



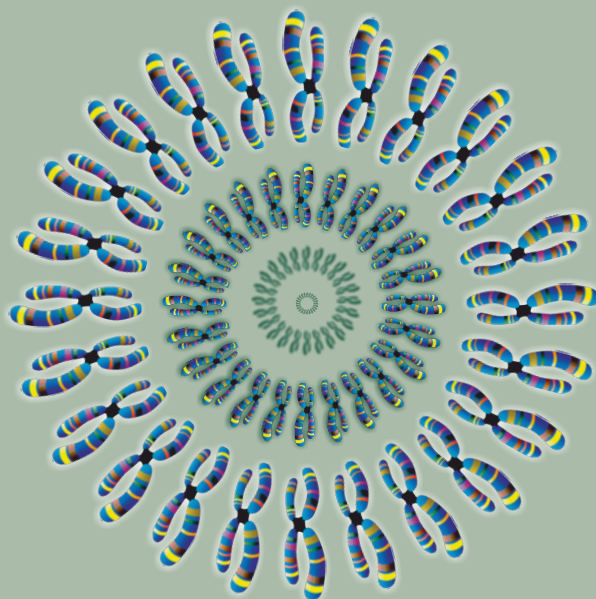
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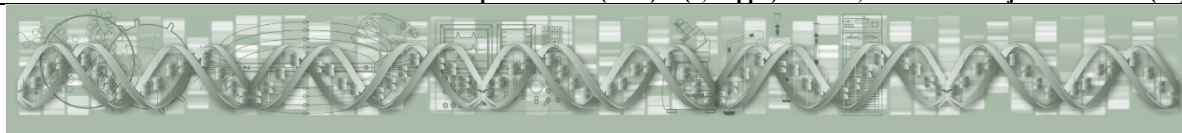
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ABSTRACTS BOOK

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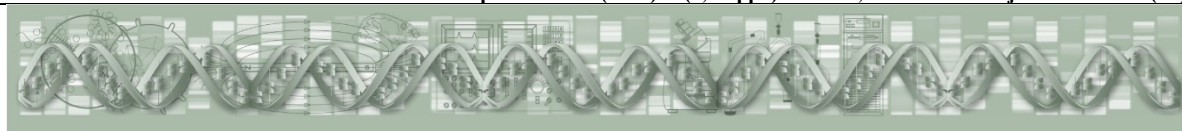
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FOREWORD

This volume brings together the abstracts of scientific works that have been communicated in the Scientific Session of the Faculty of Biology (SSFB), *New Trends in Biology: from Molecules to Complex Systems*, 4th edition, October 25-26, 2024.

The SSFB 2024 was organized by the Faculty of Biology of “Alexandru Ioan Cuza” University of Iași, in partnership with “Anastasiu Fătu” Botanical Garden, Museum of Natural History, Romanian Academy – Iași Branch, and Association of Biology Students from Iași. A diversity of scientific events (i.e., plenary lectures, poster session, oral communications, roundtable, and exhibitions) summed 58 contributions of 151 authors from Romania and abroad (i.e., Canada, Bulgaria, France, Greece, Poland, South Africa, Ukraine, USA). As in the previous editions of SSFB, the scientific contributions have been grouped into three major themes named *Taxonomy and Ecology*, *Experimental and Molecular Biology*, and *Educational Resources in Biology*. This volume includes the abstracts of 35 works presented within the SSFB 2024, disseminating new research results on a variety of topics, such as plant anatomy and histology, animal behavior, entomology and parasitology, biodiversity conservation, bioarchaeology, biotechnology, neurobiology, omics, cytotoxicity, teaching methods.

The scientific events occasioned by SSFB 2024 strengthened again the collegial and professional links between the participants, debating relevant issues, challenges, opportunities, and new discoveries in Biology. The success of the SSFB 4th edition resulted from the common effort and enthusiasm of the organizing committee members, moderators, as well as all the authors, to whom we thank once again!

On behalf of the organizers,
Luminița Bejenaru, Mihaela Danu, and Marius Mihășan



TAXONOMY AND ECOLOGY**NATURA 2000 LEPIDOPTERA FROM ROSCI0135 BÂRNOVA-REPEDEA
IDENTIFIED IN 2015-2016****PANFIL CĂTĂLINA¹, POPESCU IRINEL EUGEN^{1*}**¹Faculty of Biology, Alexandru Ioan Cuza University of Iași*Corresponding author: irinellus@yahoo.com

In the Natura 2000 factsheet for ROSCI0135 Bârnova-Repedea, variant from 2017 and the online variant from 2024, with the mention of the update from 2020.12 ([N2K ROSCI0135 dataforms \(europa.eu\)](https://n2k-rosci0135.dataforms.europa.eu)), there are enumerated three species of Lepidoptera: *Euplagia (Callimorpha) quadripunctaria* (Poda) (Erebidae), *Euphydryas maturna* Linnaeus (Nymphalidae) and *Lycaena dispar* (Haworth) (Lycaenidae). There are another two species of Natura 2000 Lepidoptera present in the site but not mentioned in the Natura 2000 factsheet for ROSCI0135 Bârnova-Repedea: *Zerynthia polyxena* (Denis & Schiffermüller) and *Parnassius mnemosyne* (Linnaeus) (Papilionidae), so in reality there are five Natura 2000 Lepidoptera species present in the site. *L. dispar*, *E. maturna* and *E. quadripunctaria* are present in the Annexe II from the Habitat Directive 92/43 CEE. *Z. polyxena*, *P. mnemosyne*, *L. dispar* and *E. maturna* are present in the Annexe IV from the Habitat Directive. *P. mnemosyne* (LC), *L. dispar* (NT) and *E. maturna* (DD) are mentioned in the IUCN Red List of Threatened Species. *Z. polyxena* (LC), *P. mnemosyne* (NT), *L. dispar* (LC) and *E. maturna* (VU) are mentioned in the IUCN Red Lists of Threatened Species for Europe. *Z. polyxena*, *P. mnemosyne*, *L. dispar* and *E. maturna* are included in the Annexe II from the Bern Convention. *L. dispar*, *E. maturna* and *E. quadripunctaria* are listed in the Annexe I of the Resolution 6 of the Bern Convention. *Z. polyxena* (EN) and *E. maturna* (EN) are enumerated in the Draft Red List of Butterflies (Lepidoptera: Papilionoidea) of the Carpathian Mountains. *L. dispar* and *E. maturna* are mentioned in the Red Book of Invertebrates of Romania. All the species are included in OUG 57/2007: *L. dispar* and *E. maturna* in the Annexe 3 and 4a, *E. quadripunctaria* in the Annexe 3, *Z. polyxena* and *P. mnemosyne* in the Annexe 4a.

**NATURA 2000 COLEOPTERA FROM ROSCI0135 BÂRNOVA-REPEDEA
IDENTIFIED IN 2015-2016****OPREA GEORGIANA¹, POPESCU IRINEL EUGEN^{1*}**¹Faculty of Biology, Alexandru Ioan Cuza University of Iași*Corresponding author: irinellus@yahoo.com

In the Natura 2000 factsheet for ROSCI0135 Bârnova-Repedea, the online variant from 2024 (update 2020.12) ([N2K ROSCI0135 dataforms \(europa.eu\)](https://n2k-rosci0135.dataforms.europa.eu)), there are enumerated eight species of Coleoptera: *Carabus variolosus* Fabricius, *Rhysodes sulcatus* (Fabricius) (Carabidae), *Rosalia alpina* (Linnaeus), *Morimus funereus* Mulsant, *Cerambyx cerdo* Linnaeus (Cerambycidae), *Lucanus cervus* (Linnaeus) (Lucanidae), *Bolbelasmus unicornis* (Schränk) (Geotrupidae), *Cucujus cinnaberinus* (Scopoli) (Cucujidae). Another one species is present in site but not mentioned in the Natura 2000 factsheet for ROSCI0135 Bârnova-Repedea: *Osmoderma barnabita* Motschulsky (as *O. eremita* in Natura 2000) (Scarabaeidae), so in reality there are nine Natura 2000 Coleoptera species present in the site. All the nine species are present in the Annexe II from the Habitat Directive 92/43 CEE. *C. variolosus*, *R. alpina*, *C. cerdo*, *B.*

unicornis, *O. barnabita*, *C. cinnaberinus* are present in the Annexe IV from the Habitat Directive. *R. alpina* (VU), *M. funereus* (VU), *C. cerdo* (VU), *O. barnabita* (NT), *C. cinnaberinus* (NT) are mentioned in the IUCN Red List of Threatened Species. *R. sulcatus* (EN), *R. alpina* (LC), *C. cerdo* (NT), *L. cervus* (NT), *O. eremita* (NT), *C. cinnaberinus* (NT) are mentioned in the IUCN Red Lists of Threatened Species for Europe. *R. alpina*, *C. cerdo*, *O. eremita*, *C. cinnaberinus* are included in the Annexe II from the Bern Convention. *L. cervus* is included in the Annexe III from the Bern Convention. *C. variolosus*, *R. sulcatus*, *M. funereus*, *L. cervus*, *B. unicornis*, *O. eremita*, *C. cinnaberinus* are listed in the Annexe I of the Resolution 6 of the Bern Convention. *C. variolosus* (VU), *R. sulcatus* (EN), *R. alpina* (VU), *M. funereus* (VU), *C. cerdo* (VU), *B. unicornis* (CR), *O. eremita* (VU), *C. cinnaberinus* (NT) are mentioned in the Red Book of Invertebrates of Romania. All the nine species are included in the Annexe 3 and 4a from the OUG 57/2007.

COPROPHAGOUS SCARABAEIDAE IDENTIFIED IN THE COW DUNG IN THE PRAHOVA VALLEY IN 2006

ȘOLESCU CRISTINA¹, POPESCU IRINEL EUGEN^{1*}

¹Faculty of Biology, Alexandru Ioan Cuza University of Iași

*Corresponding author: irinellus@yahoo.com

In the period May – September 2006 it was collected 25 cow dungs (5 per month) from the Prahova Valley (Prahova County). Every cow dung it was put in a recipient full of water and the collected Scarabaeidae (sensu lato, including Geotrupidae) were identified. It was collected 1786 specimens from 13 species: *Copris lunaris* (Linnaeus), *Geotrupes stercorarius* (Linnaeus), *Anoplotrupes (Geotrupes) stercorosus* (Hartmann), *Trypocopris (Geotrupes) vernalis* (Linnaeus), *Pentodon idiota* (Herbst), *Caccobius schreberi* (Linnaeus), *Euoniticellus (Onticellus) fulvus* (Goeze), *Onthophagus vacca* (Linnaeus), *Onthophagus ovatus* (Linnaeus), *Aphodius aestivalis* Stephens, *Aphodius fimetarius* (Linnaeus), *Aphodius rufipes* (Linnaeus), *Teuchestes (Aphodius) fossor* (Linnaeus). The most abundant species were *O. ovatus* (453 specimens), *A. fimetarius* (426), *C. lunaris* (246), *E. fulvus* (226) and *A. stercorosus* (217). 69.32% were euconstant species (*O. vacca*, *O. ovatus*, *E. fulvus*, *A. stercorosus*, *C. lunaris*, *C. schreberi*, *A. fimetarius*, *A. aestivalis*) and 30.7% accidental species (*T. vernalis*, *G. stercorarius*, *A. rufipes*, *T. fossor*). *O. ovatus* it was the most frequent species, followed by *A. fimetarius*, *C. lunaris*, *E. fulvus* and *A. stercorosus*.

ECTOPARASITOSIS RECORDED IN ANIMALS INVESTIGATED AT THE “MEDICRISVET” VETERINARY CLINIC IN FĂLTICENI IN 2023

HRISCU GEORGE RĂZVAN¹, SANDU OVIDIU VASILE², POPESCU IRINEL EUGEN^{1*}

¹Faculty of Biology, Alexandru Ioan Cuza University of Iași

²“MEDICRISVET” Veterinary Clinic Fălticeni

*Corresponding author: irinellus@yahoo.com

We investigate the prevalence and transmission dynamics of animal ectoparasitic infections recorded at “MEDICRISVET” veterinary clinic in Fălticeni (Suceava county) during 2023. Samples from the animal hosts were analyzed using light microscopy as the primary examination technique. It was investigated 120 animals (cats, dogs, hamsters), 95 being infested with 4 ectoparasitic species belonging to Arachnida: *Rhipicephalus sanguineus* (Latreille)

(Ixodida: Ixodidae) (on dogs), *Otodectes cynotis* Hering (Sarcoptiformes: Psoroptidae) (on cats), *Demodex cati* (Megnin) (Trombidiformes: Demodecidae) (on cats) and *Demodex criceti* Nutting & Rauch (Trombidiformes: Demodecidae) (on hamsters). *Rhipicephalus sanguineus* was found on 41 dogs, mainly on ears (15) and neck (13), but also on the back (6), head (3), abdomen (2) and legs (2). If we consider the sex and age, 22 dogs were males and 19 females, 19 dogs were under one year, 15 between 1-3 years and 7 between 3-12 years. In 26 cases the dogs were the common race and the others German Shepherd (4), Bucovina Shepherd (3), Central Asian Shepherd (3), Cane Corso (2), Lagotto Romagnolo (2) and German Shorthaired Pointer (1). *Otodectes cynotis* was found on the ears of 34 cats, 19 males and 15 females, 28 under one year and 6 older than one year. In 25 cases the cats were common race and the others were British Shorthair (3), Persian (3), Siamese (3) and Birman (1). *Demodex cati* was found on the skin of 12 cats, 8 males and 4 females, 9 under one year, 2 at two years and 1 on four year. In 7 cases were common race and the others were Siamese (3), Ragdoll (1) and Birman (1). *Demodex criceti* was found on the skin of 8 Syrian (Golden) hamsters (*Mesocricetus auratus* Waterhouse), 6 males and 2 females, 5 between 1-2 years and 3 between 2-3 years.

CODRII IAȘILOR - NATURAL PARK DESIGNATION: FROM CIVIL INITIATIVE TO SCIENTIFIC SUBSTANTIATION

BERZOVAN ALEXANDRU¹, BALTAG EMANUEL², DAVIDEANU ANA^{3,*}, DAVIDEANU GRIGORE³, DIAC MIHAI^{4,*}, GACHE CARMEN⁵, GAVRILUȚ INES⁶, HULUBAȘ ADINA^{7,*}, IRIMIA IRINA⁵, OLARIU ANDREI COSMIN⁸, POCORA IRINA⁹, POCORA VIOREL⁹, POLENSCHI CIPRIAN⁴, POPESCU IRINEL E.⁵, POSTOLACHE ADRIANA⁸, STOICA DAN LAURENȚIU⁸, STOLERIU CRISTIAN CONSTANTIN⁸, STRUGARIU ALEXANDRU¹⁰, ZAMFIRESCU STEFAN⁵

¹Institutul de Arheologie Iași, Romania

²Stațiunea Biologică Marină “Prof. Dr. Ioan Borcea” Agigea, Universitatea “Alexandru Ioan Cuza” din Iași, Romania

³Muzeul de Istorie Naturală*, Universitatea “Alexandru Ioan Cuza” din Iași, Romania

⁴Asociația “Codrii Iașilor – cunoaștem, prețuim, păstrăm”, Romania

⁵Facultatea de Biologie*, Universitatea “Alexandru Ioan Cuza” din Iași, Romania

⁶Asociația “Bruno Manser Fonds”, Basel, Elveția

⁷Institutul de Filologie Română „A. Philippide” al Academiei Române, Filiala Iași, Romania

⁸Facultatea de Geografie și Geologie*, Universitatea “Alexandru Ioan Cuza” din Iași, Romania

⁹Centrul pentru Cercetarea și Conservarea Liliiecilor, Romania

¹⁰Centrul de Studii Interdisciplinare, Universitatea “Alexandru Ioan Cuza” din Iași, Romania

*Corresponding author: anamuzeu@yahoo.com; mihai.diac@gmail.com

The plateau and hilly area of Moldova includes prioritised habitats of contact between continental and steppe-silvosteppe regions. It has an equally rich historical and intangible cultural heritage of recognised value. Despite these attributes, no Natural Park has yet been designated in the historical province.

The initiative of the “Codrii Iașilor” NGO and specialists in philology, biology, geography and archaeology has contributed to a substantiation study that assesses the potential and concludes on the fact that “Codrii Iașilor” is scientifically compatible with IUCN and national criteria for a Natural Park.

The proposed area of 21,191.783 hectares includes the ROSCI0135 and ROSPA0092 sites, natural reserves (Locul fosilifer Dealul Repedea, Poiana cu Schit etc.), cultural-touristic attractions (“Saint Pantelimon” wooden church, monasteries etc.) and archaeological sites (Poiana cu Cetate, Cetățuia, Palanca, Dealul Bobeica), all acting as testimony to a significant legacy. Cultural values are an integrated part of the territory: customs, crafts, superstitions, and traditional practices of managing the land lead to unique landscapes. These can further support tourism as a significant source of income for inhabitants.

Bârnova forest offers a remarkable habitat and flora diversity. Five Natura 2000 habitats (9130, 91Y0, 6520, 62C0*, 40C0*), two types of national habitats (R5310, R5301), and a rich and varied flora (909 species, 391 infraspecies), including rare plants listed in Romania's Red List, are outlined in the study. The fauna is rich in species protected by national and European agreements.

So far, 18 invertebrates of community interest, 20 of herpetofauna (18 included in OUG 57/2007), a diverse bird fauna including 126 species (80 in OUG 57/2007), and 33 mammals (31 in OUG 57/2007) were identified.

The Natural Park status can foster a unified management of the complex Bârnova Repedea area, a landscape ensemble where the interaction of human activities with nature is based on in-situ conservation of ecosystems and habitats.

EVIDENCE OF INTRAGUILD PREDATION ON *PELOBATES FUSCUS* AND CANNIBALISM IN MARSH FROGS (*PELOPHYLAX RIDIBUNDUS*) FROM DANUBE DELTA, ROMANIA

DONCEA ANTONIO¹, GHERGHEL IULIAN², ZAMFIRESCU ȘTEFAN REMUS¹, SPASENI PETRONEL¹

¹ Faculty of Biology, Al. I. Cuza” University of Iași, Iași, Romania

² Department of Exact and Natural Sciences, Institute of Interdisciplinary Research, “Alexandru Ioan Cuza” University of Iași, Iași, Romania

*Corresponding author: donceaantonio12@gmail.com

Intraguild predation, including cannibalism, where species within the same trophic level prey on each other, is a well-documented ecological phenomenon. Anurans, such as the marsh frog *Pelophylax ridibundus*, are generalist predators that typically consume invertebrates, but larger individuals may also prey on small vertebrates, with vertebrate predation positively correlated with body size. In this note, we document two cases of predation by *P. ridibundus* observed during nocturnal field surveys in the commune of Sfântu Gheorghe, Tulcea County, Romania. The first case involves predation on the common spadefoot toad *Pelobates fuscus*. The second case involves cannibalism, with a larger *P. ridibundus* preying upon a smaller conspecific. Both observations suggest that the abundance and size variation within local *P. ridibundus* populations may drive such predatory behaviors. These findings enhance our understanding of the predatory capabilities and ecological roles of *P. ridibundus*, highlighting the importance of studying amphibian interactions within shared habitats.

MIGRATION PATTERNS AND WEATHER INFLUENCES ON COMMON CHIFFCHAFF AND WILLOW WARBLER IN THE WESTERN BLACK SEA REGION

BALTAG EMANUEL-STEFAN^{1,*}, PINTILIOAIE ALEXANDRU-MIHAI¹, DUCEAC VANESA¹, JURJESCU ANA², TOPALA LAURA-ELENA², AMARGHIOALEI VLAD¹, FILOTE BEATRICE-DANIELA¹, ION CONSTANTIN³, ȘFICA LUCIAN⁴

¹Marine Biological Station „Prof. Dr. Ioan Borcea”, Agigea, „Alexandru Ioan Cuza” University of Iasi, Romania

²Faculty of Biology, University of Bucharest, Bucharest, Romania

³Faculty of Biology, Alexandru Ioan Cuza University of Iași, Iași, România

⁴Department of Geography, Faculty of Geography and Geology, Alexandru Ioan Cuza University of Iasi, Iasi, Romania

*Corresponding author: emanuel.baltag@uaic.ro

The Agigea Bird Observatory in southeastern Romania, the country's only year-round ringing station, has recorded the migration patterns of 128 bird species that either migrate through or exhibit movement within southeastern Romania. This study focuses on two warbler species, the Common Chiffchaff (*Phylloscopus collybita*) and the Willow Warbler (*Phylloscopus trochilus*), to analyze their migration dynamics and the influence of weather conditions during both spring and fall migrations in the Western Black Sea region.

In terms of subspecies, *Phylloscopus collybita collybita* dominates the migration of the Common Chiffchaff through the observatory, with less than 1% of individuals identified as *Phylloscopus collybita abietinus*. Similarly, *Phylloscopus trochilus trochilus* represents the majority of Willow Warblers, with less than 1% belonging to *Phylloscopus trochilus acredula*. These results contradict broader scientific literature, which suggests that *Phylloscopus collybita abietinus* and *Phylloscopus trochilus acredula* are the primary subspecies migrating through Eastern Europe.

To investigate the factors influencing migration, General Linear Mixed Models (GLMMs) were applied to both species, incorporating weather-related variables over three consecutive years (2019–2021). For the Common Chiffchaff, spring migration was influenced by mean temperatures in Turkey and Romania, as well as atmospheric pressure in Israel. In fall, migration patterns were affected by the North Atlantic Oscillation (NAO) and atmospheric pressure in Finland. The Willow Warbler's autumn migration was influenced by the NAO and atmospheric pressure in Israel, while both NAO and mean temperatures in Romania played a key role in autumn movements.

These findings provide valuable insights into subspecies migration dynamics and the environmental factors that shape bird migration in the region, contributing to a deeper understanding of avian movement through southeastern Romania.

UPDATED SITUATION OF THE POPULATION OF *LIGULARIA GLAUCA* (L.) O. HOFFM. FROM CALAFINDEȘTI (SUCEAVA COUNTY)

NEGRUȚI LAVINIA-ELENA^{1,*}, MÂNZU CIPRIAN-CLAUDIU¹

¹ Faculty of Biology, Alexandru Ioan Cuza University of Iași, B-dul Carol I, no. 20A, 700505 Iași, Romania

*Corresponding author: negrutilavinia@yahoo.com

Population size and some specific quantitative parameters can be significant aspects for the assessment of the conservation status of rare species. Accumulating such data allows the understanding of population dynamics in an ecological context and can lead to the formulation of effective management strategies. *Ligularia glauca* (L.) O. Hoffm. is considered a glacial relict species, rare in Romania. The main range of the species is in Asia, extended also in some European countries where populations are unevenly distributed, thus it can be considered as a Euro-Siberian species.

Considering the conservation importance of this species, the aim of the study was to update the information on the population size of *Ligularia glauca* in the protected area "Fânațele seculare de la Calafindești". In order to obtain the most accurate assessment of the population size, we carried out a detailed mapping of the groups of individuals, which allowed us to identify their distribution in the site. The method consisted in establishing sample areas of 25 m² and counting all individuals, also taking into account developmental stage aspects, i.e. differentiating between vegetative and fertile adult individuals. In fertile adult individuals, several quantitative parameters were quantified, including the length of the flowering stem and inflorescence, as well as the number of capitulum.

The results of the study allow an update of the population size of *Ligularia glauca*, with a total of 2502 individuals identified. Compared to previous surveys, a considerable decrease can be observed, with previous studies indicating a total of 4487 individuals, mainly due to anthropogenic factors.

PARASITOSIS RECORDED IN THE HUMAN POPULATION INVESTIGATED AT THE “SF. DIMITRIE” HOSPITAL IN TÂRGU NEAMȚ IN 2023

TOARCĂȘ MARCU EMANUEL¹, POPESCU IRINEL EUGEN^{1*}

¹Faculty of Biology, Alexandru Ioan Cuza University of Iași

*Corresponding author: irinellus@yahoo.com

This study investigates the prevalence and transmission dynamics of human parasitic infections recorded at “Sf. Dimitrie” Hospital in Târgu Neamț during 2023. The research focuses on common parasitic infestations, including *Giardia lamblia* and *Ascaris lumbricoides*, examining their biological life cycles, clinical manifestations, and epidemiological patterns. Samples from the hospital's parasitological lab were analyzed using copro-parasitological with direct microscopy as the primary examination technique. Results reveal a seasonal variation in infestation rates, with a higher prevalence in rural populations than in urban settings. The study showed that 6.47% of the cases examined had positive parasite diagnoses. Out of these, 4.15% were carriers of *Ascaris lumbricoides* and 2.32% were carriers of *Giardia lamblia*. The study found that a total of 3.07% of the 1205 individuals examined were infested with intestinal parasites, with the highest infestation rate observed in patients over 18 years of age. *Ascaris lumbricoides* was the most common parasite among adults, accounting for 2.16% of cases, while *Giardia lamblia* infestation was found in 0.91% of adults. Among children aged 1-3 years and 3-7 years, *Ascaris lumbricoides* and *Giardia lamblia* were the most prevalent parasites. Interestingly, no cases of *Ascaris lumbricoides* or *Giardia lamblia* were found in the 0-1 year age group, which had the fewest examinations and infestations. Gender and age group analyses indicate a significant incidence in adult women, especially in rural areas. The research further highlights the socio-environmental factors contributing to parasitic transmission, emphasizing poor hygiene and contaminated water as key drivers. Findings suggest the need for improved public health interventions, particularly in rural regions. This study also discusses treatment strategies for parasitic infections, focusing on the efficacy of antiprotozoal and anthelmintic drugs, such as metronidazole and albendazole. Future research should aim to develop more targeted prevention strategies and explore potential resistance mechanisms to existing treatments.

HISTOLOGICAL AND ANATOMICAL PECULIARITIES OF THE MEDICINAL SPECIES *PRIMULA VERIS* L.

MACOVEI PETRONELA¹, GOSTIN IRINA NETA^{1,*}

¹Faculty of Biology, Alexandru Ioan Cuza University of Iași, Romania

*Corresponding author: irinagostin@yahoo.com

In addition to their nutritional benefits, plants also serve as valuable medicine for humans. *Primula veris* L., in particular, has been recognized since ancient times for its wide range of medicinal uses. This work aims to present the main anatomical and histological characters of the vegetative organs of the species *Primula veris* L. They present at anthesis only primary

structure. The root has a tetrarch stele at the top, and towards the base an atypical structure for dicotyledonous angiosperms, with parenchyma in the central area. It presents a compact cortical parenchyma and numerous and short root hairs. The stem has the primary structure from the terminal part to the base, with vascular bundles arranged in a circle; pith and cortex present aeriferous spaces of different sizes, and numerous glandular trichomes are found on the epidermis. The lamina is bifacial heterofacial, with numerous glandular trichomes, shorter on the lower epidermis and longer on the upper one; all trichomes have a unicellular gland. Histo-anatomical features of medicinal plants are essential for accurate identification, quality control, understanding of medicinal properties, and supporting pharmacological research, all of which contribute to the safe and effective use of plant-based medicines.

DROUGHT-TOLERANT ORNAMENTAL SPECIES: BIOLOGICAL CHARACTERISTICS AND POTENTIAL ECOLOGICAL BENEFITS

STRATU ANIȘOARA^{1,*}, ZAINA MIHAELA²

¹ Faculty of Biology, Alexandru Ioan Cuza University of Iași, Iași, Romania

² Secondary School of Oțeleni, Iasi County, Romania

*Correspondent author: anisoara.stratu@uaic.ro

The purpose of this paper is to highlight the biological characteristics of some decorative species and their potential uses, based on the analysis of the data reported in the specialized literature.

Seven drought-tolerant decorative herbaceous species belonging to three botanical families (Asteraceae, Lamiaceae, Portulacaceae) were studied.

Most of the species studied are native to South America. For ornamental purposes, they are often grown in urban green spaces (parks, public gardens, private gardens), in private gardens in the countryside as well as in pots (*Portulaca grandiflora*, *Gazania splendens*).

They have variously colored flowers, a long flowering period (from summer to late autumn) and attract a wide range of pollinating insects (bees, butterflies, bumblebees, etc.) contributing to the support of biodiversity.

Research carried out in recent years has shown the possibility of using some species in the phytoremediation of degraded lands as well as in the biological control of pests.

ANALYSIS OF THE POPULATION CHARACTERISTICS OF *ALDROVANDA VESICULOSA* IN THE DANUBE DELTA, ROMANIA

CHIRILĂ SIMONA DUMITRIȚA^{1,*}, DOROFTEI MIHAI¹, BĂNESCU ALEXANDRU¹, LIVANOV OLIVER¹, VELEV NIKOLAY²

¹ Danube Delta National Institute for Research and Development, Tulcea, Romania

² Department of Plant and Fungal Diversity and Resources, Institute of Biodiversity and Ecosystem Research, Bulgarian Academy of Sciences, Sofia, Bulgaria

*Correspondent author: simonachirilasc@yahoo.com

Aldrovanda vesiculosa L. is a critically endangered plant in Romania, threatened by water eutrophication and its decreasing level. In this context, the study aimed to identify the environmental factors that influence the characteristics of *A. vesiculosa* populations. The study was carried out in June 2024, in Perișor (Tulcea County), in 66 polders.

The study was carried out in August 2024, in Perișor (Tulcea County). For the phytocoenological analysis, 66 relevés were carried out. A ProDSS Multiparameter Digital Water Quality Meter was used for the physical-chemical analysis of water.

For the hydrological analysis of the main channel, the GPS Global Navigation Satellite System (GNSS) SPECTRA PRECISION SP80 and the SonTek Acoustic Doppler Current Profiler (ADCP) RiverSurveyor M9 (manufactured by SonTek, San Diego, USA), equipped with 3×3 transducers, each oriented differently, were used.

The results showed that *A. vesiculosa* grows in the associations *Typhetum angustifoliae*, *Spirodelo-Aldrovandetum*, *Caricetum ripariae*, *Schoenoplectetum lacustris*, *Nymphaeetum albae*, and *Scirpo-Phragmitetum*. Regarding the characteristics of the species, the results showed that the number of individuals analyzed varied from 5.000 to 200.000, and the length of the plant (cm) varied from 5 to 20 cm. The density of individuals varied from 3 to 320 per m². The physical-chemical analysis of the water showed that *A. vesiculosa* preferred waters with moderate temperatures, from 22 °C to 27 °C, a more alkaline pH, from 8.5 to 10.5, low concentrations of ammonium and nitrate and depths of up to 0.23 m. The EUNIS habitats where the species occurs are Q51 Tall-helophyte bed, Q53 Tall-sedge bed, and N1H Atlantic and Baltic moist and wet dune slack. The average depth on the Perișor is 1.20 m in the autumn season, with an average water speed of 0.12 m/s and an average flow rate of 1.76 mc/s.

As pressure and nitrate concentration increase, a rise in the number of individuals of *A. vesiculosa* per m² is observed. Areas with moderate depth, high water transparency, and balanced chemical parameters support richer vegetation. Extreme conditions in any of these factors could limit vegetation growth and reduce the number of individuals of *A. vesiculosa* per m².

ECOLOGY AND DISTRIBUTION OF TWO RARE SPECIES OF THE GENUS IRIS IN ROMANIA: *I. SINTENISII* AND *I. BRANDZAE*

CHIRILĂ SIMONA DUMITRIȚA^{1,*}, MÂNZU CIPRIAN CLAUDIU², BĂDĂRĂU ALEXANDRU SABIN³, SÎRBU CULIȚĂ⁴, DOROFTEI MIHAI¹, CHIRILĂ ANA MARIANA⁵, CHIOSA ANA MARIA²

¹ Danube Delta National Institute for Research and Development, Tulcea, Romania

² Faculty of Biology, Alexandru Ioan Cuza University of Iași, Iași, Romania

³ Faculty of Environmental Sciences and Engineering, Babeș-Bolyai University, Cluj-Napoca, Romania

⁴ Faculty of Agriculture, Iasi University of Life Sciences, Iași, Romania

⁵ Independent researcher, Iași, Romania

*Correspondent author: simonachirilasc@yahoo.com

Iris brandzae and *I. sintenisii* are threatened plant species in Romania, which have not been sufficiently studied in terms of their distribution and ecological needs until now. Populations of these species are declining, primarily due to the impact of human activities and climate variations. There is a general lack of studies focusing on rare species distribution and ecological conditions. In this context, the present study aims to examine the ecological conditions and update the distribution of these species in Romania. Data on topographical, bioclimatic, anthropogenic and chemical soil factors were collected for each analysed population. The hierarchical agglomerative clustering method was applied for vegetation classification, using the β -flexible algorithm with $\beta = -0.25$ and the Bray-Curtis dissimilarity.

The study revealed that *I. brandzae* was identified in 19 localities from Botoșani, Buzău, Iași, and Vaslui counties, while *I. sintenisii* was recorded in five localities from Tulcea and Constanța counties. *I. brandzae* occurs most frequently in the association *Taraxaco serotinae-Festucetum valesiacae*, and *I. sintenisii* occurs in the association *Paeonia peregrinae-Quercetum pubescentis*. The density of individuals of *I. sintenisii* varies from 5 to 40

individuals per 100 m², and the density of individuals of *I. brandzae* varies from 5 to 25 individuals per 100 m². The habitat of these species falls within various EUNIS habitat types, such as deciduous forests (T1), semi-desert areas with saline soils (R64), dry continental grasslands (R1B) and moist or mesotrophic to eutrophic grasslands (R36). The CCA analysis showed that the variation of the floristic composition of the phytocoenoses of *I. brandzae* and *I. sintensii* are influenced by BIO1 (the Annual Mean Temperature), respectively elevation. The causes of species decline are overgrazing and collecting plants. The study's conclusions underline the urgent need for specific conservation measures to protect these species.

DIACHRONIC APPROACH OF DENTAL MACROWEAR VARIATION IN ARCHAEOLOGICAL HUMAN POPULATIONS FROM NORTH-EASTERN ROMANIA - A PRELIMINARY STUDY

**CIORPAC-PETRARU OZANA-MARIA^{1,*}, POPOVICI MARIANA², GROZA VASILICA-MONICA²,
BEJENARU LUMINIȚA^{1,2}**

¹Faculty of Biology, "Alexandru Ioan Cuza" University of Iași, Iași, Romania

²"Olga Necrasov" Center of Anthropological Research, Romanian Academy, Iași Branch, Iași, Romania

*Corresponding author: ozana.ciorpac@uaic.ro

Dental macrowear is the non-pathological loss of hard tissues, usually on the occlusal surface of the teeth. In archaeological contexts, the dental macrowear patterns can offer valuable insights especially for bioarchaeologists to correlate diet abrasiveness, food storage and processing techniques with the worn surfaces of the teeth. The aim of this study concerns to the diachronic comparative assessment of the dental wear of archaeological human mandibular second molars (M2) from Prehistory (5000–1200/1150 BCE) and Late Middle Ages (17th century CE) discovered in North-Eastern Romania. The degree of occlusal macrowear was assessed by the semiquantitative scoring system (Scott's method for recording occlusal molar wear), quantitative assessment on dentine exposure (image analysis) followed by statistical analysis. The scoring system showed that two grades of wear were identified in the analysed dental samples (i.e., moderately advanced wear and advanced wear). As assumed, the scoring system showed that a higher percentage of the analyzed mandibular molars are characterized by advanced wear, especially in the samples from Prehistory. When the sex criterium was considered, the male molars were more worn-out compared to female ones. All female molars from the 17th century CE were characterized by a moderate wear while only 63.6% of the female molars from Prehistory belong to the same wear category. The percentage of dentine exposure (PDE%) showed increasing values along the age-ranges. No statistical difference was obtained when the PDE was compared diachronically by sex within the same age at death category. Though dental wear is an age-dependent process, there are other factors that can affect the loss of dental tissue, especially in archaeological populations, including diet, food access and processing techniques, and ingestion of grit through food. More dental samples will be integrated in an overall study regarding the diet-related dental wear in the past human populations from North-Eastern Romania.

PRELIMINARY ANALYSIS OF HUMAN REMAINS DISCOVERED IN THE 15TH- 19TH CENTURY NECROPOLIS OF SF. ATANASIE CHURCH IN NICULIȚEL (TULCEA COUNTY, ROMANIA)

**DONCIU PAUL-IULIAN^{1,*}, GROZA VASILICA-MONICA², STĂNICĂ AUREL-DANIEL³, BEJENARU
LUMINIȚA^{1,2}**

¹Faculty of Biology, “Alexandru Ioan Cuza” University of Iași, Iași, Romania

²“Olga Necrasov” Center of Anthropological Research, Romanian Academy, Iași Branch, Iași, Romania

“Gavrilă Simion” Eco-Museum Research Institute, Tulcea, Romania

* Corresponding author: donciu_p@yahoo.com

This preliminary research focuses on the human remains recovered during archaeological excavations carried out in the necropolis of 15th-19th centuries, near the “Sf. Atanasie” Church from Niculițel (Tulcea County, Romania). The church was built at the beginning of the 14th century by a local ruler with the purpose of a familiar necropolis. Subsequently, the church underwent renovations during the 15th, 17th and 18th centuries serving a small rural community. Preventive archaeological research from 2022-2023 documented 348 burial tombs/funeral complexes covering the chronological interval of 15th-19th centuries. More than 500 human skeletons belonging to all age categories were discovered. The archaeological inventory includes various metal objects, jewellery, and clothing accessories. This anthropological study targets a rural Christian community from the Dobrogea region under Ottoman occupation.

To date, the human remains of 117 individuals have been studied, and they are presented in terms of age at death and sex estimations, osteometry, taphonomy, and pathologies. Of the total estimated individuals, 74 are adults and 43 children (*infans* I, and *infans* II). In adult category, 19 individuals have been identified as males, 11 females, and 44 as indeterminable. Skeletal material generally shows a poor degree of preservation. However, various taphonomic traces were evaluated, such as those left by rodents' teeth, metal oxidation, and soil action. Bone pathologies are numerous in adult individuals, among which are deficiencies, inflammation, infections, fractures, etc. At the dentition level, they were found multiple caries, calculus, enamel hypoplasia (linear transversal type), microdontia, absence of teeth (partial and total edentation).

The research on this large skeletal sample will be continued, and the results will contribute to the knowledge of local and regional history with information such as the demographic structure, health status, daily occupations of the inhabitants.

PRELIMINARY STUDY OF THE FAUNAL REMAINS RECOVERED FROM THE ARCHAEOLOGICAL SITE OF HELLENISTIC MEDGIDIA 3 (CONSTANȚA COUNTY, ROMANIA)

CREȚU ELIZA-IOANA^{1,*}, STANC MARGARETA-SIMINA¹, COLȚEANU PETRE², CROITORU CRISTIAN¹, BEJENARU LUMINIȚA¹

¹Faculty of Biology, “Alexandru Ioan Cuza” University of Iași, Iași, Romania

²Museum of National History and Archaeology Constanța, Constanța, Romania

*Corresponding author: eliza.cretu@uaic.ro

The site Hellenistic Medgidia 3 was discovered in the fall of 2022, following an intrusive archaeological diagnosis generated by the Romcim company's investment and development plans. The land on which the investment was proposed is located on the SW side of the Medgidia quarry, in the outskirts of Poarta Alba commune, on the border between Poarta Alba UAT and Medgidia municipality. It is part of a complex of settlements, Hellenistic Medgidia 1-3, chronologically dated to the beginning of the second Iron Age (beginning of the 4th century – first half of the 3rd century BC), in Dobrogea known as the Hellenistic period. The determined area of the site has approximately 8 ha, of which 1 hectare has been surveyed. As a result of the research, 126 archaeological features were identified and documented. Until this stage of data processing, 2 sunken dwellings have been identified, 6 fire installations (furnaces) of which 2

are clearly related to a ceramic kiln, supply pits, household pits, a burial grave (inhumation), pillar pits and contemporary pits (irrigation ditches). The artefacts are those typical of a settlement – pottery, predominantly amphoric material, wall fragments, stone tools, metal pieces, and animal bones. The area that was subjected to research is on the western edge of the site.

The archaeozoological study started with the sample collected from the complex 29 representing a household pit, and it was carried out within the Archaeozoology Laboratory (Faculty of Biology, "Alexandru Ioan Cuza" University of Iași). The methods mainly consisted of anatomic and taxonomic identifications, age and sex estimations. A taphonomic evaluation was also carried out by detecting the traces of human activity (e.g., butchering, burning, processing), and the action of some carnivores. The quantification was based on the number of remains assigned to each taxon, and the estimation of the minimum number of individuals. The faunal assemblage includes remains of household origin, consisting of bone fragments, cornular processes, teeth. Burn marks were observed on three bones, and traces of butchering cuts were noted on six bones; one bone fragment showed traces left by the teeth of a carnivore, probably a dog from the settlement. Due to the high fragmentation of the bones and the fact that some are from immature individuals, few measurements were possible. The analysed sample has 85 remains from mammals, most of them domestic species, and few wild ones. The identified species are *Bos taurus* (cattle), *Ovis aries/Capra hircus* (sheep/goat), *Equus caballus* (horse), *Canis familiaris* (dog) and *Lepus europaeus* (hare). The 55 remains of cattle were attributed to one mature individual (over 2.5 years), and two immatures (one slaughtered at 12-18 months, and another at 18-24 months). The sheep/goat remains (20) come from two mature individuals (2-3 years old), one of which is a horned female. The five horse bone fragments were attributed to a mature individual, and it is assumed that the meat of this species was consumed. For dog, a mature individual was estimated, as well as for the only one wild species – the hare.

CATTLE (*BOS TAURUS*) IN THE OLD IASI CITY (EAST ROMANIA) OVER HALF A MILLENNIUM (15TH-20TH CENTURIES), VIEWED FROM THE FAUNAL REMAINS DISCOVERED IN ARCHAEOLOGICAL SITES

STANC MARGARETA SIMINA^{1,*}, BEJENARU LUMINIȚA¹

¹Faculty of Biology, Alexandru Ioan Cuza University of Iasi, Romania

*Corresponding author: simina.stanc@uaic.ro

The archaeological research in the site Old Town Center-Princely Court in Iasi – Point “Ghica-Daniel House / St. Petersburg Hotel”, provided a large amount of faunal remains belonging to three chronological levels: 15th-16th centuries, 17th-18th centuries, and 19th-20th centuries. Thus, three archaeozoological samples were constituted for the study. Archaeozoological analysis consisted of anatomical and taxonomic identifications, quantification as number of identified remains (NISP), estimations of age and sex, and osteometry. The analyse of metric data on metapodials and horn cores aimed to evaluate the dimensional dynamic in cattle during the time. Based on the metapodial measurements, the sex and the withers height were estimated. In all three chronological levels, the remains of mammals predominate, and within this category, cattle (*Bos taurus*) is the species with the largest frequency. The cattle female individuals are predominant compared to the castrated ones, in all three samples. Male individuals were estimated only in the sample of the 17th-18th centuries, and their number is smaller than of females.

For all three samples, the clustering of metric data on horn cores diagrams illustrates the predominance of "brachycerous" type, belonging to females. An increase in sizes of the horn

cores is observed: the average value for the base circumference of the horn cores is 125.2 mm in the 15th-16th centuries, respectively 151.8 mm in the 17th-18th centuries, and reaches 165.5 mm in the 19th-20th centuries.

It is also to remark an increase of the maximum value of the wither's height in cattle. For the 15th-16th centuries the maximum value in castrate individuals was 120.5 cm, for the following period the maximum limit was 128 cm, and for the 19th-20th centuries it reaches 136.8 cm. The maximum value of this parameter in females is 120.3 cm for the 15th-16th centuries, 121.4 cm for the 17th -18th centuries, and 125.7 cm for the 19th-20th centuries.

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FAUNAL REMAINS OF 17th-20th CENTURIES DISCOVERED IN THE ARCHAEOLOGICAL SITE ON THE ESPLANADE OF "VASILE ALECSANDRI" NATIONAL THEATER, IN IAȘI CITY (EASTERN ROMANIA)

IFRIM MARCELA^{1,*}, ASĂVOAIE COSTICĂ², MIRON ADRIANA², NIȚĂ COSMIN², BEJENARU LUMINIȚA¹

¹Faculty of Biology, "Alexandru Ioan Cuza" University of Iași, Iași, Romania
History Museum of Moldova, National Museum Complex Moldova Iași, Iași, Romania

* Corresponding author: ifrimmarcela21@yahoo.com

This paper presents an anatomical-comparative study of faunal remains found on the Esplanade of the National Theater "Vasile Alecsandri" in Iași, dating from the 17th to the 20th centuries. The archaeological research conducted in 2022 recovered a variety of artifacts as well as animal skeletal remains. To date, the archaeozoological analysis has focused on a sample of 411 faunal remains, categorized into two animal classes: mammals (403 remains) and birds (8 remains). The analysis reveals a predominance of domestic mammals, with cattle (*Bos taurus*) being the most common, followed by pig (*Sus domesticus*), sheep/goat (*Ovis aries/Capra hircus*), horse (*Equus caballus*), and dog (*Canis familiaris*). The bird remains mainly consist of turkey (*Meleagris gallopavo*) and chicken (*Gallus domesticus*).

EXPERIMENTAL AND MOLECULAR BIOLOGY

EFFECTS OF 6-HYDROXY-L-NICOTINE ON MEMORY FORMATION IN 5XFAD ALZHEIMER'S MOUSE

HRITCU LUCIAN^{1,*}, BOIANGIU RAZVAN STEFAN¹, HONCERIU IASMINA¹, BRINZA ION¹, MIHASAN MARIUS¹

¹Facultatea de Biologie, Universitatea Alexandru Ioan Cuza din Iași, Iași, România

*Corresponding author: hritcu@uaic.ro

6-hydroxy-L-nicotine (6HLN) is a nicotinic derivative from the nicotine metabolism within *Paenarthrobacter nicotinovorans* that possess cognitive-improving abilities and antioxidant properties, eluding the side-effects of nicotine, the parent molecule. The present study examined the effects of 6HLN on cognitive impairments in 5XFAD transgenic mice with five familial Alzheimer's disease (AD) mutations. 6HLN (0.3 mg/kg and 0.6 mg/kg, b.w., i.p.) was administered daily to 5XFAD mice for 7 days and 30 min before behavioral testing. Cognitive

function was evaluated using Y-maze and radial arm maze tests, while anxiety-depressive-like behaviors were assessed by elevated plus maze and forced swimming tests. To elucidate the possible mechanism underlying the memory improving effects of 6HLN in 5XFAD mice, A β 1-42 and DNA fragmentation levels in mice hippocampus were evaluated. Vehicle-treated 5XFAD mice exhibited hippocampus-dependent memory deficits as compared with non-transgenic mice, which were reversed in 6HLN-treated 5XFAD mice. In addition, reduced hippocampal A β 1-42 and DNA fragmentation levels in 6HLN-treated 5XFAD mice compared to non-transgenic mice were noticed, indicating the positive effects of 6HLN on cognitive function. Collectively, findings from this study support the positive impact of 6HLN against AD.

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PROMNESIC, ANXIOLYTIC, AND ANTIOXIDANT EFFECTS OF THREE NATURAL BIOACTIVE COMPOUNDS IN THE OKADAIC ACID-INDUCED ZEBRAFISH MODEL OF ALZHEIMER'S DISEASE

HONCERIU IASMINA^{1,*}, HRITCU LUCIAN¹

¹Department of Biology, "Alexandru Ioan Cuza" University of Iasi, Iasi, Romania

*Corresponding author: iasmina.honceriu@student.uaic.ro

Alzheimer's disease (AD) is the most common type of dementia, characterized by memory impairments, elevated oxidative stress levels in the brain, and anxiety. As the global population continues to age, AD is emerging as a growing public health issue, highlighting the urgent need for innovative treatments. Mansorin A (MA), mansorone G (MG), and 6-paradol (PD) are three plant-derived phenolic ketones with good oral bioavailability, drug-like properties, and the ability to cross the blood-brain barrier. Their potential in treating AD was investigated using a novel okadaic acid (OKA)-induced zebrafish model of AD. The animal model was created by immersing the animals in OKA (10 nM) for four days, after which MA, MG, and PD were chronically administered via immersion at concentrations of 1, 3, and 6 μ g/L. To assess short-term memory in the experimental groups, the Y-maze and Novel Object Recognition tasks were employed, while anxiety-like behavior was examined through the Novel Tank and Novel Object Approach tests. Subsequently, a series of biochemical analyses were conducted to assess the activity of antioxidant markers such as catalase, superoxide dismutase, reduced glutathione, malondialdehyde, carbonylated proteins, and glutathione peroxidase. The results demonstrate the promnesic, anxiolytic, and antioxidant effects of MA, MG, and PD in the animal model, particularly at concentrations of 3 and 6 μ g/L. In conclusion, this study highlights three promising treatments for AD while providing new insights into the OKA-induced zebrafish model of AD.

THE USE OF HEMP SEEDS IN THE DIET OF CARP (*CYPRINUS CARPIO*) IMPROVES GROWTH AND OXIDATIVE STATUS

BURDUCEA MARIAN^{1,*}, DÎRVARIU LENUȚA¹, ȘERBAN DANA ANDREEA¹, DUMITRU GABRIELA², RIMBU CRISTINA MIHAELA³, HORHOGEA CRISTINA ELENA³, TODIRAȘCU-CIORNEA ELENA², BARBACARIU CRISTIAN-ALIN¹

¹ Station of Research and Development for Aquaculture and Aquatic Ecology, "Alexandru Ioan Cuza" University of Iași, Iași, România

² Faculty of Biology, "Alexandru Ioan Cuza" University of Iași, Iași, România

³ Faculty of Veterinary Medicine, “Ion Ionescu de la Brad”, University of Life Sciences in Iași, Iași, România

* Corresponding author: marian.burducea@yahoo.com

Aquaculture is one of the most important branches of agriculture, contributing significantly to global food security. Improving feed is essential for increasing production efficiency and maintaining fish health. The aim of this study was to evaluate the effect of hemp seeds on the growth and oxidative status of carp. Four diets with varying hemp seed content (V1, V2, V3, and V4) were tested on one summer carp in a recirculating aquaculture system, analyzing growth parameters, gut microbiota, oxidative status and biochemical composition of meat. The duration of the study was seven weeks. The results showed that hemp diets caused an increase in weight gain, profile index and relative growth rate, while the feed conversion factor and protein utilization efficiency were reduced compared to the control diet. In addition, hemp diets reduced the number of intestinal microorganisms and improved the physiological status of the fish. Biochemical analysis of the meat did not reveal significant changes between the control and hemp diets. The use of hemp seeds in the diet of carp may represent an effective strategy to improve growth performance and health status, without affecting the biochemical composition of the meat.

PRELIMINARY STUDY AND MOLECULAR CONFIRMATION OF *MACROBRACHIUM NIPPONENSE* IN THE DANUBE DELTA

**CIMPEANU ANA-MARIA^{1,*}, SURUGIU VICTOR¹, NASTASE AUREL², PARASCHIV MARIAN²,
HONT ȘTEFAN², IANI MARIAN², GORGAN DRAGOȘ-LUCIAN¹**

¹Alexandru Ioan Cuza University of Iasi, Faculty of Biology, Romania

²Danube Delta National Institute for Research and Development Tulcea, Romania

*Corresponding author: anna.cimpeanu@yahoo.ro

The present study investigates the origin of the invasive freshwater shrimp, *Macrobrachium nipponense*, in the Romanian Danube Delta. Unlike other regions where this species has been documented, its accidental introduction to Romania is likely due to its presence in neighboring countries.

Macromorphological analysis, based on the significantly larger second pair of pereopods in adult males, has confirmed the species' classification within the *Macrobrachium* genus. To determine the exact origin of this invasive shrimp, a combination of morphological comparison and DNA sequencing will be employed.

For this study, 18 individuals were collected from the southern region of the Danube Delta and preserved in absolute ethanol. Phylogenetic analysis of these samples suggests that the genetic diversity observed in the lower Danube basin may have originated from Henan Province, China. This diversification process is likely attributable to favorable environmental conditions in recent years, as evidenced by the similarity between the genetic variants found in these two regions.

IN VITRO GERMINATION OF *ANGRAECUM CALCEOLUS*: A STUDY ON CULTURE MEDIA EFFICIENCY

JARDA LILIANA^{1,*}, MOCAN CRINA¹, ROȘCA-CASIAN OANA¹, PUI DOINA ANGELA¹

¹Alexandru Borza Botanic Garden, Babes-Bolyai University, Cluj-Napoca, Romania

*Corresponding author: liliana.jarda@ubbcluj.ro

Angraecum calceolus Thours is a small orchid species with a limited geographical distribution in Madagascar, Mozambique and the Comoros, Mascarene, and Seychelles Islands. It is found in forests located at altitudes between 100 and 1400 meters, in areas with moderate rainfall. It can be lithophyte or epiphyte, having a fast growth. In vitro germination of orchid seeds is a complex process, due to the existing symbioses in these plants. There is an advantage of obtaining a large number of individuals in a short time, by using the in vitro culture of this species, compared to the vegetative propagation, which requires several years.

The seeds used in the study were obtained in 2024 from the exchange of plant material that “A. Borza” Botanic Garden is having with the Bratislava Botanic Garden. The main purpose of the study was to test the in vitro germination of *Angraecum calceolus* seeds on eight variants of culture medium, such as: MS with vitamins (V1), MS basal salt (V2), ½ MS with vitamins (V3), and ½ MS basal salt (V4). In some cases, 1 g/l activated charcoal was added. The seeds were sterilized inside the capsule, afterwards being opened in sterile distilled water, and the resulting solution inoculated on the culture medium.

The seed sterilization efficiency was 57.82% and the germination efficiency was 24.32%. The first signs of germination were observed on V1 and V3 media, after 30 days, and no germination on activated carbon media. The highest germination percentage was 44.44% on V1 medium, followed by 33.33% on V3 and 11.11% on V2 and V4. After germination, the plants were transferred to multiplication media, and after 60 days, those with more than three leaves were acclimated in vitrovent boxes, in order to be transferred to the greenhouse for final acclimation.

ADAPTATION OF *MEDICAGO SATIVA* TO HEAT STRESS: MORPHO-ANATOMICAL, BIOCHEMICAL AND GENETIC RESPONSES DURING SYMBIOTIC NITROGEN FIXATION

BOZ IRINA^{1,2}, STEDEL CATALINA¹, ZOANOS EMMANOUIL³, KALLONIATI CHRYSANTHI³, FLEMETAKIS EMMANOUIL³, EFROSE RODICA CATALINA^{1,3,*}

¹ Department of Experimental and Applied Biology, Institute of Biological Research Iasi subsidiary. National Institute of Research and Development for Biological Sciences, Bucharest, Romania

² Faculty of Medicine and Biological Sciences, Ștefan cel Mare University, Suceava, Romania

³ Laboratory of Molecular Biology, Department of Biotechnology, Agricultural University of Athens, Athens, Greece

* Corresponding author: rodica.efrose@icbiasi.ro

Symbiotic nitrogen fixation (SNF) is crucial for sustainable agriculture due to its role in enhancing plant growth and nutrition. Leguminous plants, which are key contributors to agricultural productivity, often face challenges from abiotic stresses. Thermal stress disrupts metabolic processes and impairs the ability of rhizobium to fix nitrogen symbiotically, thereby limiting plant growth and development in many regions. This study aims to evaluate the response of alfalfa (*Medicago sativa* L.) to temperature stress during symbiotic nitrogen fixation. Experiments were conducted on temperature-resistant alfalfa plants, either uninoculated or inoculated with indigenous *Ensifer meliloti* strains, and subjected to thermal stress for 14 days. The selected RMCC strains, known for their high nitrogen fixation capacity, exhibit diverse phenotypic traits. Control and stressed plants were collected once phenotypic changes became evident, and their morphological traits were assessed. In addition to growth analyses, various morpho-anatomical and biochemical parameters were measured to evaluate the plant's response to enhanced temperatures. The observed morpho-anatomical changes were closely related to seedling height, the appearance of the first pair of true leaves, the thickness of the bark, and the central cylinder at the hypocotyl level, as well as alterations in leaf morphology. Notably, leaf thickness increased with rising temperature. Our data indicated that

moderate heat stress (35 °C) also led to increased antioxidant enzyme activity in alfalfa. Furthermore, RT-qPCR transcriptomic analysis was conducted to examine heat-induced changes in gene expression related to oxidative stress pathways (CAT, Cu/Zn SOD) and nitrogen assimilation (GS, GOGAT, AAT). This combined analysis offers new insights into the mechanisms by which nitrogen-fixing legume crops adapt to and tolerate thermal stress, with significant implications for leguminous plant cultivation under adverse environmental conditions.

OF MICROBIAL TRANSGLUTAMINASE PRODUCED BY *STREPTOMYCES MOBARAENSIS* ATCC 27441 USING ION EXCHANGE RESINS

STRUNGARIU IOAN^{1,*}, DUMITRAȘCU MIRELA², NECHITA ELENA², ȘTEFAN MARIUS¹

¹ Faculty of Biology, “Alexandru Ioan Cuza” University of Iași, Iași, Romania

² SC MIB-TH SRL of Iași, Iași, Romania

* Corresponding author: ionut.strungariu@yahoo.com

Microbial transglutaminase (mTG) can catalyze covalent bonds between proteins, a property that is used in the food industry to restructure meat, improve the texture of dairy products, and extend the shelf life of foods. mTG was obtained using the *Streptomyces mobaraensis* ATCC 27441 strain and purified using various ion exchange resins, such as: Amberlite CG-50, Resindion SP 825L, Relisorb and Flactogel EMD SO₃⁻. The enzymatic activity was monitored using a spectrophotometric method. The results obtained show that the use of the Flactogel EMD SO₃⁻ resin led to the highest yield in the purification process (84.23%), recovering an enzymatic activity of 1613.83 U. Using Relisorb, a total enzymatic activity of 882.07 U and a yield of 46.04% was evidenced, and in the case of Amberlite CG-50 a total activity of 869.558 U was achieved, with a final yield of 45.38%. The lowest final yield was recorded for Resindion SP 825L resin – 5.08%, with an enzymatic activity of 97.420 U. The results indicate that Flactogel EMD SO₃⁻ is the most efficient resin for mTG purification, providing a robust approach for obtaining a high-purity enzyme suitable for industrial applications.

ALZHEIMER (AD): A MULTIFACTORIAL NEURODEGENERATIVE DISEASE

SARAGEA PAULA DENISA^{1,*}, TUDOSE CRISTIAN¹

¹ Faculty of Biology, University „Alexandru Ioan Cuza” of Iași, Iași, Romania

*Corresponding author: paula_denisa_2000@yahoo.com

Situated within the broad spectrum of neurodegenerative disorders, AD is known for its complexity, heterogeneity, multiple genetic mutations, epigenetic and biochemical modifications, and irreversible evolution from early stages characterized by deficits in the ability to encode and store new information to subsequent progressive cognitive, functional, behavioral decline.

The aim of the conducted study was to compile conclusive statistics, identify genetic factors and correlate them with environmental ones, thus highlighting the importance of developing evaluation programs and early introduction of medication, in order to decelerate the progression of neurodegenerative processes.

The retrospective study encompassed individuals admitted to the Neurology Department of “Jacob Cziha” Military Emergency Hospital Iași between 01.01.2022 and 31.12.2023. Out of

2277 patients hospitalized with chronic neurological diseases, 219 were diagnosed with AD in various stages. Forty-three cases exhibiting genetic predisposition (19.6347%) were selected and thoroughly analyzed based on medical records.

The study emphasizes the significant position of AD among chronic neurological diseases. Although the majority do not present hereditary antecedents (80.3652%), predisposing diseases (T2D, hypercholesterolemia, hypertension, TBI, obesity), environmental factors (alcohol, pesticides, smoking, aluminium, organic solvents), stress, as well as the region of residence, play fundamental roles in the determinism. It is observed that individuals in the 60-70 age category (71.2328%) from urban areas (63.0136%), especially females (63.4703%), have a higher probability of developing AD. Maternally transmitted Alzheimer's prevalence was 58.1395%, while paternally inherited AD accounted for 32.5581%, with only 4 cases having antecedents on both lines (9.3023%).

Unequivocally characterized by a vast etiology, cerebral atrophy, neurotrophin depletion, mitochondrial dysfunction, accumulation of senile plaques and neurofibrillary tangles following dominant autosomal mutations (APP, PSEN1/2) or the appearance of allelic variants (APOE4, SORT1, MAPT, APOJ), AD is a multifactorial disorder resulting from the bilateral interaction between genetic and environmental factors or solely one of them. However, the transition from vulnerability to the actual disease is achieved through the continuous corroboration of these two major classes of factors.

IN SILICO COMPARATIVE ANALYSIS OF PHYTOCHEMICALS FROM *RUBUS FRUTICOSUS* WITH RELEVANCE FOR NEURODEGENERATIVE DISEASE

SARAGEA PAULA DENISA^{1,*}, HRIȚCU LUCIAN¹

¹ Faculty of Biology, “Alexandru Ioan Cuza” University of Iasi, Iasi, Romania

*Corresponding author: paula_denisa_2000@yahoo.com

This study focuses on an in silico comparative and descriptive analysis of the phytochemical compounds in *Rubus fruticosus* (blackberry) using the computational tool SwissADME, with an emphasis on their potential applicability to neurodegenerative diseases such as Alzheimer's disease (AD). SwissADME enables the prediction of comprehensive pharmacokinetic profiles, including gastrointestinal absorption (HIA), blood-brain barrier (BBB) permeability via the BOILED-Egg model, and drug likeness. Moreover, this study evaluates the probability of these compounds being actively effluxed by P-gp (PGP+), which is crucial for assessing their bioavailability and potential therapeutic effectiveness in the central nervous system. The interaction of phytochemicals with P-gp can significantly influence their ability to penetrate the BBB, with higher efflux probabilities indicating reduced central nervous system accessibility. Additionally, similarities and differences between these compounds are highlighted to assess their therapeutic potential.

Using SwissTargetPrediction and SwissDock, the study further evaluates the interaction of these phytochemicals with crucial enzymes and molecular targets involved in neurodegeneration, such as: β -secretase and acetylcholinesterase (implicated in amyloid plaque formation and cholinergic signaling), kinases like GSK3 β , CDK5, and ERK2 (involved in tau protein hyperphosphorylation and neurodegeneration), β -amyloid protein and microtubule-associated protein tau (amyloid plaques and NFTs - critical in AD pathology).

Key bioactive compounds from *Rubus fruticosus* – noted for their antioxidant, anti-inflammatory, and neuroprotective effects, are compared against established AD treatments, including galantamine and rivastigmine.

This comparative analysis underscores the potential of *Rubus fruticosus* phytochemicals as viable candidates for developing treatments for neurodegenerative diseases, with the potential to enhance cognitive function and delay or slow disease progression in conditions like AD. By integrating computational methods, this research seeks to facilitate the discovery and development of new drug from natural sources, like *Rubus fruticosus*, while emphasizing the necessity of experimental validation to confirm the bioinformatic predictions.

ANTIBIOFILM ACTIVITY OF BrCl-FLAV AGAINST *ACINETOBACTER PITTII*

MOLDOVAN CRISTINA-VERONICA^{1,*}, OLARU ȘTEFAN-MIHĂIȚĂ¹, BIRSA LUCIAN-MIHAIL², ȘTEFAN MARIUS¹

¹Faculty of Biology, Alexandru Ioan Cuza University of Iași, Iași, Romania

²Faculty of Chemistry, Alexandru Ioan Cuza University of Iași, Iași, Romania

*Corresponding author: mcristina.veronica@gmail.com

Bacterial biofilms are specific structures that make sessile cells up to 1000 times more resistant to antibiotics than planktonic cells, playing a particularly important role in antibiotic resistance. The formation of biofilms involves several steps, including the irreversible attachment of microbial cells to a particular substrate, growth and micro-colonies formation and detachment of cells from the biofilm. Once established, mature biofilms are difficult to eradicate. Therefore, the identification of antimicrobial compounds that prevent either the adhesion and formation of bacterial biofilms or their maturation is a priority in the scientific community.

In this context, the aim of the present study was to evaluate the activity of synthetic flavonoid BrCl-flav on the formation of biofilm by resistant *Acinetobacter pittii* strain. Cristal violet staining was used to assess adhesion, formation, and biofilm maturation in the presence of different concentrations of BrCl-flav. The effect of synthetic flavonoid on biofilm inhibition was also evaluated using scanning electron microscopy. Tetrazolium salt (MTT) was used to evaluate the metabolic activity of *A. pittii* cells withing the treated biofilm.

Our data have shown that BrCl-flav inhibited adhesion and biofilm formation at sub-inhibitory concentrations up to 80% compared to control. Moreover, the metabolic activity of bacterial cells was reduced by 95%. The mature biofilm produced by *A. pittii* was also eradicated by BrCl-flav. The results suggest that synthetic compound BrCl-flav has a significant potential as a novel antibiofilm agent against *Acinetobacter* biofilm.

A NEW CLASS OF TRICYCLIC FLAVONOIDS WITH ANTIMICROBIAL ACTIVITY

SAVU MIHAELA^{1,*}, MOLDOVAN CRISTINA-VERONICA¹, MANTEA LOREDANA-ELENA¹, BIRSA LUCIAN², ȘTEFAN MARIUS¹

¹Faculty of Biology, Alexandru Ioan Cuza University of Iasi, Iasi, Romania

²Faculty of Chemistry, Alexandru Ioan Cuza University of Iași, Iași, Romania

Corresponding author: mihaelasavu2@gmail.com

Antibiotic resistance is one of the greatest threats to human health. It is estimated that antibiotic resistance was responsible for 1.27 million deaths worldwide in 2019 (WHO). Due to the worldwide problem of antibiotic resistance, the identification of new antimicrobial agents is a priority for the scientific community. In this context, a new series of tricyclic flavonoids with a methyl substituent on ring A of the flavonoid skeleton was synthesized to determine their antimicrobial properties. Antimicrobial activity was identified by determining the minimum

inhibitory concentration and the minimum bactericidal/fungicidal concentration. Growth kinetic and time-kill assay was used to confirm antibacterial efficacy. Fluorescence microscopy was used to investigate the mechanisms of action. Our results suggest that the tricyclic flavonoids have shown very good antimicrobial activities, with MIC and MBC values as low as 1.95 µg/mL and 3.90 µg/mL recorded for compound 5e against a multidrug-resistant MRSA strain. In the presence of compound 5e, no viable cells were detected after 6 hours of incubation and a total kill effect was observed up to 24 hours. Investigations showed that *S. aureus* MRSA cells lose their membrane integrity in the presence of compound 5e. Our results suggest that compound 5e has significant anti-MRSA activity, but further investigation is necessary.

CONVERTING OPTICAL DENSITIES INTO CFUS – A CASE STUDY USING *PAENARTHROBACTER NICOTINOVORANS* ATCC 49919

IURIA MIRUNA¹, MIHĂŞAN MARIUS^{1,*}

¹Faculty of Biology, Alexandru Ioan Cuza University of Iaşi, România
Corresponding author: marius.mihasan@uaic.ro

Paenarthrobacter nicotinovorans ATCC 49919 is a soil bacterium known for its nicotine metabolism via the pyridine pathway, which also produces a characteristic blue pigment. This pathway, encoded on a megaplasmid, is of interest for synthesizing green chemicals such as 6-hydroxy-L-nicotine. Efforts are underway to enhance its yield through genetic engineering. Accurate estimation of colony-forming units (CFUs) is essential for this work. Standard methods rely on optical density (OD) measurements and generalized conversion factors derived from *E. coli*, which are often inaccurate for organisms with unique growth profiles, such as *P. nicotinovorans*.

This study aimed to develop OD-to-CFU conversion factors tailored specifically to *P. nicotinovorans*. OD measurements at three wavelengths were taken during different growth phases, and colony counting was performed. Results showed that accurate CFU estimates from OD readings are only possible during the logarithmic phase, with calibration curves yielding R² values over 0.9. A formula for CFU estimation was proposed, but for the lag and stationary phases, plate counting remains the most reliable method. These conversion factors are phase-specific, applicable only during the log phase.

OPTIMIZATION OF A BIOTRANSFORMATION ASSAY FOR THE CONVERSION OF NICOTINE TO 6-HYDROXY-L-NICOTINE BY *PAENARTHROBACTER* *NICOTINOVORANS* NCAIM P(B) 001499

MUNTEANU IUSTIN-TIBERIUS^{1,*}, HUŞLEAG ANA¹, MIHĂŞAN MARIUS¹

¹BioActive Research Group, Faculty of Biology, Alexandru Ioan-Cuza University of Iasi, Romania
*Corresponding author: tibimunteanu897@gmail.com

6-Hydroxy-L-nicotine (6HLN), a metabolite in the nicotine degradation pathway of *Paenarthrobacter nicotinovorans* pAO1 ATCC 49919, is known for its neuroprotective effects, including improving memory and reducing oxidative stress. However, 6HLN is further converted into 6-hydroxy-pseudooxynicotin. To increase the production of 6HLN, this study aims to use the strain *Paenarthrobacter nicotinovorans* NCAIM P(B) 001499, which overexpresses nicotine dehydrogenase (NDH) and ZnSO₄ as a chemical inhibitor for 6-hydroxy-L-nicotinine oxidase (6HLNO). This strain, derived from *P. nicotinovorans* pAO1

ATCC 49919, was used to accomplish these aims. We aim to develop a biocatalytic system similar to those used in *Pseudomonas* sp. HZN6 and *Agrobacterium tumefaciens* S33, thereby enhancing 6HLN production.

Strains *P. nicotinovorans* pAO1 ATCC 49919 wild-type and *P. nicotinovorans* NCAIM P(B) 001499 were cultured in nicotine citrate medium at 28°C for 12 h. Cells in the log phase were harvested, washed and resuspended with sterile distilled water (1 ml : 1 g cells). The biotransformation assay was performed by incubating nicotine-induced cells with 3 mM nicotine at 28°C for 7 hours. At regular intervals 1 ml of supernatant is collected and HPLC analysis on a Shimadzu Prominence UPLC system equipped with a RP-18e 150-4.6 mm HPLC column (Chromolith HighResolution Sorbet Lot/Column No. U1141/010). The mobile phase was a mixture of 1 mM H₂SO₄: methanol (90:10 v/v) at a flow rate of 1 ml/min. The separation was performed at 30°C using isocratic elution and 6HLN levels were monitored at 290 nm.

Testing 0.2 to 5 grams of the wild-type showed that higher biocatalyst amounts increased 6HLN accumulation but also led to faster consumption of both nicotine and 6HLN, with depletion occurring after 250 minutes. In contrast, cells of the *P. nicotinovorans* strain NCAIM P(B) 001499 consumed nicotine more rapidly while allowing 6HLN to persist longer, especially with 0.5 and 1 g of biocatalyst, whereas amounts above 1 g accelerated conversion to below 50 minutes and maximised 6HLN accumulation.

The amount of biocatalyst from *P. nicotinovorans* NCAIM P(B) 001499 strain has been established for biotransformation of nicotine into 6HLN. Work regarding substrate concentrations and potential enzyme inhibitors is in progress.

COMPARATIVE STUDY OF GUT MICROBIOME PROFILES IN NEUROLOGICAL AND GASTROINTESTINAL AUTOIMMUNE DISEASES

KASIANCHUK NADIIA^{1,2}, POLISHCHUK ANASTASIIA³, LUCANU ANA⁴, MLESNITA ANDREEA-MIHAELA^{5,*}

¹Faculty of Biology, Adam Mickiewicz University in Poznań, Uniwersytetu Poznańskiego 6, 61-614 Poznań, Poland

² Faculty of Undergraduate Studies, Kyiv School of Economics, Mykoly Shpaka 3, Kyiv, 02000, Ukraine

³Department of Animal Taxonomy and Ecology, Faculty of Biology, Adam Mickiewicz University in Poznań, Uniwersytetu Poznańskiego 6, 61-614 Poznań, Poland

⁴Department of Molecular Biology and Biotechnology, Faculty of Biology and Geology, Babeş Bolyai University of Cluj-Napoca

⁵BioActive Research Group, Faculty of Biology, Alexandru Ioan Cuza University of Iaşi, 700506 Iasi, Romania

* Corresponding author: mlesnitaanda@gmail.com

Celiac Disease (CD) and Multiple Sclerosis (MS) are two distinct conditions that exemplify the complexities of autoimmune and neurodegenerative diseases. Recent research has increasingly focused on the role of the gut microbiome in health and disease. Dysbiosis, or an imbalance in the gut microbiota, has been implicated in the pathogenesis of various diseases, and emerging evidence suggests that the gut microbiome may influence disease progression, symptom severity, and overall patient outcomes in both CD and MS. This study investigates the microbiota associated with neurodegenerative disorders in relation to gastrointestinal (GI) conditions, employing publicly accessible metagenomic datasets. Our objective was to identify and characterize microbial signatures associated with different autoimmune disorders and to investigate the potential implications of these differences in disease pathology.

We performed a comprehensive analysis of α -diversity and β -diversity, using R v.4.4.1 and Python v.3.10 with the pandas, numpy, matplotlib.pyplot and seaborn libraries, to compare microbiota profiles in patients with CD and MS. Preliminary analyses indicate variances in microbiota composition across these conditions. Comparable to CD, patients with MS exhibited

a decline in α -diversity, indicating an association between this disease and reduced microbial diversity. β -diversity analysis shows that the microbiota of the two diseases is differentiated by various species, indicating that the microbial profiles are not identical. Certain taxa, such as *Anaerotruncus* and *Dialister*, were found to be more prevalent in CD, while *Bacteroides* and *Akkermansia* displayed higher abundance in MS.

Our findings describe the main differentiators of the two disease's microbiome, giving valuable insights into the microbiome signatures associated with neurodegenerative and gastrointestinal disorders. Future research should include larger cohorts and focus on minimizing batch effects to avoid compromising genuine clinical variance.

ZEBRAFISH: AN EXPERIMENTAL MODEL FOR INDUCTION AND STUDY OF ADHD SYMPTOMS

VISTERNICU MALINA^{1,2,*}, RARINCA VIORICA^{3,1,2}, BURLUI VASILE², IONESCU CATALINA⁴,
CIOBICA ALIN^{1,2,5,6}

¹ Doctoral School of Biology, Faculty of Biology, "Alexandru Ioan Cuza" University of Iași, Iasi, Romania

² "Ioan Haulica" Institute, Apollonia University, Iasi, Romania

³ Doctoral School of Geosciences, Faculty of Geography and Geology, Alexandru Ioan Cuza University of Iasi, Iasi, Romania

⁴ Faculty of Biology, "Alexandru Ioan Cuza" University of Iași, Iasi, Romania

⁵ Center of Biomedical Research, Romanian Academy, Iasi, Romania

⁶ Academy of Romanian Scientists, Bucharest, Romania

* Corresponding author: malina.visternicu@yahoo.ro

In recent decades, attention deficit hyperactivity disorder (ADHD) has become an increasingly studied pathology, yet its neurobiological mechanisms remain partially unclear. Modeling ADHD in zebrafish (*Danio rerio*) represents a promising approach in the research of neurobiological mechanisms and the development of therapeutic strategies for this condition. Due to neurochemical and behavioral similarities with mammals, as well as advantages related to genetic manipulation and observation during rapid developmental stages, zebrafish have proven to be a robust experimental model for ADHD. The induction of specific ADHD symptoms, such as hyperactivity, impulsivity, and attention deficits, is achieved through the use of a wide range of neurotoxic and pharmacological substances, including 6-hydroxydopamine (6-OHDA), cocaine, neurotoxic pesticides, bisphenol A (BPA), and caffeine. These substances affect dopaminergic and noradrenergic neurotransmission, contributing to ADHD-like behaviors in zebrafish that resemble those observed in humans. In addition to chemical approaches, genetic manipulations targeting genes involved in neurotransmitter regulation, such as the dopamine transporter (DAT), provide an additional method for investigating the mechanisms of this disorder. The model is further validated by positive responses to pharmacological treatments used in human ADHD, such as methylphenidate and amphetamines. Thus, zebrafish offer an essential platform for exploring the etiology of ADHD and testing new therapies, contributing to a better understanding of the disorder and the development of innovative therapeutic strategies. This research aims to provide a comprehensive synthesis of current studies on the use of zebrafish as an experimental model for ADHD by describing the methods used for inducing ADHD symptoms, including neurotoxic substances and applied genetic modifications, and assessing the validity of this model by comparing zebrafish behavior to that observed in human ADHD.

IRON – OXIDE NANOPARTICLES FOR DENTAL APPLICATIONS. A REVIEW

ARDELEANU MARIA-CRINELA^{1,*}, CIOBÎCĂ ALIN-STELIAN¹¹ Faculty of Biology, Alexandru Ioan Cuza University of Iași, Iași, RomâniaCorresponding author: ardeleanumaria425@yahoo.com

This review summarizes the most recent articles issued in the literature of the field on the applications of iron-oxide nanoparticles in dentistry. It provides a general overview of the properties and synthesis of nanoparticles and summarizes the clinical applications and current research directions of iron-oxide nanoparticles, stressing their potential in dental care and in improving patient outcomes. The integration of nanoparticles in dentistry has emerged as a potential breakthrough in addressing various dental conditions. Magnetic nanoparticles with magnetic cores encapsulated in a biocompatible coating enable precise manipulation by external magnetic fields, and play an important role in targeted drug delivery, diagnostic tests and magnetic resonance imaging. Their use in orthodontic treatments and dental implants facilitates tooth movement and tissue engineering, thus improving clinical outcomes and patient comfort. The dental applications of iron-oxide nanoparticles is an area that requires continued study due to the various types of nanoparticles in use, each with different potential to treat multiple dental conditions.

EDUCATIONAL RESOURCES IN BIOLOGY**AN EPIGENETIC PERSPECTIVE ON THE RELATIONSHIP BETWEEN ARTISTIC EDUCATION, WELL - BEING AND ACADEMIC PERFORMANCE****BĂRA CSILLA IULIANA^{1,*}**¹ Faculty of Biology, Alexandru Ioan Cuza University of Iași, Iasi, Romania*Corresponding author: csillaiulianabara@gmail.com

The study conducts a comparative analysis of the relationship between artistic education, well-being, and academic performance among two groups of high school students: 128 students from the “Octav Băncilă” Art College, Iași and 126 students from the “Dimitrie Cantemir” Theoretical High School, Iași. It emphasizes the significance of artistic education in creating a supportive learning environment that nurtures artistic skills and facilitates epigenetic transformations, which enhance emotional expression and psychological health. This perspective helps to understand how environmental factors and genetic predispositions interact to affect student outcomes in artistic education, thereby deepening the analysis of the connections between artistic education, well-being, and academic performance. The study utilizes a psychological test based on the Academic Motivation Scale in the field of Educational Psychology, and the Openness to Experiences Scale, in the Personality field [IPIP]. A key factor in interpreting the responses of participants is their belonging to the 2020-2024 generation, having begun high school during the pandemic. This context likely limited their engagement with the specialized curriculum, potentially affecting their well-being and academic performance more profoundly than their participation in artistic activities. To investigate differences in well-being and academic performance between the two groups, the study employed a T-test for independent samples. The internal consistency of the assessment items was evaluated using Cronbach's Alpha coefficient, with data analysis via SPSS 26. The findings reveal that the anticipated beneficial influence of art on stress through epigenetic mechanisms was not confirmed. While art offers opportunities for emotional expression and stress reduction, its positive effects may be overshadowed by personal and external factors, such as performance

pressure, family dynamics, and unexpected events like the pandemic, suggesting that stress and well-being might depend more on these elements than on artistic engagement.