024) were used to assess agro-system functioning in the semi-arid region of Souk Ahras, North-East Algeria. The classification of NDVI values (0.1–0.4) identified three main agrosystem categories: sparse, low dense, and moderate dense vegetation. Temporal analysis revealed pronounced fluctuations in agrosystem area, from a sharp decline in 2019 to marked recovery by 2021, followed by new patterns of moderate degradation. The total agrosystem area ranged from 2579.52 km² (2019) to a peak of 3931.11 km² (2021), highlighting the ecosystem's sensitivity to climatic and land use drivers. These findings emphasize the necessity for adaptive management measures to enhance resilience and ensure sustainable valorization of semi-arid agrosystems.

Keywords: Agrosystem, NDVI, Spatio-temporal analysis, Google earth engine, Souk Ahras.

Effect of *Artemisia herba-alba* Essential Oil on Germination and Salt Tolerance of Durum Wheat.

Zerrouki MIMOUNA^{1**}

¹IBN KHALDOUN University, Faculty of Natural and Life Sciences, Department of biology, Tiaret, Algeria.

² Geomatics & Sustainable Development Laboratory, Tiaret, Algeria. GSDL

****Corresponding author e-mail: b.zerrouki15@gmail.com**

ABSTRACT:

Salinity is among the most detrimental abiotic stresses limiting crop productivity, particularly in arid and semi-arid regions where climate change accelerates soil degradation. Durum wheat (*Triticum durum* Desf.), a staple in the Mediterranean basin, is highly sensitive to salt stress during germination and seedling establishment. Developing eco-friendly strategies to improve tolerance is therefore crucial. This study assessed the potential of *Artemisia herba-alba* essential oil as a natural biostimulant to mitigate salinity effects. Three durum wheat genotypes (Oued El Bared, Siméto, and Vitron) were evaluated under controlled conditions at four salinity levels (0, 50, 100, and 150 mM NaCl), with or without oil application. Morphological and physiological traits, including germination percentage, germination kinetics, water status, and seedling growth, were measured. Salinity significantly reduced germination and seedling vigor in all genotypes, with marked declines in water content and growth at high NaCl concentrations. However, *A. herba-alba* oil enhanced germination under saline conditions. Vitron showed the strongest response, with germination increasing from 52% under 100 mM NaCl to 71% with oil treatment, along with improved germination speed. Oued El Bared maintained relatively stable water content, while Siméto displayed consistently high germination percentages. These findings demonstrate that *A. herba-alba* essential oil can alleviate salt-induced damage and enhance seedling establishment in durum wheat. As a natural and sustainable approach, its application offers promising potential to improve salt tolerance. Further studies under field conditions are needed to validate its agronomic effectiveness.

Keywords: Durum wheat, Salinity stress, *Artemisia herba-alba* oil, Germination, Tolerance, Biostimulant.

Phytochemical Screening, Allelopathic And Bioherbicidal Potentialities Of Spontaneous Plant Harvested In The Sahara.

Reguia OTMANI¹, Bachir KHENE¹, Zineb BOURAKNA², Fatna ARABA¹, Abdellah KEMASSI³

¹Laboratoire des Mathématiques et des Sciences Appliquées. Université de Ghardaïa B.P 455 Ghardaïa 47000 Algérie.

²Biologie Systems and Geomatics Laboratory. Faculty of Natural Sciences and Life, Agronomy Department. Mascara University, Algeria.

³Laboratoire de Protection des Ecosystèmes en Zone Aride et Semi-Aride, Université de Kasdi Merbah-Ouargla, B.P 511, Ouargla 30000, Algérie.

****Corresponding author e-mail: otmani.regaia@univ-ghardaia.dz**

ABSTRACT:

Weeds interference in agricultural fields reduces the quantity and quality of crops, causing enormous economic losses for farmers. Control strategies of weeds have relied mainly on the application of synthetic herbicides. The continuous and excessive application of these treatments causes environmental pollution, negative effects on human health, and unsafe agricultural products. Another promising approach is based on bio-pesticides to improve agricultural productivity while preserving the ecological balance. However, the biological control of weeds remains relatively undeveloped: Bio-herbicides represent only 1%, while bio-insecticides (46%), bio-fungicides (44%). Although yield losses caused by weeds are very significant in the order of 32%, compared to those caused by pathogens (15%) and parasites (18%). The aim of the present study is to evaluate the bioherbicidal effects of the *Euphorbia guyoniana* extract. The extraction yield is of the order of 17.80%. Phytochemical screening shows a remarkable richness in active substances, including flavonoids, steroids, sterols and triterpenes, saponosides, free quinone, cyanidin, tannins and reducing compounds. The results obtained are promising, showed that the leaf extract of *E. guyoniana* pure and diluted at 50%, 40%, 30%, 20%, 10%, 5%, 2.5% and 1% has a very good inhibiting efficiency of the germination of weed seeds. However, it did not significantly affect the germination of wheat seeds. Germination kinetics and vigor index of weed and cultivated species treated with plant extract were slower than reported for negative control lots. The growth inhibition values of the aerial, root part and the Fisher test results affirm the strong bioherbicide power of the extract.

Keywords: Bioherbicide, Allelopathy, *Euphorbia guyoniana*, Agricultural productivity, Weed seeds, Wheat seeds.

Assessment of the Allelopathic Impact of *Sonchus asper* L Aqueous Extracts on the Early Growth Performance of *Arachis hypogaea* L.

Bachir HAMIDI^{1,2}, Djilani Ghemam AMARA^{1**}, Abdelbasset Kaddour², Zeid Alia¹ Khaled Kherraz^{3,,} Mohamed Messaoudi¹, Nezar Cherrada⁴, Hacene Laouedj¹

¹Laboratory of Biology, Environment and Health, Faculty of Natural and Life Sciences, University of El Oued, 39000 El Oued, Algeria. .

² Higher School of Agriculture Saharian, El Oued, Algeria.

³Laboratory of Ethnobotany and Natural Substances, Ecole Normale Supérieure-Kouba, Algeria

⁴Laboratory of Biodiversity and Application of Biotechnology in the Agricultural Field, Faculty of Natural and Life Sciences, University of El Oued, 39000 El Oued, Algeria

**Corresponding author e-mail: djilani-ghemamamara@univ-eloued.dz

ABSTRACT:

Sonchus asper (L.) Hill, a species belonging to the family Asteraceae, is an erect, branched annual to perennial herbaceous plant commonly found as a troublesome weed across Algerian agro-ecosystems. The present investigation aimed to assess the allelopathic potential of aqueous extracts obtained from the aerial parts of *S. asper* on the germination and early seedling growth of *Arachis hypogaea* L. Phytochemical screening revealed the presence of various classes of secondary metabolites, including polyphenols, flavonoids, coumarins, saponins, alkaloids, tannins, and terpenes, which are known to possess allelopathic and phytotoxic properties. Four concentrations of the extract (0, 15, 30, and 45 mg/ml) were evaluated under controlled laboratory conditions following a completely randomized design. The results demonstrated that increasing extract concentration significantly inhibited germination percentage, seedling length, and biomass accumulation in a concentration-dependent manner. Germination decreased markedly from 96.67% in the control to 16.67% at 45 mg/ml, while inhibition rates increased linearly to reach 82.76% at the highest concentration. The strong inhibitory response observed suggests that *S. asper* releases potent allelochemicals capable of suppressing crop establishment and early development. These findings highlight the species' high allelopathic potential and its possible ecological and agronomic implications in shaping plant community dynamics and influencing crop productivity within Algerian agricultural systems.

Keywords: *Sonchus asper* (L.); Weed; Asteraceae; Agro-ecosystems; Allelopathic; *Arachis Hypogaea* L.

Biochemical Composition and Value Nutritive of Some Species of *Sulla* Cultivated In Arid Ecosystems, Case of Ghardaïa Oases.

Bakir MOUSSAOUALI ^{1**}, Bealhadj HAMDI-AÏSSA²

¹Ghardaïa University, Faculty of Natural and Life Science sand Earth Sciences, Department of agronomic sciences, Ghardaïa, Algeria.

² Laboratoire de biogéochimie des milieux désertiques, Université de Ouargla

**Corresponding author e-mail: moussaouali.bakir@univ-ghardaia.edu.dz

ABSTRACT:

Animal production is primarily linked to the nutritional quality of plants. The chemical composition is considered the main factor indicating the nutritive and zootechnical value of plant species, with a view to their use as green fodder, particularly for dairy production. The nutritive value of forage species intended for feeding domestic animals is generally assessed on the basis of two characteristics: crude protein content and metabolizable energy concentration. The present research was carried out to assess the nutritive value of three species of *Hedysarum*, leguminous species, cultivated for the first time in agro ecological conditions of M'Zab oases, under irrigation: *Hedysarum carnosum*, *Hedysarum coronarium*, *Hedysarum flexuosum*. The choice of these species is based on their well adaptation to marginal conditions such as salinity and drought. The experimental trial was conducted in Ghardaïa during 2022 agricultural companion, using the BAC method with three replications. Several agronomic parameters were determined; such as crude protein, crude fiber, condensed tannins, flavonoids... *Hedysarum carnosum* recorded a high value of 20.87% compared with the other species: 17.43% for *H. flexuosum* and 17.19% for *H. coronarium*. The crude fiber (CF) content was very high in *H. coronarium* (18.49%), moderate in *H. carnosum* (10.02%), and low in *H. flexuosum* (7.76%). The three *Sulla* species cultivated in the Ghardaïa region exhibit variable polyphenol contents, particularly with regard to flavonoids.

Keywords: *Hedysarum*, Chemical composition, Nutritive value, Dairy production, Ghardaïa

The Kef Doukhane Wastewater: Effects and Consequences on the Oued Noumer (Ghardaïa) Region.

Khoudir KHELLAF¹, Radhia BIAD¹, Coayb BOUNAB¹, Redouane MIHOUB¹, Mebarka Soufi ZEHAR¹, Nadjat BELMAZOUZI¹

¹Ghardaia University, Faculty of Natural and Life Science sand Earth Sciences, Department of biology, Ghardaïa, Algeria. Valorization and Conservation of Arid Ecosystems Laboratory. Ghardaïa, Algeria

****Corresponding author e-mail:** khellaf.khoudir@univ-ghardaia.dz

ABSTRACT:

The western part of the Oued Noumer region is used as a spillway for treated water from Kaf Dokhan wastewater treatment plant (El Atteuf-Ghardaïa). These discharged waters have a dark color, which means that they are poorly treated and penetrate the soil, where we haven't an idea about their impact (pollution) on the soil or on the aquifer waters existing in the region. To get an idea about their effect, we carried out the in situ tests for water (pH, CE, T°, dissolved O₂) at 8 points in Kef Doukhane, random soil sampling from a 90 cm deep horizon, and performed various analyses on the samples brought back to the laboratory such as total limestone (TL), electrical conductivity (EC), pH, organic matter (OM), and chemical-weight analysis (Bouyocos method). The obtained results for the Kef Doukhane wetland showed acidic water with a strong salty. The soil chemical-weight analyses revealed a sandy texture and the physico-chemical analyses of them gave a moderately alkaline pH, a slightly salty to salt electrical conductivity, a low organic matter content, and a low to medium total limestone rate. Therefore, the soil physico-chemical qualities of the Oued Noumer region are strongly influenced by pollution.

Keywords: Physico-Chemical analysis, Soil, Pollution, Oued Noumer, Ghardaïa

Chemical Composition and Potential for Valorization of a Fatty Oil Derived from Plant Resources in the Arid Zone.

Mohamed ATOUI^{1,2**}, Abdelkader HASSANI^{3,4}

¹ Université Kasdi Merbah Ouargla, Faculty of Mathematics and Matter sciences, Department of Physics

² Laboratory of Radiation and Plasmas and Surface Physics (LRPSP), Ouargla, Algeria

³ Université Kasdi Merbah Ouargla, Faculty of natural sciences and life, Department of Biology sciences

⁴ Protection of ecosystems in arid and semi-arid zones, Ouargla, Algeria

****Corresponding author e-mail:** atouim3000@gmail.com

ABSTRACT:

There are encouraging prospects for bioproduct innovation and sustainable development when natural resources from dry habitats are valued. This study used gas chromatography–mass spectrometry (GC–MS) to identify the main components and possible uses of a fatty oil that was isolated from a native plant in the Algerian Sahara. According to the GC–MS study, the oil is high in unsaturated fatty acids, with the highest concentrations being 9,12-octadecadienoic acid (Z,Z)-methyl ester (47.3%) and 9-octadecenoic acid (E/Z)-methyl ester (~35%). Methyl stearate, methyl palmitoleate, and methyl linolenate were found in trace levels. A profile like this suggests great nutritional and aesthetic value along with possible anti-inflammatory and antioxidant qualities. Given that linoleic and oleic acids make up the majority, the oil may be used as a sustainable component in biocosmetic products, bio-lubricants, or functional foods that are suited to dry conditions. The significance of preserving biodiversity while fostering environmentally sustainable economic activity in Saharan regions is highlighted by this investigation, which also helps to chemically value native plant species. Subsequent research will concentrate on the oil's formulation potential and biological assessment for dermocosmetic uses.

Keywords: GC–MS, Arid ecosystems, Fatty acids, Valorization, Natural oil, Algeria.

Mapping of the date palm (*Phoenix Dactylifera L.*) by spatial remote sensing in the Guerrara region (Wilaya of Ghardaïa).

Mohamed KRAIMAT ^{1,**}, Meriem OULAD HEDDAR ², Lakhdar BEN ABDALLAH¹, Ayoub KHOBZI¹

¹ Laboratoire de Valorisation et de Conservation des Ecosystèmes Arides, Université de Ghardaïa, 47000, Algeria.

² Département de Biologie, Faculté des Sciences de la Nature et de la Vie et Sciences de la Terre, Université de Ghardaïa, 47000, Algeria.

****Corresponding author e-mail:** mari90440@gmail.com

ABSTRACT:

The primary objective of our work was to identify alterations in vegetation coverage utilizing LANDSAT satellite images in the Guerrara region (wilaya of Ghardaïa), employing a supervised classification method with an appropriate temporal interval between two dates, followed by post-classification and the detection of statistical and NDVI changes. The total accuracy is 77% for the 1999 photos and 87% for the 2021 photographs. Les images, obtenues par les capteurs des satellites LANDSAT 7 ETM+ et 8 OLI en 1999 et 2021, ont été classées en dix catégories représentatives des éléments terrestres : palmiers dattiers, cultures herbacées (maraîchage), végétation naturelle et vergers, zones urbaines et industrielles, wadi et Chebka. The results illustrate the temporal and spatial evolution of vegetation coverage within the study area over a span exceeding 20 years, providing vegetation coverage maps and summary tables of changes for two distinct dates, as well as insights into the influencing factors and their classifications affecting the region.

Keywords: Guerrara region, LANDSAT, Processing, NDVI, Remote sensing, Date palm.

Physico-Chemical Characterization of Groundwater and Its Suitability for Irrigation.

ABOUR Fella^{1**}

¹ Université Kasdi Merbah Ouargla, Faculty of Natural and Life Sciences, Ouargla, Algeria

Research Laboratory on Date Palm Cultivation "Phoenix"

² Laboratory of Saharan Bioresources: Valorization and Preservation, Kasdi Merbah University, Ouargla 30000, Algeria.

***Corresponding author:** e-mail foufa.abour@yahoo.fr

ABSTRACT:

In the desert region of Ouargla, water demand is substantial and continues to increase due to population growth and agricultural expansion. This excessive and often uncontrolled consumption has resulted in surface water accumulation and a noticeable decline in groundwater levels. Consequently, both agricultural soils and groundwater quality have deteriorated, influenced by hydraulic dynamics and harsh climatic conditions, particularly high evaporation rates typical of hyper-arid zones. The objective of this study is to assess the hydrochemical quality of groundwater and its suitability for irrigation by evaluating salinity hazards. Physical and chemical analyses were performed on several samples, including major ions, electrical conductivity (EC), pH, and sodium adsorption ratio (SAR). Results indicate that the high electrical conductivity values reflect elevated salinity levels. Groundwater in the Ouargla region is therefore highly exposed to salinity, leading to progressive degradation of both water and soil quality.

The Wilaya of Ouargla has a great historical heritage. Formerly an ancient Islamic city called Warklan, it was once an active commercial center with Sub-Saharan Africa and is today a strategic oil hub in Algeria. Inhabited since prehistoric times, it served as a regional capital during the Ottoman period and, after independence, was designated as the capital of the oases, encompassing the entire southeastern region of the country.

Keywords: Groundwater, Hydrochemistry, Salinity, Ouargla, SAR, Electrical Conductivity

Insecticidal Activity and Phytochemical Screening of Aqueous Plant Extracts against *Ectomyelois ceratoniae*.

Sana BEKIRI ^{1**}, Mohamed Azzedine IDDER ², Omar GUEZOUL ³, Hakima IDDER-IGHILI ⁴, Karima AZOUAOU ⁵

^{1,2,4,5}Laboratory of Research on Phoeniculture "Phoenix", Faculty of natural and life sciences, University of Kasdi Merbah-Ouargla, Algeria.

³ Laboratory Saharan Bioresource, Faculty of Agronomy Sciences, University of Ouargla, Algeria.

**Corresponding author e-mail: sanabekiri@gmail.com

ABSTRACT:

The use of aqueous plant extracts represents a promising alternative strategy to reduce damage caused by pests, particularly *Ectomyelois ceratoniae*, a lepidopteran considered a major threat to date production in Algeria. In this study, in vitro assays were conducted to evaluate the insecticidal activity of aqueous extracts from two spontaneous species, *Thymus vulgaris* and *Artemisia herba-alba*. Extracts were obtained by decoction and applied by spraying on adult insects. The results demonstrated significant efficacy, with mortality rates exceeding 90% at a concentration of 0.12 mL/mL. The lethal doses (LD₅₀ and LD₉₀) were estimated at 0.014 mL and 0.062 mL for *T. vulgaris*, and 0.019 mL and 0.069 mL for *A. herba-alba*, confirming their insecticidal potential. Phytochemical screening revealed a high content of bioactive compounds, including polyphenols, tannins, flavonoids, coumarins, and quinones, as well as terpenic metabolites (saponosides, steroids, sterols, triterpenes, and essential oils). These findings highlight the potential of these widely available and low-cost plants as natural and sustainable alternatives for the integrated management of *E. ceratoniae* in Algerian date palm groves.

Keywords: Aqueous extracts, Spontaneous plants, Insecticidal activity, *Ectomyelois ceratoniae*, Lethal dose

Morphological-analytical study of some soil profiles in the palm groves of Ghardaïa (Case of Sebseb).

Hadjer GUESSOUM¹, Fatiha LAOUAR², Fouzi BENBRAHIM³, Mohamed BENSLAMA⁴,

Hadjira BENHEDID⁵, Mohamed Tahar HALILAT⁶, Hamza NEGAIS¹

¹ University of Ghardaïa., Algeria.

² Laboratory of mathematics and applied sciences, University of Ghardaïa. BP 455 Ghardaïa 47000, Algeria.

³ Ouargla Higher Teacher Training College, Algeria.

⁴ Soil and sustainable development laboratory, Badji Mokhtar-Annaba University, BP 12 Annaba 23000, Algeria.

⁵ Department of Biological Sciences, Laboratory of Ecosystem Protection in Arid and Semi Arid Zones,

⁶ University KASDI Merbah-Ouargla, BP 511, Ouargla 30000, Algeria.

**Corresponding author e-mail: guessoum.hadjer@univ-ghardaia.dz

ABSTRACT:

The soils of the Sebseb region, influenced by the groundwater table, the quality of irrigation water, the climate and human activity. Our work consists of studying three profiles 110 cm deep that have been analyzed to characterize the soils. The morphological and analytical analyses revealed a great homogeneity. The soils are mostly sandy throughout the depth. This texture promotes the leaching of elements, which explains the low salinity. The roots of date palms are mainly found between 60 cm and 94 cm deep. The soils are highly alkaline, with a pH that varies from 8.17 to 8.51. The organic matter content is very low, ranging from 0.04% to 0.67%. This content decreases sharply from the surface to the depth, due to the influence of plant cover and biological activity. The electrical conductivity is very low (between 0.10 and 0.43 dS/m), which indicates that the soils are not salty. Soils are considered as low limestone to non-limestone, with total limestone rates ranging from 0.88% to 3.69%. The dominant cation in all profiles is magnesium. The risk of alkalization is considered low. In conclusion, the soils studied are homogeneous, sandy, very alkaline, and poor in organic matter and limestone. The low salt content is due to the sandy texture that allows good drainage.

Keywords: Profile, soil, palm groves, Ghardaïa, Sebseb.

Spatial distribution of soil organic carbon under irrigation conditions in DAYA BEN DAHOUA, Ghardaïa

Hamel IMANE¹, Ibtesem OULED ELTAYEB², Rahma DAHOU², Rekia CHERIF¹, Amel HEROUINI¹, Faredj CHIKHI¹, Fouzi

BENBRAHIM³.

¹ Laboratory of Valorization and Conservation of Arid Ecosystem (LVCAE), Faculty of Natural and Life Sciences and Earth Sciences, Université de Ghardaia. Scientifique Zone, Ghardaia, 47000, Algeria.

² University of Ghardaia, Faculty of Natural and Life Sciences and Earth Sciences, Department of Biology, B.P.455 Ghardaïa 47000, Algeria.

³ École Normale Supérieure de Ouargla, BP 398, Hai Ennasr, Ouargla 30000, Algérie.

**Corresponding author e-mail: hamel.imane@univ-ghardaia.edu.dz

ABSTRACT:

Soil organic carbon plays a crucial role in maintaining soil fertility and supporting agricultural productivity. This study investigates the impact of irrigation on the spatial distribution of organic carbon in date palm soils. The research was conducted in the Ibrahim Dahou palm grove, located in Daya Ben Dahoua (Ghardaïa Province, Algeria), where irrigation is performed using groundwater from wells. Analysis of the irrigation water revealed high salinity and the presence of various mineral elements, indicating poor to moderate water quality. Random soil samples were collected from the 0–30 cm layer to determine organic carbon content. Laboratory results showed low organic carbon levels (< 1%), reflecting the sandy texture and arid conditions of the region. Electrical conductivity values decreased slightly from 0.019 dm/s before irrigation to 0.012 dm/s after irrigation, indicating that the soil itself is not saline. The pH values increased from 7.84 to 8.41, suggesting slightly alkaline conditions. Spatial analysis of the studied parameters revealed moderate to high variability in organic carbon, high to very high variability in electrical conductivity, and low variability in pH. Overall, the findings indicate that the soil is sandy, poor in organic matter, and that irrigation significantly influences the spatial distribution of organic carbon within the soil profile.

Keywords: Spatial distribution, Organic carbon, DAYA BEN DAHOUA, Ghardaïa.

Sustainable Livestock Feed and Soil Fertility Enhancement in Algeria: The Potential of aquatic fern *Azolla pinnata*.

Yacine TORCHE^{1**}, Lamine NEDJAR²

¹ Nature and Life Sciences Institute, Abdelhafid Boussouf University Center, Mila, Algeria, 43000.

² Economic, Commercial and Management Sciences Institute, Abdelhafid Boussouf University Center, Mila, Algeria, 43000.

****Corresponding author e-mail:** torche.yacine@centre-univ-mila.dz

ABSTRACT:

Livestock feed is a serious issue in Algeria with a continuously high pressure on all bioclimatic stages especially in forests and steppic zones, then, it is essential to investigate other source of resources for livestock feed to prevent an increasing pressure on the fragile flora, already threatened by climate change. Our research explores the cultivation and utilization of *Azolla pinnata*, a fast-growing aquatic fern, as a sustainable resource for livestock feed and soil fertility improvement in Algeria. The study examines its potential economic benefits, especially in regions with limited agricultural resources. To evaluate the feasibility of large-scale *Azolla* production, assess its nutritional value as animal feed, and analyze its impact on reducing dependency on traditional feed sources, four ponds of 2.6 m² were constructed and filled with 15 cm of different natural fertilized soil (cow dung and fowl manure) and up to 15 cm of freshwater. Different amount of *Azolla* was added to each pond and we controlled the weight every 7 days from March to May 2023. Results demonstrate that *Azolla* growth exponentially from week to week increasing its production to 200% in the third week. These results suggest that *Azolla* can be successfully integrated into Algerian livestock feed agrosystems due to its high growth rate, rich protein content, and low production cost. *Azolla* represents a viable solution for addressing food security and sustainability challenges in Algeria. By adopting *Azolla* cultivation, Algeria can reduce feed import costs, improve agricultural efficiency, and support rural development.

Keywords: Sustainability, Livestock feed, Soil fertility, *Azolla pinnata*.

Water Quality of the Continental Intercalaire (CI) Aquifer in Metlili.

Alia Sara LAKHDARI¹, Boualem BOUSELSAL¹

¹Laboratory of Underground Oil, Gas and Aquifer Reservoirs, Department of Earth and Universe Sciences, University of Kasdi Merbah, Route de Ghardaïa, Ouargla, Algeria

****Corresponding author e-mail:** lakhdarisara23@gmail.com

ABSTRACT:

The Metlili region, located in the Algerian Sahara, covers an area of 5,010 km², with an estimated population of about 54,041 inhabitants. Groundwater is the only source available to meet the various needs (domestic supply, irrigation, and industry). The quality of this groundwater remains a concern due to its high mineralization and the concentration of undesirable elements such as nitrates. The objective of this work is to study the chemical quality of groundwater from the Continental Intercalaire aquifer in the Metlili region. The hydrochemical study shows that CI waters are dominated by three facies types: calcium sulfate (27.28%), sodium sulfate (54.54%), and sodium chloride (18.18%). The concentration of chemical elements falls within acceptable limits for drinking water according to Algerian potability standards. However, the use of the Water Quality Index (WQI) method indicates that this water is of poor quality for drinking purposes. The evaluation of water quality for irrigation is based on the methods of Richards and Wilcox, as well as parameters such as electrical conductivity (EC), permeability index (PI), residual sodium carbonate, %Na, Kelly's Ratio (KR), salinity potential (SP), and magnesium hazard (MH). The study of these parameters shows that CI groundwater is generally suitable for irrigation in the majority of analyzed wells.

Keywords: Metlili, Continental Intercalaire, WQI, Irrigation, Drinking water standards.

Hydrochemical and Hydrogeological Study of Water Resources in the Illizi Region.

Boualem BOUSELSAL¹ and Alia Sara LAKHDARI¹

¹Laboratory of Underground Oil, Gas and Aquifer Reservoirs, Department of Earth and Universe Sciences, University of Kasdi Merbah, Route de Ghardaïa, Ouargla, Algeria

**Corresponding author e-mail:

ABSTRACT:

The Wilaya of Illizi, located in the extreme southeast of Algeria at the heart of the Sahara, is dominated by a hyper-arid climate. In this region, surface water resources are extremely limited, making groundwater the main source of supply, essential for domestic needs, oasis agriculture, and industrial activities. Hydrogeological and hydrochemical analyses highlight a complex and stratified aquifer system, composed of several groundwater reservoirs, the two main ones being the Terminal Complex (CT) and the Continental Intercalaire (CI). The region also contains several secondary aquifers, including those of the Carboniferous, Cambro-Ordovician, Devonian, as well as shallow aquifers associated with alluvial deposits of wadis. These latter play an important role in meeting local water needs, particularly for agriculture and domestic use. Physico-chemical analyses reveal significant variability in parameters, reflecting both the geological diversity of the aquifers and the mineralization processes at play. The total dissolved solids concentration generally ranges between 500 and 1200 mg/L. In terms of potability, the Cambro-Ordovician aquifer stands out with excellent water quality, meeting World Health Organization (WHO) standards. In contrast, water from the Devonian and Continental Intercalaire aquifers shows more variable quality, while the Carboniferous aquifer is characterized by high mineralization, with frequent exceedances of permissible thresholds for several parameters, limiting its domestic use without specific treatment. With regard to irrigation, most aquifers provide water generally suitable for this purpose, although those with higher mineralization require careful management to prevent soil degradation due to salt accumulation. Groundwater quality is mainly controlled by prolonged interaction between water and the geological formations it traverses. Furthermore, the hyper-arid climate intensifies the concentration of dissolved salts, particularly through evaporation, a phenomenon especially pronounced in shallow aquifers.

Keywords: Illizi, aquifer system, potability, irrigation, mineralization, evaporation.

Towards New Biopesticides Against Plant Pathogens and Anthelmintic Agents from the Extracts of *Pergularia tomentosa* L. and *Forsskaolea tenacissima* L.

Abdallah AISSA^{1,2} **, Sujogya Kumar PANDA^{2,3}, Noureddine BOURAS^{4,5}, Walter LUYTEN²

¹ Centre de Recherche Scientifique et Technique en Analyses Physico-Chimiques (CRAPC), BP 384, Zone Industrielle, Bou-Ismaïl RP, DZ-42004, Tipaza, Algeria.

² Department of Biology, Animal Physiology and Neurobiology Section, KU Leuven, Naamsestraat 59, box 2465, 3000 Leuven, Belgium.

³ Center of Environment, Climate Change and Public Health, Utkal University, Vani Vihar, Bhubaneswar, 751004, Odisha, India.

⁴ Laboratoire de Biologie des Systèmes Microbiens (LBSM), Ecole Normale Supérieure de Kouba, Alger, Algeria. (N.B)

⁵ Laboratoire de Valorisation et Conservation des écosystèmes Arides (LVCEA), Faculté des Sciences de la Nature et de la Vie et Sciences de la Terre, université de Ghardaïa, Ghardaïa, Algeria.

**Corresponding author e-mail: abdellah.ais@gmail.com

ABSTRACT:

Natural products from plants have attracted increasing interest in recent years as potential sources of new sustainable bioactive molecules. Plant-based pesticides targeting bacteria and fungi are valuable for eco-friendly crop protection and post-harvest damage control. Additionally, natural plant extracts have long been used as dewormers for humans and livestock, offering an effective alternative in the search for new, safe anthelmintics. The aim of this study was to evaluate the activity of extracts from two Saharan plants against nine bacterial and three fungal plant pathogens, as well as against the model nematode *Caenorhabditis elegans*. Results showed that hexane and ethyl acetate extracts of *Pergularia tomentosa* exhibited broad-spectrum antimicrobial activity. Hexane extract of *Forsskaolea tenacissima* showed good activity against one fungal pathogen. Extracts of *Pergularia tomentosa* demonstrated significant activity against *C. elegans*, whereas extracts of *Forsskaolea tenacissima* exhibited low activity. Preliminary phytochemical screening by HPTLC (High-Performance Thin-Layer Chromatography) revealed that both plants are rich in steroids and flavonoids, which may explain their observed bioactivity. These results suggest that the studied plants possess broad-spectrum antibacterial effects with narrow-spectrum antifungal properties, potentially acting as broad-spectrum biopesticides. Such natural biopesticides could offer more sustainable crop protection with reduced environmental and human health risks. Furthermore, plant extracts that inhibited *C. elegans* may provide a promising starting point for the development of new anthelmintic drugs for human and veterinary use.

Keywords: Biopesticide, Antibacterial, Antifungal, Plant pathogen, Anthelmintic, HPTLC.

Importance of a Soil Seed Bank for the Regeneration of Camel Rangelands in the Wadis of the Tademaït Plateau (Case of the Timegutén Region: Adrar (Algeria))

Bahazaz MOHAMMED^{1**}, Bouallala M'hammed^{1,2}, Bradai LYÉS³, Benslimen SALAH¹, Boubekour ABDERRAHMAN^{1,2}

¹Saharan Natural Resources Laboratory, Faculty of Natural and Life Sciences, Ahmed Draia University, 01000 Adrar, Algeria

²Higher School of Saharan Agriculture, 01000, Adrar, Algeria

³Saharan BioResources Laboratory: Preservation and Valorization, Kasdi Merbah Ouargla University, Algeria

****Corresponding author e-mail:** bahazazmhd@gmail.com

ABSTRACT:

The Objective of This Work is To Assess The Potential Impact of The Soil Seed Bank On Vegetation Renewal In Camel Rangelands (Wadi Beds In The Timoguten Region :Adrar Province,Algeria) For This Reason, 20 Soil Samples Were Collected From Two Sites (Labiod Wadi And Yahia And Brahim Wadi) After A Census of Existing Plants During The Winter Of 2025 The Soil Samples Were Placed In Greenhouse Trays To Monitor Seed Germination The Results Obtained From The Plant Inventory Allowed Us To Identify 55 Plant Species (28 Perennial Species And 27 Annual Species) Growing In The Wadi Beds Studied, Representing 18 Botanical Families The Results Obtained After Germination Allowed Us To Identify Only 32 Species Distributed Between 20 Perennial Species And 12 Annual Species In General, The Number of Germinated Species Represents More Than Half of The Plants That Exist On The Soil Surface, Confirming The Role of The Seed Bank In The Regeneration of Camel Rangelands.

Keywords: Seed bank, Wadi Beds, Camel Rangelands, Tademaït Plateau, Vegetation Renewal, Sahara.

Impact of the dromedary on the preservation of its ecosystem.

Hassen MAHMA^{1,2**}, Abdelmadjid CHEHMA^{1,2}, Johann HUGUENIN³

¹ University of Ghardaïa

²Kasdi Merbah University, Ouargla — Laboratory of Saharan Bioresources: Preservation and Valorization

³CIRAD, UMR SELMET, 34398 Montpellier cedex 5, France SELMET, CIRAD, Univ Montpellier, Montpellier, France.

****Corresponding author e-mail:** hassen.mahma@yahoo.fr

ABSTRACT

The Saharan environment is characterized by a fragile ecosystem in which climatic conditions exert a marked influence on the floristic diversity of rangelands. These rangelands remain an important source of forage for livestock, particularly the dromedary (*Camelus dromedarius*), which is recognized as the only domestic species capable of efficiently exploiting and utilizing these specific grazing ecosystems due to its unique adaptations to pastoral vegetation. The objective of the present study was to assess the role of the dromedary in the preservation of its natural environment. For this purpose, a spatio-temporal monitoring of the feeding behavior of three lactating females was carried out using a video camera, covering both morning and afternoon periods. The results showed that, through its ambulatory behavior, the dromedary diversified its diet by consuming 82% of the species present on the rangeland (28 out of 34 species). Statistical analyses revealed a highly significant relationship between species abundance and their selectivity ($P = 0.001$), indicating that the most abundant species were also the most consumed. This feeding strategy contributes to the floristic regeneration of rangelands. Conclusion: The findings of this study highlight the key ecological role of the dromedary in the preservation of its ecosystem, through its feeding behavior that actively supports the regeneration and sustainability of pastoral vegetation.

Keywords: Saharan ecosystem, rangelands, Floristic diversity, Dromedary, Ecological effect.

Current state of knowledge on the distribution of the date-palm pest *Oryctes agamemnon* (Coleoptera: Scarabaeidae) in southeastern Algeria.

Salim MEDDOUR^{1**}, Randa MLIK², Othman MOSTEFAOUI³, Yasmina KHERBOUCHE⁴, Amar EDDOUD⁴, Nabil BOUBAKEUR

⁵, Djamilia Zoulikha MEGHAZI⁵, Makhoulouf SEKOUR⁴,

¹Laboratoire Valorisation et Conservation des Ecosystèmes Arides (LVCEA), Faculty of Natural Sciences, Life and Earth sciences, University of Ghardaia

²Saharan area Laboratory for Modernization and Development of Agriculture (Salama lab), Higher School of Saharan Agriculture – El Oued, PB 90 Chouhada, El Oued 39011, Algeria

³Direction des services agricole de la Wilaya d'El Oued

⁴Department of agronomy sciences, Faculty of sciences of natural and life, University of Ouargla

⁵ Institut National de la Protection des Végétaux, Station de Biskra

**Corresponding author e-mail: salimeddour@gmail.com

ABSTRACT:

The date palm (*Phoenix dactylifera* L.) is a strategic resource for the economy and food security of Algerian Saharan regions. However, its cultivation is threatened by several pests, among which *Oryctes agamemnon* Burmeister, 1875 (Coleoptera: Scarabaeidae) is considered one of the most damaging in southeastern Algeria. Larvae attack the roots and collar, causing progressive weakening and sometimes tree death. This study assesses the distribution of *O. agamemnon* by combining field surveys and bibliographic data. In the El-Oued region, infestation signs were recorded and georeferenced by GPS. Literature data complemented these observations, providing a broader picture of the pest's range. In 2018, *O. agamemnon* was restricted to border areas with Tunisia (Douar El Ma, Ben Guecha, Taleb El Arebi). By 2022, it had expanded across all municipalities of El-Oued Province, reaching the boundaries of Biskra (Oum Tyour) and Ouargla (El Borma). This rapid spread highlights its high dispersal capacity and the growing risk for oasis sustainability. Dead palms hosted 3–18 larvae per tree, distributed at different sites within the trunk and across developmental stages, which reduces cannibalism and enhances reproductive success. Biometric measurements showed larvae reaching up to 96 mm in length and 13 mm in width. Regarding management, chemical control with Flupyradifurone and pheromone-based sexual confusion (Russell IPM, PCT-Trilure-1) are the most commonly used strategies, though effectiveness varies across sites. These findings underscore the need to strengthen monitoring programs and develop integrated pest management strategies to safeguard Algerian oasis ecosystems.

Keywords: *Oryctes agamemnon*, Date palm pest, Distribution, Biometry, pest management, Algeria.

Biopesticide Activity Of Extracts From Some Steppe Plants Against *Aphis Fabae* (Scopoli, 1763) (Homoptera, Aphididae) In Djelfa.

Oumhani BELATRA¹, Abdelkader DJANAOU¹ et Fatima HOURA¹

¹Faculté des Sciences de la Nature et de la Vie, Université Ziane Achour .Djelfa

**Corresponding author e-mail: o.belatra@univ-djelfa.dz

ABSTRACT:

Our study evaluated the bio-insecticidal effect of extracts from four medicinal plants: *Nerium oleander*, *Peganum harmala*, *Mentha piperita*, and *Artemisia herba-alba*, against aphids (Aphididae), known to degrade crops and transmit phytopathogenic viruses. The concentrations (45%, 75%, 95%), in order to evaluate the dose-dependent efficacy. The results revealed that the effectiveness increases with the concentration. The results showed that the extract from the studied plants revealed variable mortality rates depending on the species studied. The extract of *Peganum harmala* shows high efficacy at all concentrations, with a mortality rate ranging from 97.40% to 98.67%. *Artemisia herba-alba* and *Nerium oleander* at 75% exhibited the highest mortality rates of 96.55% and 96.32%, respectively. *Mentha piperita* showed a lower mortality rate at 75% (81.18%). The LD₅₀ and LD₉₀ confirm these trends, they are 51.2 and 73.5 µl/ml for *Peganum harmala*, and 11 and 9.1 µl/ml for %, *Artemisia herba-alba* and *Nerium oleander*, and 5.66 and 319.3 g/ml for *Mentha piperita*.

Keywords: *Peganum harmala*, *Artemisia herba-alba*, *Nerium oleander*, *Mentha piperita* *Aphis fabae*, Aqueous extracts.

Importance of butterflies in oases and Saharan agriculture 'preservation and protection' region of Ghardaïa, Algerian.

Mohamed Tahar MEBARKI ¹, Mohamed KADRI ², Salim MEDDOUR^{1,3}, Abdellah SIBOUKEUR¹, Abdelhafid SEBIHI¹, Yamina HADJ KOUIDER ².

¹Département sciences agronomiques, Faculté des Sciences de la Nature et de la Vie et Sciences de la terre, Université de Ghardaïa, Algérie

²Département sciences biologiques, Faculté des Sciences de la Nature et de la Vie et Sciences de la terre, Université de Ghardaïa, Algérie

³Laboratoire Valorisation et Conservation des Ecosystèmes Arides (LVCEA), Faculty of Natural Sciences, Life and Earth sciences, University of Ghardaia. Email

**Corresponding author e-mail: mohamedtahar.mebarki@univ-ghardaia.dz

mebarkimed@gmail.com.

ABSTRACT:

The analysis of lepidopterans and their role in the diversity of butterflies in the Ghardaïa region across two sites between June 2024 and May 2025 using five capture techniques (sweet traps and mowing, light traps and colorful traps) led us to the following observations: The use of five collection techniques led to the identification of 8 distinct species of lepidopteran distributed over 7 different families. The order of lepidopterans is encountered at all stations and sampling methods. In the two stations there are 8 species of lepidopterans belonging to 7 different families. Nymphalidae have the largest number of individuals (Ni = 128), followed by Lycaenidae (Ni = 97) and Pyralidae (Ni = 59). Regarding the two species-rich stations that are distinguished by their vast areas and a favorable climate, station 1 is identified with (S = 8) followed closely by station 2 with also (S = 8). The most widespread technique for sampling lepidopterans is undoubtedly that of using a sweeping net (mowing). In my opinion, this work is perceived as a contribution to the monitoring of lepidopterans in field crops (agrosystems). We have synthesized the most significant ones as follows: Deudorix livia attacks the plants Ziziphus spina-christi and Ziziphus mauritiana, and the butterfly Danaus chrysippus the flowers and poisonous plants, Pieris rapae feed all the vegetables of the cabbage family, Hyles livornica favors the vine and Helicoverpa armigera destroy corn and tomato as well as sunflower and wheat, zizeeria knysna deforms the leaves of lucerne and also notes that Eublemma cochylioides targets the parasite plants like Cuscuta spp. lately Coeliades sp. in sweet potato. Adult butterflies contribute to the pollination of spontaneous plants and cultivated in agroecosystem.

Keywords: Butterflies, Agrosystem, Pollination, Ghardaia, Algeria.

Protection, management and sustainable development of arid zones.

Amel BOUKHATEM^{1**}, Amina AMAMRA², Abd raouf BENSLAMA³, Mohamed BENSLAMA²

¹ Department of biology, University of El Tarf, Algeria.

² Department of biology, University of Annaba, Algeria.

³ Department of biology, University of Ghardaia, Algeria.

**Corresponding author e-mail: a.boukhatem@univ-eltarf.dz

ABSTRACT:

The ecological and environmental problems of arid zones have become an urgent global concern. Current research on ecological risk is based mainly on the dominant functions of land use, with a primary focus on land use landscape projections and less consideration of potential risks to ecosystems, system resilience and interactions between nature and future sustainable development. As part of Algeria's contribution to the United Nations Conference on Sustainable Development, several conservation actions have been addressed, the first being the conservation of biodiversity in arid and Saharan areas (850,000 ha), the protection and conservation of fragile ecosystems concerning the classification of wetlands (50 Ramsar sites), and the conservation of wildlife species and endemic species of the Saharan regions (such as Argan and Pistachio trees and other animals and insect species). Aquifer protection from pollution is an important action for a development and wise exploitation of the groundwater resources. In arid and semi-arid zones, rare surface water resources make groundwater the principal source of drinking, industrial and agricultural exploitation water.

Keywords: Ecological risk, Projections, Sustainable development, Arid zones.

Valorization of Poultry Waste for Improving Pumpkin Growth in Sandy Soils of El-Oued Region.

Hadjira BOUSSOUAR^{1**}, Aicha MOUANE²

^{1,2} University of El-Oued, Faculty of Life and Natural Sciences, Department of Agronomy, El-Oued 39000, Algeria.

^{**}Corresponding author e-mail: boussouar-hadjira@univ-eloued.dz

ABSTRACT:

In Algeria, particularly in the El-Oued region, vegetable cultivation is expanding, but the sandy soils present challenges for maintaining fertility, leading farmers to rely on costly and environmentally harmful chemical fertilizers. As a sustainable alternative, poultry manure is increasingly used to improve soil fertility at lower cost. This study investigates the effect of different concentrations of poultry waste on the growth of a local pumpkin variety compared with a non-fertilized control. Experimental treatments were prepared by mixing various proportions of poultry manure with sandy soil, followed by laboratory analyses of soil and irrigation water, including pH and electrical conductivity. The soil ranged from sandy to sandy-loam with high permeability and salinity, while irrigation water showed alkaline pH and high conductivity, indicating mineralization. Morphological parameters such as average plant height and number of leaves were measured. Plant height showed limited variation across treatments, though the highest organic matter concentration slightly improved growth. Leaf production was influenced by nutrient input and time, with lower manure concentrations reducing leaf number, possibly due to organic matter decomposition. The highest manure concentration yielded the greatest number of leaves, but salinity in both soil and irrigation water may have restricted growth potential. These findings highlight the potential of poultry manure as an effective organic fertilizer while emphasizing the need to consider salinity effects when applying organic amendments in sandy soils. This research provides practical insights to guide farmers in adopting more sustainable fertilization practices.

Keywords: Analysis, Concentrations, Fertilization, Poultry waste, Pumpkin.

Rodent Biodiversity in Agricultural Environments of the El-Meniaa Region.

Salim MEDDOUR^{1**}, Randa MLIK², Ahlam BOUCENNA¹ and Makhlouf SEKOUR³

¹Laboratoire Valorisation et Conservation des Ecosystèmes Arides (LVCEA), Faculty of Natural Sciences, Life and Earth sciences, University of Ghardaia

² Saharan area Laboratory for Modernization and Development of Agriculture (Salama lab), Higher School of Saharan Agriculture – El Oued, PB 90 Chouhada, El Oued 39011, Algeria

³Department of agronomy sciences, Faculty of sciences of natural and life, University of Ouargla

^{**}Corresponding author e-mail: salimeddour@gmail.com

ABSTRACT:

The aim of this study was to assess the characteristics and diversity of rodent populations in agricultural areas of the El-Meniaa Province and to estimate the extent of the damage they cause. Rodent sampling was conducted at three agricultural stations using three types of traps: BTS traps, swatter traps, and sticky traps. A total of 41 individuals belonging to six rodent species of the Muridae family were captured. These included: *Mus musculus* (1 individual), *Gerbillus gerbillus* (15), *G. tarabuli* (11), *G. nanus* (5), *G. campestris* (5), and *G. amoenus* (4). The most abundant species was *G. gerbillus* (36.6%), while *M. musculus* was the least abundant (2.4%). Based on frequency of occurrence, species were grouped into three categories: accidental species (*G. campestris*, FO = 12.5%; *M. musculus*, FO = 12.5%), regular species (*G. tarabuli*, FO = 62.5%; *G. gerbillus*, FO = 50%), and incidental species (*G. nanus*, FO = 25%; *G. amoenus*, FO = 37.5%). Rodent diversity in El-Meniaa, as measured by the Shannon index ($H' = 2.24$; $H'_{\max} = 2.59$), indicated a moderate level of diversity. Evenness ($E = 0.87$) suggests a relatively balanced distribution of individuals among the recorded species.

Keywords: *Gerbillus gerbillus*, El-Meniaa, BTS, Trap,

Essential oils as sustainable bio-acaricides for livestock in arid ecosystems.

Salma Kaoutar ABDELALI^{1**}

¹Laboratory of Research on the Improvement and Development of Animal and Plant Production, University of Ferhat Abbas, Setif, Algeria

^{**}Corresponding author e-mail: abdelali.selmakaoutar@gmail.com

ABSTRACT:

Tick infestations represent a major constraint to livestock production in arid and semi-arid regions, where climate variability amplifies their impact on animal health and productivity. Conventional control relies heavily on synthetic acaricides, but their intensive use has led to resistance, environmental contamination, and high economic costs. Identifying eco-friendly alternatives is therefore crucial to ensuring both animal welfare and sustainable agrosystem functioning. In this study, the acaricidal potential of *Thymus vulgaris* essential oil, a locally sourced plant resource, was evaluated against the brown tick (*Rhipicephalus sanguineus*), a widespread ectoparasite of domestic animals, including livestock, with major veterinary importance. Chemical characterization revealed a profile rich in bioactive terpenes, including carvacrol, spathulenol, and borneol. Adult immersion tests across different concentrations showed significant reductions in oviposition (up to 83.8%) and hatching rates (up to 90%), with overall efficacy exceeding 98% at the highest dose. Larval immersion assays confirmed strong larvicidal activity, with LC50 values decreasing from 1.13 µl/ml at 24 h to 0.73 µl/ml at 72 h. These results demonstrate that *T. vulgaris* essential oil can effectively impair both reproduction and survival of ticks, highlighting its potential as a sustainable bio-acaricide. By valorizing steppe flora naturally adapted to arid conditions, this approach contributes to reducing reliance on synthetic chemicals, preserving biodiversity, and promoting the green economy in fragile ecosystems.

Keywords: Ticks, *Thymus vulgaris*, Essential Oils, Bio-Acaricides Arid Ecosystems

Reproductive adaptation of rabbits to seasonal conditions in semi-arid climate.

Khedidja BOUDOUR^{**1}, Elhassen LANKRI¹, Dalila AMOKRANE¹, Malika Hachi Iloul¹, Hamida Salhi¹, Meziane MALIKA

AHMED¹, Nacira ZERROUKI DAOUDI²

¹Natural Bioresources Laboratory, Hassiba Benbouali University, Chlef, Algeria

²Ressources Naturals Laboratory- Mouloud Maameri University, Tizi Ouzou, Algeria

^{**}Corresponding author e-mail: k.boudour@univ-chlef.dz.

ABSTRACT:

The objective of the study was to characterize the reproductive (fertility, prolificacy, mortality) and weight performance of does of the Algerian synthetic strain "ITELV 2006", managed by artificial insemination (AI) with a semi-intensive rhythm (farrowing interval - AI of 12 days). A follow-up of the reproductive management of 73 does, subject to 327 AI, was carried out at the animal facility of the University of Chlef (Algeria). During the study period, AI was carried out from semen collected from males of the same genetic type and analyzed locally. Data relating to AI, palpation, farrowing and weaning were recorded for all females. The effect of the season on the weight criteria and reproductive performance of the rabbits was analyzed. All data were subjected to an analysis of variance. The females showed a good prolificacy of 9.5 ± 2.4 total offspring, including 8.4 ± 2.9 live births per farrowing and 7.4 ± 2.6 weaned per weaning, with fertility rates of $85.6 \pm 35.1\%$ at palpation and $69.7 \pm 45.9\%$ at farrowing. The adult weight of the females at AI was 3584 ± 391 g. The young rabbit weighed on average 63 ± 13 g at birth and 490 ± 81 g at weaning. A very significant effect of the season was recorded on the fertility and prolificacy of the does, and on the weight and stillbirth of the young rabbits, with the lowest values recorded in the hot season (63% fertility). However, the females remained productive during this period of great heat.

Keywords: Chlef, Temperature, The synthetic strain, Reproductive performance, Mortality.

Impact of agricultural practices on the health of honeybees in the Bouira region.

Cherifi ASSIA^{1,2*}, Djenadi KATIA^{1,3}, Benfodil KARIMA^{1,4}, Cherifi ZAKIA^{1,4}, Abdelli AMINE^{1,4}, Ait Kara YASMINE^{1,4}, Dahmani CHAHRA^{1,4}, Abchiche HOURIA^{1,4}, Mouhoub-Sayah CHAFIKA^{1,4}.

¹ Université Akli Mohand Oulhadj de Bouira

² Laboratoire de production, sauvegarde des espèces menacées et des récoltes. Département de Biologie Animale et végétale. Faculté des sciences biologiques et des sciences agronomiques. Université Mouloud Mammeri de Tizi-Ouzou, Algérie

³ Laboratoire de biochimie appliquée, Faculté des sciences naturelles et de la vie, Université de Béjaia, Algérie

⁴ Laboratoire de Gestion et Valorisation des Ressources Naturelles et Assurance Qualité, Université de Bouira.

*Corresponding author e-mail: a.cherifi@univ-bouira.dz

ABSTRACT:

The honeybee *Apis mellifera* plays an important role in the functioning of agrosystems thanks to its pollination activity, which determines the reproduction of many cultivated plants and thus contributes to improving agricultural yields. However, modern agricultural practices such as the excessive use of pesticides pose a real danger to bee populations, which are experiencing a worrying decline. Our study focused on determining, in the laboratory, the toxic effect of the insecticide Aceplan 20sp, the most widely used by farmers in the Bouira region, on worker bees. The bees were fed syrup contaminated with the pesticide at doses of D1=300mg/l, D2=150mg/l, D3=75mg/l and D4=37.5mg/l. The results showed that the toxicity of the product in question increases with increasing concentrations. After 48 hours of exposure, bee mortality rates were higher, reaching 100% with D1 (300mg/l) after the third day of exposure. It was also found that Aceplan causes behavioural disorders such as paralysis, inability to fly, tremors and then mortality. Given all these risks and for the sake of sustainable agriculture and beekeeping, it is important to establish quality measures for this insecticide in the ecosystem and to set up a system of phytopharmacovigilance and public awareness.

Keywords: Agricultural practices, *Apis mellifera*, Disorder, Insecticide, Toxicity.

Reuse of Treated Wastewater Filtered Through Sand for Agricultural Irrigation Under Drought Conditions in the Wilaya of Ghardaïa (Algeria)

OULED BELKHIRECheikh^{1*}, GUESSOUM Hafsa¹

¹Department of Hydraulics and Civil Engineering, Faculty of Science and Technologie, Laboratory LMSA, University of Ghardaïa, 47200 Ghardaïa, Algeria.

²Department of Hydraulics and Civil Engineering, Faculty of Science and Technologie, University of Ghardaïa, 47200 Ghardaïa, Algeria,

*Corresponding author e-mail: ouledbelkhir.cheikh@univ-ghardaia.edu.dz

ABSTRACT:

Agricultural systems in semi-arid regions face severe water deficits due to the recurrence of drought episodes, necessitating the exploration of non-conventional water resources. Treated wastewater represents one of the viable alternatives to support water sustainability. The wilaya of Ghardaïa is equipped with several wastewater treatment plants, the largest of which is the Kaf Ed-Doukhane (El-Atteuf) facility, producing over 40,000 m³ of treated water per day. The objective of this study is to evaluate the suitability of wastewater treated through sand filtration (a one-meter-high sand filter) for irrigation purposes, in comparison with untreated wastewater. An experiment lasting six (6) months was conducted on three types of crops: cereals, vegetables, and young fruit tree seedlings. The plants were divided into two treatments: one group irrigated with sand-filtered treated wastewater from the Kaf Ed-Doukhane plant, and another irrigated with raw (untreated) wastewater. Vegetative growth and plant survival were monitored throughout the experimental period. For cereals and vegetables, irrigation with untreated wastewater induced rapid and vigorous growth during the first 20 to 30 days, attributable to the high nutrient content of the water. However, from the second month onward, pronounced signs of physiological stress (growth slowdown, deterioration of plant vitality, and partial mortality) were observed, reflecting cumulative toxicity effects caused by the accumulation of salts, organic pollutants, and microbial contaminants. In contrast, irrigation with treated wastewater produced slower but steady and sustained growth, with no recorded mortality, indicating the effectiveness of sand filtration in reducing pollutant loads. Regarding young fruit tree seedlings, consistent vegetative growth was observed throughout the six-month experiment, even when irrigated with unfiltered wastewater. This suggests a higher tolerance to hydric and chemical stress at this developmental stage compared to short-cycle herbaceous crops. The results demonstrate that the use of untreated wastewater poses a high risk for short-cycle herbaceous crops due to the rapid accumulation of contaminants in plant tissues and the root zone. Conversely, wastewater treated through sand filtration appears suitable for prolonged irrigation without significant deterioration of plant vitality. The use of wastewater for irrigating fruit trees seems feasible in the short term; however, long-term monitoring remains essential to prevent potential accumulation of salts or toxic elements in perennial tissues and fruits.

Keywords: *Pistacia Atlantica*, Semi-Arid Ecosystem, Species Diversity, Facilitation, Tébessa, Algeria.

Exploratory Study on the Effect of Microplastics in Soil on the Rhinoceros Beetle *Oryctes Agamemnon*.

Yamina BEN BESSIS^{1,2}, Wassila GHANEM¹, Sara FERHAT¹, Bouthaina DEBBECHE¹.

¹École Normale Supérieure de Ouargla, Algeria.

²Laboratoire de bioressources saharienne, valorisation et préservation, Université Kasdi Mernah Ouargla, Algeria

*Corresponding author e-mail: yaminabenbessisse@gmail.com

ABSTRACT:

The accumulation of microplastics is a serious pollution problem that poses a threat to biological life in soil. Therefore, this study aims to investigate the impact of microplastics, polyethylene (PE), on the larvae of *O. agamemnon*. The study was conducted under controlled experimental conditions, where first, second and the third instar larvae were exposed to three concentrations (5%, 20%, 40%) of PE microplastics. During the experiment, changes in the larvae were monitored in terms of color, weight, movement, and mortality. At the end of the experiment, All the three instars larvae samples were dissected to observe the effect of microplastics on the digestive system. The results showed that the first and second instar larvae exposed to PE were affected by it, with the first instar larvae being more affected than the second instar larvae. A decrease in weight, changes in normal color, and movement were observed. As for mortality, it was recorded only in the first instar larvae. No significant changes were observed in the third instar larvae. Dissection results revealed a clear difference in the shape of the intestines and the amount of digested chyme in the treated larvae. It was also observed that the size of the microplastics found in the intestines and feces of the larvae was smaller than that in the substrate, indicating the degradation of microplastics by the larvae. In light of these results, further in-depth studies are needed to explore the effect of microplastic pollution on this beetle species and, on the other hand, to study the potential role of the rhinoceros beetle *O. agamemnon* in the biological degradation of microplastics as a persistent pollutant that threatens the balance of the ecosystem.

Keywords: *O. agamemnon*, Larvae, Microplastics, Polyethylene (Pe), Biological Activity, Soil.

Characterization of date pastes from some secondary cultivars in the Ouargla region, Algerian sahara.

Rima DEROUCHE^{1,2*}, Fatima Zahra BEN AMEUR¹, Isra BOUGUERRA¹

¹ Ecole Normale Supérieure de Ouargla, Department of Natural Sciences, Ouargla, Algeria.

² Laboratoire de recherche sur les ressources naturelles sahariennes et subsahariennes,

Ecole Normale Supérieure de Ouargla, Algeria.

**Corresponding author e-mail: derouiche.rima@ens-ouargla.dz

ABSTRACT:

The genetic diversity of Algerian date palms is characterized by great importance, with nearly 1,000 identified varieties. However, despite this genetic diversity, attention is often focused on a limited number of commercial varieties with high market value, while many other local varieties are at risk of being neglected and declining. Valorizing dates involves giving them importance, status, or meaning by integrating them into processing processes to create new, sought-after products, thus making them useful. The study aimed to examine some sensory and physicochemical properties of date paste from some secondary cultivars from the Ouargla region: Mizit, Tatiout Nouh, and Takermoust. The results showed that, from a sensory perspective, Mizit paste had the best texture and appearance but the weakest flavor, while Takermoust had a balanced flavor and appearance, and Tatiout Nouh had the weakest texture and flavor. However, all cultivars were generally well accepted. Regarding physicochemical properties, acidity (pH) ranged from 5.59 to 6.13, total sugars from 83.1% to 85.7%, total soluble solids (TSS) from 44.91 to 76.9°Brix, moisture content from 23.26% to 24.86%, and ash content from 1.33% to 1.75%. Yield ranged from 36.07% to 50.6%. These preliminary results highlight the importance of promoting secondary date varieties in Ouargla province, not only as innovative economic solutions, but also as a concerted effort to preserve biodiversity and enhance the region's agricultural identity.

Keywords: Physicochemical, Organoleptic, Secondary dates, Date paste, Ouargla.

Reproductive Efficiency of Locally-Born Holstein Heifers under Saharan Climatic Conditions.

Lazoumi OUARFLI^{1*} and Abdelmadjid CHEHMA ²

¹Laboratory for valorization and conservation of arid ecosystems (LVCEA). Faculty of nature and life sciences and earth sciences, university of Ghardaia, Ghardaia, Algeria

²Laboratory of Saharan bio resources. Preservation and valorization 30000 Ouargla, Algeria

* Corresponding author e-mail: lazoumi.ouarfli@univ-ghardaia.dz

ABSTRACT:

This study examines the reproductive performance of Holstein heifers in the challenging Saharan climate, using data from 1998 to 2016 from a dairy farm in Algeria's Northern Sahara. The retrospective analysis of 501 heifers focused on the effects of climatic factors, particularly the Temperature Humidity Index (THI), and management practices on reproductive outcomes. Results show that early breeding significantly improves pregnancy rates (PR%), with 100% success for heifers bred before 12 months (mo), declining to 72.07% for those bred between 12–18 mo, and further to 64.26% for 18–24 mo ($p < 0.0001$). Over time, PR% increased from 54.35% in 1995–2000 to 77.42% in 2010–2015 ($p < 0.0001$). Optimal fertility was observed at moderate THI levels (75–78), achieving a PR of 77.53%, compared to 55.84% at higher THI levels (>84) ($p = 0.026$). Timed artificial insemination (TAI) proved more effective than estrus detection artificial insemination (EDAI), with TAI yielding a PR of 81.08% versus 66.38% for EDAI ($p < 0.0001$). These findings emphasize the importance of early breeding, environmental stress management, and suitable breeding techniques in improving reproductive efficiency in harsh climates.

Keywords: Holstein Heifers, Saharan Environmental Factors, Reproductive Performance, Temperature-Humidity Index, Artificial Insemination.

Study Of The Effect Of Oil Mill Effluents, Treated By Two Methods: Centrifugation And Sand Filtration, On The In Vitro Rumen Fermentation Of Sheep.

Abdelhafid AOUADI^{1**} et Rabah ARHAB²

¹Département de Biologie, Faculté des Sciences Exactes et des Sciences de la Nature et de la Vie, Université Ghardaïa, Algérie. Zone scientifique, BP 455 Ghardaia, 4700, Algérie

² Département de Biologie, Faculté des Sciences Exactes et des Sciences de la Nature et de la Vie, Université Larbi Ben Mhidi, Oum-El-Bouaghi, Algérie

* Corresponding author e-mail: hafid.aouadi@gmail.com

ABSTRACT:

The objective of this study is to evaluate the influence of liquid olive by-products, known as "Olive mill wastewater (OMWW)" from discontinuous olive mills, treated using two methods, on the in vitro ruminal fermentation of wheat hay (*Triticum aestivum*). The effluents were treated either by centrifugation or by sand filtration, and their effects on gas production, ciliated protozoa population, and ammonia concentration were analyzed.

The results indicate that sand filtration is more effective, removing 70.1% of the organic matter, compared to only 7.3% for centrifugation. This process reduces both soluble and insoluble organic fractions. This method is recommended for the removal of organic pollutants from OMWW to mitigate their environmental impact. Furthermore, the in vitro incubation of triticale hay with raw OMWW altered fermentation dynamics by increasing total gas production by 16%, reducing methane production by 20%, and decreasing the ciliated protozoa population by 22%. OMWW treated by centrifugation resulted in a 10% reduction in methane production and a 31% decrease in the ciliated protozoa population. Conversely, sand-filtered OMWW had a negative impact on the digestion process, reducing gas production by 16%, ammonia concentration, and the ciliated protozoa population by 44%. As a result, the use of sand-filtered OMWW as livestock feed is strongly discouraged.

Keywords: Ammonia nitrogen, Centrifugation, Filtration, Gas, Methane, Olive mill wastewater, protozoa.

Catfish farming in an aquaponics system.

Negais HAMZA¹, Hemeir ABDELHAFIDH², Manamani RADIA³, Benhedid HADJIRA⁴

¹ University of Ghardaïa, Ghardaïa. Email: negais.hamza@univ-ghardaia.edu.dz

² National Center for Research and Development of Fisheries and Aquaculture (CNRDPA). Bousmail, Tipaza. Email: hafidhemeir@gmail.com

³ University of Kasdi Merbah, Ouargla.

⁴ University of Ghardaïa, Ghardaïa.

* Corresponding author e-mail : hamza.bio30@gmail.com

ABSTRACT:

Aquaponics is an integrated farming system that combines fish farming with plant cultivation in a shared environment. Through recycled water, livestock waste disappears and becomes an input for crops. The aim of this study is to demonstrate the performance of the NFT aquaponics system (closed circuit) by evaluating the quality of the rearing water, fish growth and the estimated production of the crop used in this system. The experiment was carried out at the CNRDPA experimental station in Ouargla. The biological material chosen for this system was catfish (*Clarias gariepinus*), and lettuce (*Lactuca sativa*, V. blonde du Paris and V. blonde de MARTIN). The experiment was monitored for five weeks. Analyses of water quality parameters such as ammonia, nitrites, nitrates and pH and biometric measurements of the biological material used were carried out weekly. The results obtained show that the water quality parameters are acceptable in accordance with the FAO standard for aquaponics. Fish growth was notable in terms of body weight, with the specific growth rate for reaching 2.98 %/. The biomass obtained from the cultivated lettuce was high with an average weight was 275.164± 84.6135 g. In addition, a good earliness of 35 days. Water use for aquaponic farming was much lower than for conventional open circuit farming (400 L compared with 3900 L), representing a water saving of 89.743 %. This innovative technique has contributed to the production of biomass and the preservation of the environment and water resources better than the other conventional methods. Further research must be carry out in order to determine the real performances of our aquaponic system. It is needed to repeat the experiment with a large-scale system and with a high density of fish.

Keywords: Aquaponics system, *Clarias gariepinus*, nitrates, nitrites, culture, fish.

Valorization of the different palm grove wastes as soil amendements in Ghardaïa region.

Fatiha LAOUAR¹, GUESSOUM Hadjer², OUSTANI Mabrouka³, BENBRAHIM Fouzi⁴,

HALILAT Mohamed Tahar⁵.

^{1,2} University of Ghardaïa., Algeria.

⁴ Laboratory of mathematics and applied sciences, University of Ghardaïa. BP 455 Ghardaïa 47000, Algeria.

⁶ Ouargla Higher Teacher Training College, Algeria.

^{3,5} University KASDI Merbah-Ouargla, BP 511, Ouargla 30000, Algeria.

ffati77@yahoo.fr

Abstract:

Composting is an aerobic biological process of degradation and valorization of organic matter in a stabilized and hygienic product. The present work aims at following the evolution of some physical, physicochemical parameters, contents of major nutrients as well as the appreciation of the degree of maturity of four types of compost prepared from different mixtures of residues of vegetable origin (waste of date palm, waste of olive tree and the straw) and poultry manure. The mixtures made are: T1: 40% date palm waste (DP) + 40% poultry manure (PM) + 20% waste mixture (wheat straw + olive tree residues) (MI); T2: 50% date palm waste (DP) + 50% poultry manure (PM); T3: 50% date palm waste (DP) + 50% mixed waste (wheat straw + olive residue) (MI); T4: 50% poultry manure (PM) + 50% mixed waste (wheat straw + olive residue) (MI). The phytotoxicity test of the prepared composts conducted on lettuce, radish and bean revealed that the impact on germination and vegetative growth of these plant species depends on both the compost used and the species grown. In fact, no toxic effect was found on radish and bean, with germination rates exceeding (85%) for all four treatments. However, some inhibition of germination was reported in lettuce at the (PM+MI) treatment. Overall, the results obtained show that the composts obtained meets the characteristics of a product with good agronomic value, stable, hygienic and suitable for sustainable agriculture in arid regions.

Keywords: Composting, Palm grove waste, Phytotoxicity, Ghardaia.

Pollution of Agricultural Soils by Heavy Metals in Constantine: Assessment of Health and Environmental Risks.

Seifeddine SELLAMI^{1*}, Said LIFA², Omar TEBBOUB³, Lotfi BENMEKHBI¹, and Ouahida ZEGHOUAN⁴.

¹ Department of GP, Faculty of Process Engineering, Salah Bounider University of Constantine 3, Constantine, Algeria.

² Institute of Mines, University Echahid Cheikh Larbi Tebessi, Tébessa, Algeria.

³ Department of SM, Faculty of SESNV, University Echahid Cheikh Larbi Tébessi, Tébessa, Algeria.

⁴ National Center for Biotechnology Research, Constantine, Algeria.

*Corresponding author. E-mail: seifeddine.sellami@univ-constantine3.dz

ABSTRACT:

Mining sites represent a permanent toxicological problem for surrounding ecosystems and human health. In the present study, we examine the accumulation of heavy metals in agricultural soils sampled from the area surrounding a mining site in Constantine (Algeria). The occurrence of heavy metals in the soil was, in decreasing order, Zn > Pb > Cu > Cd. The concentrations of heavy metals were higher in the studied soils compared to the control soil. Based on the geoaccumulation index (Geol) and the contamination factor (CF), the degree of contamination can be defined as slightly contaminated for Pb and Zn, heavily contaminated for Cd, and moderately contaminated for Cu. Regarding the pollution load index (PLI), the metal levels exceed local and regional reference concentrations, indicating a sufficiently high contamination to attract attention and pose a risk to the ecosystem. Heavy metals are persistent in the environment and are subject to bioaccumulation in food chains, thus posing substantial health risks for humans and animals.

Keywords: Agricultural soils, Mining sites, Heavy metals, Contamination degree.

Effect of evaporation on the evolution of chemical facies in salt-affected soils of eastern Algeria.

Hadjer LAOUFI^{1,2**}, Amel BOURAHLA^{1,2},

¹ Mohamed El Bachir El Ibrahimi University, Faculty of Natural and Life Sciences, Earth and Universe Sciences, Department of agronomy, Bordj Bou Arreridj El-Anasser, 34030, Algeria.

² Laboratory of characterisation and valorisation of natural resources. Bordj Bou Arreridj, Algeria.

**Corresponding author e-mail: hadjer.laoufi@univ-bba.dz

ABSTRACT:

Soil salinisation represents a major constraint to the sustainability of agricultural systems in arid and semi-arid regions, by altering fertility, water availability, and soil–plant interactions. Driven by climate warming and increased evapotranspiration, this issue also affects wetlands, which play a key role in hydrological regulation and biodiversity conservation. In this study, 105 soil samples were collected along topossequences in four sebkhas, either protected or in the process of being designated, within the South-Sétif eco-complex. Physico-chemical analyses (pH, EC, major ions) were conducted to characterise facies using the Piper diagram and to assess their evolution according to the concentration factor (CF). Results reveal a clear predominance of the sodium-chloride facies (68.57%), followed by calcium-chloride (17.14%) and sodium-sulphate (12.38%) facies. Evaporation enhances the accumulation of chlorides and reduces sulphates, while calcium becomes more pronounced in concentrated solutions. These hydrochemical dynamics, linked to evaporite dissolution and carbonate precipitation, highlight the high vulnerability of sebkhas to climatic and anthropogenic pressures. Understanding these processes is crucial for developing sustainable management strategies that reconcile agricultural productivity, soil conservation, and the preservation of protected wetlands as reservoirs of biodiversity.

Keywords: Soil, Salinisation, Chemical facies, Semi-arid, Wetland, Algeria



Poster

OTHERS



Colostrum Quality in two Crossbreed Goats During four Days after Kidding

Loubna DJOUZA^{1**}, Alla Eddine MAHAMED^{2,3}

¹Ghardaia University, Faculty of Natural and Life Science sand Earth Sciences, Department of agronomic sciences, Ghardaia, Algeria.

²Ghardaia University, Faculty of Natural and Life Science sand Earth Sciences, Department of biology, Ghardaia, Algeria

³Ecole Normale Supérieure de Kouba Cheikh Mohamed Elbachir El ibrahimi, Laboratoire de Biologie des Systèmes Microbiens (LBSM), Alger, Algeria

**Corresponding author e-mail: loubna_djouza@yahoo.fr

Abstract:

Quick and adequate administration of colostrum in the first hours after birth ensures good health and better long-term growth of newborn animals. In order to evaluate the colostrum quality, eight crossbred goats (Saanen × Makatia and Saanen × Alpine) raised in the arid region of Ghardaia are involved in this study. Colostrum samples were collected over the first four days postpartum and analyzed for microbiological quality and key physicochemical parameters, including fat and protein content, pH, titratable acidity, density, conductivity. Results showed a decline in fat and protein content from day one to day four in both goat groups, although the average differences over the four days were not statistically significant. Acidity and density also decreased, with a significant change observed in the Saanen × Makatia group. pH levels remained relatively stable across the sampling period. Conductivity increased steadily in both groups. Microbiological analysis revealed the absence of sulphite-reducing Clostridium, Salmonella, and yeasts in all samples. The levels of Staphylococcus aureus, total aerobic mesophilic flora, and total and faecal coliforms were within acceptable limits for raw milk, confirming the good microbiological quality of the colostrum. Moreover, colostrum from the Saanen × Makatia goats was found to have higher protein and fat content compared to that from the Saanen × Alpine goats.

Keywords: Colostrum, Alpine, Makatia goat, Microbiological quality, Physicochemical analysis, Saanen

Comparative Evaluation of AI-Based Models for Daily Runoff Prediction in the Oued Zeddine Watershed, Northern Algeria

Djihad HACHANI^{1*}, Tayeb Boulmaiz², Salim Boubelli²

¹ Faculty of Natural and Life Sciences and Earth Sciences, University of Ghardaia, BP 455 Ghardaia 47000, Algeria ,

² Laboratories of Valorization and Conservation of Ecosystems Arids (LVCEA), Faculty of Natural Sciences and Life, University of Ghardaia, Algeria.

*Corresponding author e-mail address: hachani.djihad@univ-ghardaia.edu.dz

ABSTRACT:

Flash floods pose a significant threat in arid and semi-arid regions, putting lives, property, and infrastructure at risk. This study focuses on modeling and forecasting flash floods in the Oued Zeddine watershed, located in Aïn Defla in northern Algeria using artificial intelligence techniques. Two machine learning approaches Feedforward Neural Network (FFNN) and Extreme Learning Machine (ELM) were compared for predicting daily streamflow based on precipitation data. Model performance was evaluated using the Modified Kling-Gupta Efficiency (MKGE), Nash-Sutcliffe Efficiency (NSE), and coefficient of determination (R^2) during both training and testing phases. The FFNN model achieved MKGE values of 0.93 in training and 0.87 in testing, while the ELM model reached MKGE values of 0.78 and 0.82, respectively. These results demonstrate that both models are effective for runoff prediction, with FFNN providing higher accuracy and ELM offering faster training, highlighting the potential of artificial intelligence for enhancing flood risk management and early warning systems.

Keywords: Machine learning; Feedforward Neural Network; Extreme Learning Machine; arid and semi-arid.

Chronic Kidney Disease Among Diabetic Patients in the Ghardaïa Region.

BENSAHA Houda^{*(1),(2)}, HAMDAROU Houari⁽³⁾⁽⁴⁾

¹Ghardaia University, Faculty of Natural and Life Science sand Earth Sciences, Department of biology, Ghardaia, Algeria.

² Valorization And Conservation of Arid Ecosystems Laboratory. Ghardaia, Algeria. VCAEL

³

*e-mail: Almainas164@gmail.com.

Abstract:

This study aims to assess the extent of end-stage chronic kidney disease among diabetic patients undergoing hemodialysis treatment in Ghardaïa, and to determine the characteristics of these patients including age, gender, and clinical profile. Diabetic nephropathy, the leading cause of kidney failure in diabetics, is concerning due to its serious implications for public health, significantly impacting patients quality of life. The study's findings indicate a significant prevalence of chronic kidney disease among these patients, predominantly affecting those over 50 years old and predominantly males (57.77%). Type 1 diabetes is more frequently associated with this complication. Identified risk factors include inadequate glycemic control, hypertension, family history of diabetes, and unhealthy lifestyles. To enhance clinical outcomes and patient quality of life, proactive management of diabetes and its complications is crucial, necessitating an integrated multidisciplinary approach.

Keywords : End-stage chronic kidney disease, Diabetic nephropathy, Diabetes, Epidemiology, Risk factors, Ghardaïa.

The Use of Biochar in Sludge Treatment

Aloui Nabiha^{1*}, Ladjel Segni², Touggourt Sara³

¹Process Engineering Laboratory, Faculty of Natural and Life Sciences Department of Biological Sciences Ouargla University, Algeria.

²Process Engineering Laboratory Kasdi Merbah University Process Engineering Ouargla University, Algeria

³ Faculty of Natural and Life Sciences Ouargla University, Algeria

**Corresponding author e-mail: aloui.nabiha@univ-ouargla.dz

Abstract:

In order to reduce the impact of sloughs on the environment, we carried out a 20-day treatment trial of hydrocarbon-contaminated soil at Haouth Berkaoui using biochar extracted from date pits of the Ghars variety. Physical and chemical analyses were carried out on the soil before and after treatment with biochar, and on the product obtained after pyrolysis at 600°C. The results showed a decrease in pH from 9/90 to 7.45, a significant drop in electrical conductivity from 30.8 dS/cm to 4.84 dS/cm, and a granulometric analysis showing that the texture was sandy-loamy. Scanning electron microscopy of the biochar revealed that the high porosity of the surface of our product provided better attachment sites for microbes, which accelerated the degradation of hydrocarbons. Concerning the analysis of hydrocarbons by GC/MS, the results showed a marked reduction in the concentration of toxic compounds after treatment, which testifies to the effectiveness of the biochar treatment in decomposing heavy and complex compounds into lighter and more stable compounds, although some require longer degradation periods. The effectiveness of date kernel biochar is also explained by its composition, which is rich in organic matter (75.64%) and mineral nutrients such as nitrogen (0.19%), phosphorus (0.16%), potassium (0.65%) and magnesium (0.73%). The study confirms that biochar from date pits is an effective and sustainable ecological option for treating soil polluted by hydrocarbons.

Keywords: Date kernels, Biochar, Traitement, Drilling quagmires, Sustainable Development, Saouth of Algeria

Treatment Of Wastewater Using Quicklime At The Kaf Dukhan Station

Kheira BOUAMER ^{1**}

Materials Laboratory, Technology, Energy Systems and Environment (MESTEL) University of Ghardaia

Faculty of technological science, process engineering department, university off Ghardaia, Algeria.

[** kr.bouameur@gmail.com](mailto:kr.bouameur@gmail.com)

ABSTRACT:

This study focuses on enhancing wastewater treatment in the city of Ghardaïa, Algeria, using locally sourced lime (calcium oxide, CaO). The research targets the Kaf Dukhan wastewater treatment plant, which relies on natural lagooning but lacks advanced tertiary treatment to improve water quality. The study proposes the use of local quicklime, extracted from a nearby traditional plant, to reduce pollutants such as Chemical Oxygen Demand (COD), Biological Oxygen Demand (BOD), Suspended Solids (SS), nitrogenous compounds, and to regulate pH levels. Lime production involves extracting calcium carbonate (CaCO₃), calcining it in specialized kilns, and processing it into a fine powder. Physico-chemical analyses demonstrated significant improvements in water quality after lime treatment, with increased dissolved oxygen levels, reduced electrical conductivity, and a decrease in COD from 131 mg/L to 102 mg/L, while BOD levels dropped from 59 mg/L to 7 mg/L, indicating a considerable reduction in organic pollutants. Additionally, the treatment effectively reduced ammonium concentrations while slightly increasing nitrate and nitrite levels, a natural part of the nitrogen cycle during treatment. The findings confirm that the use of locally sourced lime is a cost-effective and efficient method for enhancing wastewater treatment processes in Ghardaïa, making the treated water more suitable for agricultural reuse or environmental discharge.

Keywords: Treatment of wastewater, Physical and Chemical Parameters, Lime, Physical, Disinfection.

Study of Treated Bentonite Efficiency in Dye Wastewater Treatment

Kerroumia Moulai ^{1,2**}, Hamed Boukhari², Mohamed Salah AGGOUN²

1Ghardaia University, Faculty of Sciences and Technologies, , Ghardaia, Algeria.

2 Laboratory of Materials, Energy Systems Technology and Environment, . Ghardaia, Algeria.

moulai.kerroumia@univ-ghardaia.dz

Abstract.

This research focuses on the application of natural clay as a low-cost, environmentally friendly adsorbent for the treatment of urban wastewater, particularly from the Kef Eddoukhane wastewater treatment plant located in Ghardaïa. The study evaluates two forms of clay: raw local clay and purified clay, both selected for their abundance, affordability, and favorable adsorption properties. Laboratory-scale experiments demonstrated the effectiveness of these materials in reducing organic pollutants, with biochemical oxygen demand (BOD₅) levels decreasing to 60 mg/L using raw clay and to 24 mg/L with purified clay. Although a slight increase in electrical conductivity was observed—attributed to the dissolution of salts present in the clay—the overall results confirm the efficiency of natural clay in removing organic matter compared to conventional chemical treatments used in wastewater facilities. This natural process not only offers comparable or improved performance but also avoids the high operational and maintenance costs associated with traditional technologies. Based on these findings, the study highlights the potential of clay-based treatment as a sustainable solution for wastewater purification and recommends further investigation into the influence of specific physico-chemical parameters, in-depth characterization of filtering materials, and the development of multilayer filtration systems using locally sourced resources.

Keywords : Wastewater treatment ; Adsorption ; Natural clay ; Organic pollution ; BOD₅ Biochemical Oxygen Demand) ; COD (Chemical Oxygen Demand)

Analyse et reconstitution polliniques de deux mares tourbeuses dans la région d'Ouled Attia dans la wilaya de Skikda (Nord-Est algérien).

Ali Tatar Braham^{1,4*}, Badouna Bahaeddine², Hamel Tarek³, Benslama Mohamed¹,

¹ Laboratoire de recherche sols et développement durable .Département de Biologie, faculté des Sciences, Université BADJI Mokhtar Annaba, Algérie, 23 000.

² Laboratoire de biochimie et la Toxicologie Environnementale, Département de Biologie, faculté des Sciences, Université BADJI Mokhtar Annaba, Algérie, 23 000.

³Département de Biologie, faculté des Sciences, Université BADJI Mokhtar Annaba, Algérie, 23 000.

⁴Département des sciences agronomiques, institut des agronomiques et vétérinaires, Université Mohamed Chérif Messaadia Souk Ahras, Algérie 41 000.

Abstract:

Deux mares tourbeuses (Aoural et Ain Salhat) de la région de la petite Kabylie orientale (Nord Est d'Algérie) ont fait l'objet d'inventaires floristiques et d'analyses polliniques durant six années (2016-2022). L'étude floristique a révélé l'existence de 174 espèces dont 119 pour la mare Aoural et 109 pour celle d'Ain Salhat. L'analyse pollinique de sédiments de surface de deux mares a permis d'identifier 52 taxons polliniques. Dans la mare d'Ain Salhat, les pourcentages des taxons des arborées dominant cet assemblage, atteignant un taux de 47,4%, suivis par les herbacées 24,5%, les arbustives avec 24,4% et enfin 3,7% pour les taxons indéterminés, ceci est dû à la position de la mare dans un milieu forestier boisé. D'autre part, dans la mare Aoural, les herbacées dominant ces spectres avec 37%, suivies des arbres qui sont de l'ordre de 36%, les arbustes 23,4% et enfin les indéterminés avec environ 3,6%.

L'apport de l'analyse pollinique à la connaissance de la flore actuelle de deux mares étudiées est de 58%. Au total, 186 espèces ont été recensées grâce à ces deux méthodes, dont 12 espèces ont été observées seulement dans le spectre pollinique. L'étude floristique et l'analyse pollinique sont donc deux méthodes d'étude qui se complètent.

Keywords : Kabylie orientale (Nord-Est algérien), mare tourbeuse, phytoécologie, pollen de surface, taxon indicateur.

L'analyse paysagères comme outil dans la gestion écotouristique des ressources et des territoires : le cas de la wilaya de Souk Ahras (Nord-est de l'Algérie).

BADOUNA Bahaeddine^{1*}, BOUMENDJEL Mahieddine¹, ALI TATAR Braham², MECHENTEL ElHadi²

¹ Laboratoire de Biochimie et de Toxicologie Environnementale. Université Badji-Mokhtar Annaba. Algérie

² Institut des Sciences Agronomiques et Vétérinaires de Taoura. Université de Souk Ahras. Algérie.

*Corresponding author e-mail: badounabaha@yahoo.com

Abstract:

Cette étude porte sur l'analyse paysagère en tant qu'outil d'évaluation écotouristique des bassins versants de la région de Souk Ahras, située dans le nord-est de l'Algérie. Une démarche méthodologique combinée a été mise en œuvre, intégrant deux approches complémentaires : une approche « utilisateur » ou visuelle, fondée sur l'analyse des champs visuels, et une approche « expert », reposant sur une évaluation quantitative des différentes sous-unités constituant le site d'étude. Les résultats issus de ces deux approches présentent une convergence significative, indiquant que les valeurs obtenues par la méthode quantitative sont en parfaite concordance avec celles de la méthode qualitative. Il en ressort que l'évaluation paysagère constitue un indicateur pertinent pour l'appréciation du potentiel écotouristique du territoire. Enfin, une carte synthétique recensant l'ensemble des sites étudiés a été élaborée afin de faciliter leur intégration dans des guides écotouristiques.

Keywords: Analyse du paysage, écotourisme, sites Natuels, Méthode de cotation, Equation de Neuray, Bio-diversité paysagère



About ICVCAE 2025

Arid ecosystems are facing major challenges caused by climate change, environmental degradation and excessive exploitation of resources, which are affecting the biodiversity and sustainability of these systems. In spite of being fragile, these environments have economic and ecological potential that can be exploited through innovative and sustainable strategies.

The ICVCAE 2025 congress aims to discuss ways of preserving arid ecosystems and developing their resources through a multidisciplinary approach encompassing environmental sciences, sustainable agriculture and the green economy. It also seeks to strengthen scientific research and international cooperation, propose concrete solutions to mitigate the effects of environmental degradation, enhance the value of arid ecosystems, and promote sustainable development based on the responsible use of resources.