



PROCEEDINGS



INDO-POLAND INTERNATIONAL CONFERENCE ON EVOLUTIONARY BIOLOGY

4TH OCTOBER, 2023

ORGANIZED BY
DEPARTMENT OF ZOOLOGY,
DR. HARISINGH GOUR VISHWAVIDYALAYA
(A CENTRAL UNIVERSITY)
SAGAR- 470003 (M.P.)



Prof. Piotr Swiatek
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Katowice, Poland



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Convener and Head
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Sagar (M.P.)

EVOLUTIONARY BIOLOGY



INDO-POLAND INTERNATIONAL CONFERENCE ON EVOLUTIONARY BIOLOGY

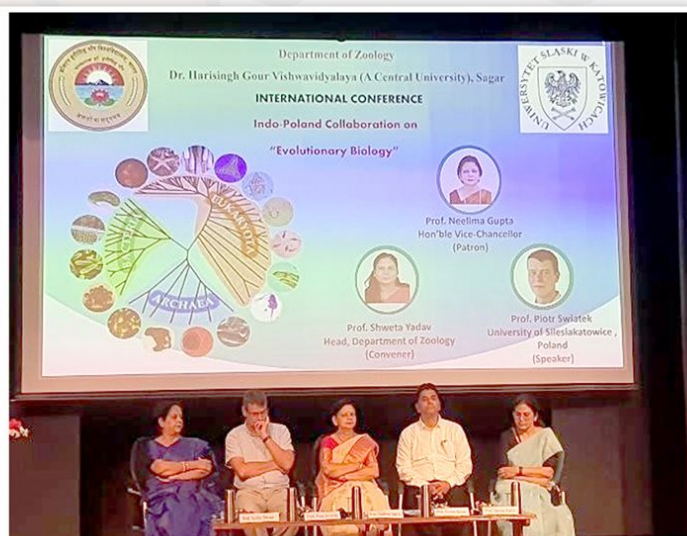
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The "**Indo-Poland International Conference on Evolutionary Biology**" was held on October 4, 2023, at the Abhimanch Sabhagar, organized by the Department of Zoology, Dr. Harisingh Gour Vishwavidyalaya, Sagar. The academic event was aimed to foster collaboration and knowledge exchange in the field of Evolutionary Biology. The conference brought together renowned scientists, scholars, and students to explore the mysteries of evolution and its implications for various global challenges.

During the inaugural session, distinguished guests were present to the dais:

- **Prof. Neelima Gupta**, Hon'ble Vice Chancellor Dr. Harisingh Gour Vishwavidyalaya (A Central University) Sagar, M.P. India
- **Prof. Piotr Swiatek**, University of Silesia, Poland
- **Prof. Naveen Kango**, Director of Academic Affairs
- **Prof. Versha Sharma**, Dean, School of Biological Sciences
- **Prof. Shweta Yadav**, Head, Department of Zoology, and Convener of the Indo-Poland Conference



A glimpse of conference during inaugural session with dignitaries



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The traditional Indian rituals of lighting the lamp and garlanding were performed, invoking the blessings of **Goddess Saraswati** and paying tribute to **Dr. Harisingh Gour**, the founder of the University. Further, floral welcomes were extended to the esteemed dignitaries.



Glimpse of lightening of the lamp by invited guest



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Hon'ble Vice Chancellor **Prof. Neelima Gupta** welcomed **Prof. Piotr Swiatek**, University of Silesia, Poland, with a bouquet, and vice chancellor **Prof. Neelima Gupta** was welcomed by **Prof. Versha Sharma** Dean, School of Biological Sciences, and **Prof. Shweta Yadav**, Convener of this conference.



Welcoming the dignitaries with bouquet



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Prof. Shweta Yadav, convener of the **Indo-Poland** conference, delivered a warm welcome address, introducing the conference's theme and objectives. She covered the details of the Indo-Poland collaboration and its aim and vision. She also highlighted the significance of clitellates.



Prof. Shweta Yadav, Convener of the conference, addressing the gathering

Director, Academic Affairs highlighted the importance of collaboration and also briefed about other collaborations of the university.



Prof. Naveen Kango, Director of Academic Affairs, addressing the gathering



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Prof. Piotr Swiatek, University of Silesia, Poland discussed research collaboration between India and Poland, offering a glimpse into the world of evolutionary biology. He also introduced about his country and university and presented the work of his university, University of Silesia, Katowice, Poland.



Prof. Piotr Swiatek, addressing the gathering

Hon'ble Vice Chancellor, **Prof. Neelima Gupta** presided over the session, delivering her blessings and thoughts on the conference. She greeted the guest in Polish and shared her visit experiences in Poland.



Hon'ble Vice Chancellor, Prof. Neelima Gupta addressing the gathering



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The session concluded with the dignitaries being felicitated with shawls, shrifals, and mementos, as a gesture of gratitude for their presence and contributions. **Hon'ble Vice Chancellor, Prof. Neelima Gupta** felicitated **Prof. Piotr Swiatek** with shawl, shrifal and memento. **Prof Shweta Yadav** felicitated Hon'ble Vice Chancellor, **Prof. Neelima Gupta** with shawl, shrifal, and memento.





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A short tea break provided attendees with an opportunity to refresh and network before the technical session.

Technical Session of the Conference

The technical session was chaired by **Dr. Malavika Sikdar** and co-chaired by **Dr. Deepali Jat**, with **Dr. Raj Kumar Koiri** as the recorder.

The highlight of this session was the presentation made by **Prof. Piotr Swiatek** from the University of Silesia, Poland, on the "Organization of Ovary". Broadly the lecture was divided into two parts: "**Ovary organization and oogenesis in clitellate annelids**" and "**Ovary organization in clitellate annelids – earthworms**". The first part was devoted to the general aspects of ovary organization and the course of oogenesis in clitellate annelids. There was provided information about ovary morphology, histology, and ultrastructure; the course of oogenesis; the comparison of ovary and oogenesis between taxa; and the possible ways of ovary evolution in Clitellata. Special attention was paid to the organization and functioning of germline cysts. The second part was devoted to preliminary results about ovary structure and functioning in earthworms. Histological and ultrastructural data about ovaries in Hormogastridae, Lumbricidae, Megascolecidae, and Eudrilidae was presented. Analyses presented in this part were financed by National Science Centre, Poland, contract number 2020/37/B/NZ4/00560.



Prof. Piotr Swiatek, presenting his lecture on the "Organization of Ovary"



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Prof. Piotr Swiatek, presenting his work on "Organization of Ovary"

Following the presentation, **an open discussion allowed** students to engage with **Prof. Swiatek** and seek clarifications on various aspects of the topic.

The interactive session provided valuable insights and promoted academic dialogue.

During the open discussion, Professors, Research scholars and Masters' students asked several questions, making the session interactive and interesting.

The programme concluded with a vote of thanks delivered by **Dr. Deepali Jat**, who expressed to the audience and the gathering for sharing their time and knowledge.

The programme ended on a patriotic note, as attendees gathered to sing the national anthem, reaffirming their commitment to scientific exploration and international cooperation in the pursuit of knowledge.



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Poster Presentation Session

Following the conclusion of the meeting, **Prof. Piotr Swiatek** assessed the posters presented by scholars and engaged in discussions with them.





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Deliberation

The **"Indo-Poland International Conference on Evolutionary Biology"** concluded with a sense of accomplishment. The event achieved its objectives of fostering collaboration and knowledge dissemination in the field of evolutionary biology. Attendees left with enhanced understanding and insights into this vital area of scientific research.

This conference marked a significant milestone in the academic journey of the **Department of Zoology**, Dr. Harisingh Gour Vishwavidyalaya, and set a positive precedent for future collaborations and scientific endeavors.





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Gut microbiota modulating by Probiotic, Prebiotic and Synbiotics Role in immune system and reproductive physiology of poultry

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The escalating male infertility rates attributed to reproductive dysbiosis and contemporary lifestyles, the promotion of global reproductive health has become exceptionally vital. The gut microbiota wields substantial potential in influencing both our overall health and reproductive physiology. Probiotics, live microorganisms administered in sufficient quantities, bestow health advantages upon their host, while prebiotics are non-living dietary components associated with the modulation of intestinal microbiota. Manipulating probiotics, prebiotics, and synbiotics through dietary means has emerged as a viable strategy for enhancing animal nutrition, nutraceuticals, and therapeutic approaches. The objective of this research is to investigate the impact of probiotics, prebiotics, and synbiotics on estrogen receptor-mediated reproductive health. In Summary, modulating the gut microbiota of poultry through probiotics, prebiotics, and synbiotics can have a positive impact on both the immune system and reproductive physiology. A balanced gut microbiota supports nutrient absorption, reduces the risk of infections, and ultimately leads to healthier and more productive poultry. Proper management and a tailored approach to probiotic, prebiotic, or synbiotic supplementation are essential for achieving these benefits in poultry farming. Therefore, our study concluded that oral probiotic and prebiotic supplementation enhances the immune system and reproductive efficacy of Poultry.

Keywords: Probiotics, prebiotics, antioxidant potential, estrogen receptors, reproductive health



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Nurturing Brain Resilience: Lifestyle's Role in Neurodegeneration

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Neurodegenerative diseases, including Alzheimer's, Parkinson's, and Huntington's disease, represent a growing global health challenge with significant social and economic implications. Emerging evidence suggests that lifestyle factors, such as diet, exercise, and sleep, play a crucial role in the risk and progression of these debilitating conditions. Several attempts have been made to expand the current knowledge on the complex interplay between lifestyle choices and neurodegenerative diseases. Dietary habits have gained increasing attention, with studies revealing associations between specific diets (e.g., Mediterranean, DASH) and reduced risk of cognitive decline. Additionally, certain nutrients, including omega-3 fatty acids, antioxidants, and polyphenols, have demonstrated neuroprotective effects. Physical activity has emerged as a potent protective factor, with regular exercise linked to improved cognitive function and decreased neuroinflammation. Mechanisms underlying these benefits include enhanced neuroplasticity, increased production of neurotrophic factors, and reduced oxidative stress. Sleep disturbances, prevalent in neurodegenerative disease patients, are increasingly recognized as contributing to disease progression. Disrupted sleep patterns exacerbate amyloid-beta accumulation and tau pathology, exacerbating cognitive decline and progression of Alzheimer's disease. Moreover, lifestyle factors often interact synergistically, influencing disease risk in complex ways. Lifestyle modifications, including the adoption of brain-healthy diets, regular physical activity, and improved sleep hygiene, offer promising avenues for prevention and adjunctive therapy. Thus, the study investigates the importance of lifestyle factors in neurodegenerative disease risk and progression, providing a foundation for the development of personalized prevention and treatment strategies in the pursuit of healthier cognitive aging and improved quality of life for individuals at risk of or suffering from neurodegenerative diseases.

Keywords: Neurodegeneration, Lifestyle factors, Sleep, Cognition, Diet.



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Significance of Earthworm in minimizing the frequency of antibiotic resistance in contaminated soil

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Antibiotic resistance genes (ARGs) are contemporary environmental toxins that contaminate the soil. It can be found in a range of environments, such as soils, water, and sediments. Animal excrement can introduce antibiotics into agricultural soils, which may influence soil microbial activity, limit the growth of soil plants and animals, and encourage the dissemination of antibiotic-resistance genes (ARGs). Antibiotic residues have the potential to promote the emergence of antibiotic resistance genes (ARGs) in the environment, and biodegradation is the main method of antibiotic eradication. Through the soil profiles, earthworms can transport microorganisms and genes that confer antibiotic resistance (ARGs). However, there is still a lack of comprehension on the earthworm gut microbiota and its interaction with antibiotic resistance. In terms of diversity and organisation, the bacterial populations in the soil and earthworm gut are distinct. The earthworm gut exhibits a significant relationship between the physical separation between sites and the diversity of the bacterial community. The ARGs were found consistently lower in the earthworm gut than in the nearby soil. When compared to the surrounding soil, the relative abundance of mobile genetic elements and dominant bacterial phylotypes, that are possible hosts of ARGs, was shown to be much lower in the earthworm gut. The study concluded that may be a factor in the decline of ARGs in the earthworm gut. Microcosm experiments and field testing revealed that earthworms significantly reduced the quantity and abundance of ARGs in soils. Due to earthworm stimulation, Actinobacteria, Acidobacteria, and Gemmatimonadetes may be responsible for eliminating ARGs from the soil. Thus, by increasing ARG clearance, earthworms may be able to repair antibiotic genes in contaminated soil.

Keywords: Acidobacteria, Gemmatimonadetes, Earthworm, Antibiotic resistance genes, Soil microorganisms.



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Microplastic Induced-Neurotoxicity: A Concern for Human Health

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Microplastics, tiny plastic particles measuring less than 5 mm in diameter, have become a pervasive environmental pollutant with far-reaching implications for human health. Over the past decade, research in this emerging field has provided evidence that microplastics can permeate various environmental compartments, including air, water, and soil. They have infiltrated ecosystems, and subsequently entered the food chain exposing organisms at all trophic levels, including humans. Due to their ability to adsorb and transport various chemicals and toxins, microplastics have raised concerns regarding their potential to induce neurotoxicity. Many comprehensive studies critically investigate the neurotoxic effects of microplastic exposure across a spectrum of organisms, from aquatic species to terrestrial mammals. While the direct impact on the human nervous system is an area of ongoing investigation, studies involving model organisms have elucidated potential mechanisms through which microplastics may induce neurotoxicity, including oxidative stress, inflammation, and disruption of neural pathways. The role of microplastics as carriers of neurotoxic compounds, such as heavy metals and persistent organic pollutants, and their capacity to facilitate their transport across biological barriers. The importance of understanding the potential neurotoxicity of microplastic exposure serves as a critical public health concern. Thus, knowledge of the neurotoxic effects of microplastic exposure serves as a foundation for future research efforts to elucidate the mechanisms of action and potential consequences for human health. As microplastic pollution continues to escalate, understanding its impact on neurological function is imperative for informed decision-making and policy development aimed at mitigating its detrimental effects.

Keywords: Environment, microplastics, Neurotoxicity, oxidative stress, inflammation.



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Chronic alcoholism and Acetaminophen Induced Liver cirrhosis: its impact on glycolytic as well as Antioxidant pathway

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Alcohol usage ranks seventh in terms of the most frequent causes of death and disability worldwide. In order to reduce pain and fever paracetamol, a non-steroidal anti-inflammatory drug, is routinely utilized. According to current research, consuming alcohol and paracetamol combined increases the risk of liver damage, which may lead to chronic liver cirrhosis. Further anemia-like symptoms and hepatic encephalopathy may be brought on by cirrhosis of the liver. Although it has been reported that strengthening liver and brain functions under specific disease situations boosts them, neither ferrous sulfate nor folic acid, together or separately, have ever been backed by any scientific evidence to support the assertion. In the present investigation, an attempt was made to analyze motor co-ordination in paracetamol and chronic alcoholism induced hepatic encephalopathy. Behavioural studies included Catalepsy test, String test, foot printing test as well as Open field test. Further analysis of different antioxidant pathway enzymes (Superoxide dismutase, Catalase, Glutathione peroxidase, Glutathione reductase, Glutathione-S-transferase, Lipid peroxidation and Glutathione) as well as glycolytic pathway enzymes and proteins (Lactate dehydrogenase, Pyruvate dehydrogenase-E1 alpha subunit, PDK2) in paracetamol and chronic alcoholism induced liver cirrhosis and to evaluate the therapeutic efficacy of ferrous sulfate and folic acid together and individually. Results suggest that ferrous sulfate and folic acid together and individually improved motor co-ordination which was impaired during moderate hepatic encephalopathy. Ferrous sulfate and folic acid together and individually modulated different enzyme and protein levels, those altered during chronic liver cirrhosis.

Keywords: Chronic Alcoholism, Acetaminophen, Liver Cirrhosis, Hepatic



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Therapeutic Mechanism of an Anti-Inflammatory Phytochemical in Alleviating Allergic Airway Inflammation in an OVA-Induced Asthmatic Mouse Model

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Asthma, a severe and life-threatening chronic respiratory condition, is a major worldwide health issue estimated 262 million people in 2019 and caused 461000 deaths. Asthma impacts the lives of more than 300 million people globally, according to WHO statistics. Allergic disorders caused during the exposure of allergens and automobiles, burning of crop stubble, coal-powered power plants and other anthropogenic activities responsible for ambient air pollution. Chronic exposure to high levels of air pollution has been associated with greater risk of developing respiratory tract infections, asthma, and stunted lung growth. Various therapeutically focused synthetic medicines are currently available for the treatment of asthma because of their anti-inflammatory properties, inhaled corticosteroids are now the gold standard therapy for asthma patients, reducing symptoms such as airway hyperresponsiveness, eosinophilia, cytokines, and IgE production. Emerging research indicates phytochemicals supplementation interfere with cellular functions and develops current understanding of herbal- based anti-asthmatic therapy and its molecular mechanisms based on our in vivo study. Plant phytochemicals have dynamic qualities that contribute to a reduction in NF- κ B pathway proliferation, modifying immune cell activity by lowering cytokine levels and inflammation in lung tissues. The goal of the proposed study is to investigate immunomodulatory and anti- inflammatory properties of eugenol, a potent phytochemical, as a preventive measures for mitigating the worsening of asthma exacerbation. This study will scientifically validate antiasthmatic effect of plant derived phytochemical and various biochemical processes which improves and provide invaluable understanding of conserved signaling pathway by mitigating inflammation and airway remodeling. Current glucocorticoid-based therapeutics may be ineffective and harmful, if utilized for a long term, potent phytochemical-based treatments as pharmacological pharmaceuticals have immense commercial value with a requisite potential of being patented and alternative strategy which have minimal or no side effects.

Keywords: Asthma, airway remodeling, anthropogenic activities, phytochemical,



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Spirulina platensis inhibits diethyl nitrosamine-induced hepatocarcinogenesis

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The objective of this experiment was to evaluate the preventative benefits of *Spirulina platensis* and propose potential mechanisms of action in the context of diethyl nitrosamine (DEN)- induced hepatocarcinogenesis in male Swiss albino mice. The process of inducing hepatocarcinogenesis through chemical means involved the intraperitoneal injection of DEN at a dosage of 100 mg/kg body weight (b.w.) as a single initiation dose, followed by the intraperitoneal injection of CCl₄ at a dosage of 0.5 mg/kg body weight (b.w.) twice each week for a duration of 14 weeks. The mice who received DEN/CCl₄ were subjected to treatment with *Spirulina platensis* at doses of 250 and 500 mg/kg body weight via oral gavage for a duration of 4 weeks following the induction of cancer. The administration of *Spirulina platensis* to mice treated with DEN/CCl₄ effectively mitigated the increases in blood levels of liver function indicators, including AST, ALP, ALT, and total bilirubin, as well as liver tumour biomarkers, such as AFP. The administration of DEN/CCl₄ in mice resulted in significant suppression of malignant histological lesions and infiltration of inflammatory cells in the liver. However, these effects were notably mitigated when the mice were treated with *Spirulina platensis*. The levels of hepatic oxidative stress indicators, such as nitric oxide (NO) and lipid peroxidation, exhibited a substantial drop in mice treated with *Spirulina platensis* after being provided with DEN/CCl₄, in comparison to control mice that were only administered with DEN/CCl₄. In contrast, the levels of glutathione peroxidase (GPx), superoxide dismutase (SOD), and catalase (CAT) activities, along with the concentration of reduced glutathione (GSH), exhibited a significant increase in the aforementioned cohort of animals. Collectively, our findings provide evidence that the administration of *Spirulina platensis* has the potential to mitigate the development of liver cancer by augmenting its anti-inflammatory and antioxidant properties.

Keywords: Hepatocellular carcinoma, inflammation, antioxidant, spirulina, diethyl nitrosamine



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Targeting key events of glucose metabolism in Aflatoxin B1 induced early and advanced stage of hepatocellular carcinoma

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Hepatocellular carcinoma (HCC) is the sixth most commonly diagnosed cancer and the third leading cause of cancer related death worldwide. During altered metabolism, cancers cells produce more lactate and take up more glucose when there is oxygen present. This increased energy provided by aerobic glycolysis is called "the Warburg effect". Hexokinase (HK) protein family members work to convert glucose into glucose-6-phosphate (G6P) once it has entered the HCC cells. It has been shown that HCC has high levels of HK2 expression, which is associated with poor survival rates. In the presence of lactate dehydrogenase (LDH), pyruvate then combines with NADH and H⁺ to create NAD⁺ and lactate. The conversion of pyruvate to lactate is triggered by an increase in the A subunit (LDHA), which is the major isoenzyme in cancer cells. The present study evaluated the status of glycolytic proteins during the development and progression of aflatoxin B1 induced HCC. Results from the present investigation suggests that glucose metabolism is activated during the early and advanced stage of HCC.

Keywords: aflatoxins, hepatocellular carcinoma, glycolytic factors



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Analyzing the Effects of Alien Earthworms on Soil Ecology

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Ecosystem invasions by exotic species are developing into a major problem for the ecosystems that receive them. An essential component of the agro-ecosystem are earthworms. The invasion of exotic earthworms poses a severe threat to our ecosystems because their eating and burrowing habits have the ability to interfere with ecological functions. They have the power to alter the chemical and physical properties of soil, such as elevating the pH, which denotes the mineralization of the soil's organic layers. They also encourage infiltration and evapotranspiration, which decrease the amount of water in the soil. The invasion of earthworms has an impact on the carbon and nutrient content of the soil. Exotic earthworms are usually believed to be bad for the ecosystem and affect native species negatively. A number of factors, such as climatic changes, may facilitate the invasion of foreign species, despite the fact that the causes and mechanisms for invasion success and failure remain unknown. Climate change affects how susceptible an ecosystem is to biological invasions. Exotic earthworms can potentially colonize new areas despite hindrances and obstructions. Through direct and indirect effects, it is anticipated that exotic worms choose particular features in communities of soil microbes, soil animals, and plants. Additionally affected are plant defense traits, which increase their susceptibility to herbivory and disease. The invasion of earthworms has an impact on the soil's microbial ecology as well. Exotic earthworms have been discovered to affect indigenous earthworm species and local wildlife, as well as to facilitate the invasion of invasive plants by changing the soil's flora and fauna. The study demonstrates the impact of invasive species on the soil agriculture system using a metanalysis.

Keywords: : Exotic earthworms, biological invasions, metanalysis, invasive earthworms, soil ecology



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Conserving the soil ecosystem through Metabolomics Approach

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The soil ecosystem, a cornerstone of terrestrial life support, faces alarming deterioration owing to the widespread and unchecked use of xenobiotic, including pesticides, fertilizers, and industrial chemicals. This extensive xenobiotic contamination disrupts crucial soil processes, from nutrient cycling to altered metabolism of soil dwelling organisms, with far-reaching consequences for agriculture, food security, environmental health and biodiversity conservation. Environmental metabolomics; a powerful analytical approach is an emerging methodology that investigates metabolic signatures within biological systems when exposed to environmental stress. From various metabolomics-based studies across the world, the impact of xenobiotic like Atrazine and polyaromatic hydrocarbons and pyrene, on earthworm metabolism has been extensively examined. These investigations have unveiled a range of metabolic disruptions in earthworms. Atrazine, for instance, is known to suppress earthworm metabolism and induce notable fluctuations in metabolites. Pyrene, on the other hand, leads to a decrease in saturated fatty acids, elevated concentrations of certain fatty acids, impaired glucose metabolism, and alterations in TCA cycle intermediates. Additionally, earthworms inhabiting arsenic-contaminated soil exhibit disruption in Osmoregulatory metabolism, upregulation of CAB and Profilin, downregulation of Na/K ATPase, and notable changes in protein profiles. Furthermore, 1H NMR analysis of PCB-exposed soil indicates a substantial increase in ATP concentration in earthworms, while exposure to Cypermethrin results in metabolic perturbations and tissue damage at higher concentrations. Xenobiotics like triclosan, tebucolazon, carbofuran, Tri-n-butyl phosphate, and carbon-based nanomaterials also induce significant fluctuations in earthworm metabolite profiles, impacting their reproductive strategies. The study highlighted the complex and diverse effects of xenobiotic on earthworm metabolism and ecological well-being. Moreover, it may strengthen understanding of the underlying mechanisms by which harmful substances function in the environment.

Keywords: : Metabolomics, Biodiversity conservation, Xenobiotics, Soil health.



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Ameliorative effects of Thymoquinone against Malathion induced toxicity leads to oxidative stress in the fresh water major carp *Labeo rohita*

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Pesticides containing organophosphates are of wide-ranging class substances containing a variety of physicochemical properties and significant toxicological activities in the environment. They are widely employed to manage pests in a variety of food (vegetables, fruits, tea, etc.) and non-food (tobacco, cotton, etc.) crops. Malathion is one of the often and significantly used organophosphate pesticide world-wide. Thymoquinone is an anti-oxidant which is used to treat malathion induced toxicity in *Labeo rohita*. The present study clearly demonstrated that the administration of malathion causes the increased the levels of oxidative stress (CAT, SOD, GSH, LPO, NO) as well as it decreases simultaneously as it treated with thymoquinone. Histological and biochemical alterations can be seen when exposed to malathion alone as well as thymoquinone act as anti-oxidant enzymes and repair the damage caused by malathion. The increase in pesticide levels may be due to rapid formation of ROS in the target cell membranes, resulting in a reduced content of antioxidants.

Keywords: : Malathion, Thymoquinone, Organophosphate, Oxidative stress, *Labeo rohita*.



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Antifeedant activity of Abscissic acid against *Poekilocerus pictus*

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Poekilocerus pictus is a major pest of *Calotropis procera* and this host plant plays a vital medicinal role in treating complaints of urogenital tract. Its leaves and flowers are used for fast wounds healing, to treat skin disease, liver problems, cholera, asthma and indigestion etc. It has been widely used in traditional medicinal systems in North Africa, Middle East Asia, South Asia, and South-East Asia. Keep this in view, there is need to prevent the damage of this medicinal plant and thus the management of their concern pest. Regular and indiscriminate use of pesticides has harmed not only the environment and agriculture, but also the health and development of both animals and humans by introducing them into our food chain. Chemical pesticides can be replaced with natural insecticides. Plant Growth Regulators (PGRs) or Phytohormones (PHs) are a group of natural chemical compounds produced by plants. These are used to increase plant product quality, regulate plant growth rate, and thus increase crop yield. Abscissic acid, a plant growth regulator (PGR) having negative effect on some major insect pests. The present study investigates the toxic effect of Abscissic acid (ABA), on the growth of *Poekilocerus pictus*. Antifeedant assay results the significant reductions in the rate of food consumption by 5th instar nymph of *Poekilocerus pictus* after spraying 50mg/ ml of Abscissic acid on *Calotropis* leaves. This study defines that Abscissic acid show antifeedant activity and it disturbs insect feeding capacity and thus their growth and survival. So, Abscissic acid can be used as ecofriendly insecticide in insect pest management.

Keywords: : Antifeedant activity, abscissic acid, *Poekilocerus pictus*, *Calotropis procera*, insect pest management.



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Study of histopathological changes in Intestine of fishes caused by parasites

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The majority of fish, whether in wild or farmed populations, have parasites. When fish are dissected, helminths from the intestines are typically easy to see. Numerous species of digeneans, cestodes, acanthocephalans, and nematodes are among the enteric helminths. Here, key fish enteric helminth taxa's biology, morphology, and histopathological impacts will be discussed. The digestive tract is one of the main entry points for microbial and parasite illnesses in fish, as it is in other vertebrates. For otherwise weak enteric parasites, the digestive canal provides a very friendly and rich habitat that provides them with protection and nourishment. Intestinal histopathological abnormalities caused by these parasites include entirely disrupted mucosa and submucosa, thickened lamina propria, inflammation, necrosis, hyperemia, edoema, destruction to epithelial cells, and clumped mucosa folds. The mucosa's intestinal villi shrank, and an infected intestine is frequently larger and slightly irritated. A possible response in the presence of a parasite is an increase in the muscle layer's thickness. In infected individuals, the attachment site had a larger concentration of mucous and mast cells, indicating that the parasite had induced a localised innate immune response. The absence of an acquired immune response against the parasite was confirmed by the fact that the number of neutrophils, basophils, and lymphocytes in infected tissue was significantly different from that in uninfected tissue. An overview of the unique defensive mechanisms of fish gut against helminths is given in this article. The immune cellular response involving mast cells, neutrophils, macrophages, rodlet cells, and mucous cells in response to intestinal helminths will be highlighted. Given the relative significance of innate immunity in fish and the size of the economic loss caused by disease in aquaculture, this field merits a lot of attention and funding.

Keywords: : Parasite, helminths, histopathological changes, intestine of fish.



INDO-POLAND INTERNATIONAL CONFERENCE ON EVOLUTIONARY BIOLOGY



4th October, 2023

Therapeutic potential of Coenzyme Q10 in mitigating the toxic effects generated by Microcystin-LR in a murine model

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Microcystis aeruginosa is accountable for a substantial proportion of the cyanotoxins referred to as microcystin-LR (MC-LR), which are detected in aquatic environments. Mycotoxins (MCs) provide a significant risk to the well-being of both humans and animals. The main factors contributing to MC toxicity are widely acknowledged to be oxidative stress and the inhibition of protein phosphatases 1/2A. In the current investigation, a cohort of Balb/c mice was subjected to random allocation, resulting in the formation of three distinct groups, each consisting of six animals. The animals of normal control group (N) received water and normal diet ad libitum and MC-LR as well as MC-LR+CoQ10 group received MC-LR (10µg/kg bw/day, ip) for 14 days. After two weeks of MC-LR treatment, mice of (MC-LR+CoQ10) received coenzyme Q10 (10 mg/kg bw, im) for 14 days. The application of MC-LR resulted in a decrease in the activity of glutathione reductase, as well as a reduction in the content of glutathione (GSH) or thiol (-SH) groups. This was accompanied by an increase in the concentration of hydrogen peroxide, lipid peroxidation, protein carbonylation and accelerated oxidation of protein products. In summary, the administration of coenzyme Q10 effectively mitigated the tissue toxicities generated by MCLR through the reduction of oxidative stress and lipid peroxidation.

Keywords: : Microcystins, Microcystin-LR (MC-LR), Coenzyme Q10, Hydrogen peroxide, Lipid peroxidation, Thiol (-SH) content.



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4th October, 2023

Unearthing Novel Archaeal and Bacterial Genomes: Insights from Genome-Resolved Metagenomics in Conservation and Conventional Field Soils

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The soil microbial communities undergo significant alterations in agroecosystems due to various agronomic practices. However, the precise characterization of these communities, particularly in terms of the identity and metabolic capabilities of their constituent organisms, remains largely incomplete. In an effort to enhance our comprehension of these soil communities, we present metagenome-assembled genomes (MAGs) obtained from six soil metagenomes sourced from the central region of India, representing both conservation (CA) and conventional (CN) agricultural practices. In total, we have successfully retrieved four MAGs each from CA and CN soils, meeting stringent completeness criteria ($\geq 90\%$) and contamination ($\leq 5\%$). These MAGs span a diverse taxonomic landscape, encompassing one archaeal and five bacterial phyla. Taxonomic classification results suggest that a significant portion of these MAGs may potentially represent novel microbial taxa previously undescribed. Further exploration of selected MAGs reveals their involvement in various ecological processes. These encompass carbohydrate degradation, as well as key roles in the methane, nitrogen, and sulphur cycles. Notably, the MAGs encompass members of taxonomic groups such as Chlamydiota, Deinococcota, Gemmatimonadota, Myxococcota, Proteobacteria, and Thermoproteota. Collectively, these novel MAGs serve as a valuable resource, enabling us to unravel the hitherto undiscovered microbial diversity inherent to agricultural soils. Additionally, they shed light on the functional potential of these microorganisms. Ultimately, this knowledge enhances our understanding of how these microbial communities respond to diverse agronomic practices, thereby contributing to the broader field of agricultural microbiology.

Keywords: : Conservation agricultures Soil microbiome; Metagenome-assembled genomes; CAZy analysis; Functional analysis.



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4th October, 2023

Unveiling the Toolkit for Parkinson's Disease Management

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Neurodegeneration is a complex and devastating process that underlies several debilitating brain disorders such as Alzheimer's disease, Parkinson's disease, Huntington's disease, and Amyotrophic Lateral Sclerosis (ALS). It involves the gradual deterioration of neuron structure and function, crucial for transmitting information via electrical and chemical signals. Parkinson's disease (PD) necessitates a comprehensive and multifaceted therapeutic approach due to its intricate nature. Primary among these approaches are pharmacological treatments, with levodopa serving as the cornerstone by replenishing dopamine levels in the brain; however, its long-term use can lead to motor fluctuations and dyskinesias. Complementary medications, such as dopamine agonists, MAO-B inhibitors, and COMT inhibitors, are employed to supplement or delay levodopa therapy. Deep Brain Stimulation (DBS) involves implanting electrodes in specific brain regions to modulate neuronal activity and has proven highly effective in mitigating motor symptoms, particularly in advanced cases. Physical and occupational therapies aim to enhance mobility and daily living skills, while speech therapy tackles speech and swallowing challenges. Exercise, dietary adjustments, and nutritional supplements contribute to overall well-being. Emerging therapies like gene therapy and regenerative medicine hold promise for slowing disease progression by repairing or replacing damaged neurons. Complementary therapies, such as acupuncture and yoga, are explored to augment traditional treatments, and telemedicine facilitates easier access to care and monitoring. In sum, PD's multifaceted symptomatology calls for a tailored and evolving treatment strategy, offering a spectrum of options to enhance patients' quality of life and stimulate ongoing research toward potential cures and disease-modifying therapies.

Keywords: : Neurodegeneration, Parkinson's Disease, Neurons, Therapeutic approach



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4th October, 2023

Investigation of Silver Nanoparticles and their Impact on Soil Biota

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Despite the documented adverse impacts of silver nanoparticles on human health and the environment, their utilisation has been extensively observed across various domains, including the agricultural sector. The utilisation of silver nanoparticles (Ag-NPs) in modern materials has experienced a notable rise, prompting concerns over their potential impact on aquatic and terrestrial ecosystems. This interaction has the potential to induce toxicity in plants, humans, and other creatures. The application of nano-silver is widely observed in both biomedical and commercial domains, including diverse functions including antibacterial properties, food packaging, textile and electrical engineering, nano prism manufacturing, wound care, surgical instruments, catheters, and disinfection agents. It has been observed that the presence of silver nanoparticles (Ag-NPs) can impede the growth and proliferation of microorganisms, hence posing a substantial risk to the indigenous microbial community and causing an alteration in the microbial equilibrium within the soil environment. Previous research investigations have demonstrated that the internalization of silver nanoparticles (Ag-NPs) into cells is influenced by various factors, including their size, coating, and concentration, as observed by in vitro experimentation. Numerous investigations have provided evidence indicating that the presence of nanoparticles results in the build-up of silver (Ag) and subsequent harmful effects in several local and distant bodily organs, such as the brain, eyes, and kidneys, among others. The utilisation of Ag-NPs has been found to lead to an increase in the generation of reactive oxygen species, damage to DNA and mitochondria, impairment of membranes, the release of toxic dissolved species, and the activation of defence mechanisms in earthworms within the soil ecosystem. Nevertheless, additional investigation is necessary to have a comprehensive understanding of the toxicity pathways arising from various modes of exposure, due to the increasing significance of silver nanoparticles in the field of agriculture. The study presents a comprehensive review of the effects of nanoparticles on soil ecosystems.

Keywords: : Silver nanoparticles, Cytotoxicity, Catalase, Bioavailability and Soil Ecosystem



INDO-POLAND INTERNATIONAL CONFERENCE ON EVOLUTIONARY BIOLOGY



4th October, 2023

Phytoremediation of *Bacopa monnieri* in Swiss albino mice against Hepatic toxicity mediated by Synthetic pyrethroid

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Herbs have been used to support optimum health since the beginning of time. The Scrophulariaceae family includes the tiny, creeping herb known as *Bacopa monnieri* Linn. It has numerous branches, short oblong leaves, and pale purple flowers. A significant "Ayurvedic Medhya," commonly referred to as "Brahmi," is *Bacopa monnieri* Linn. Among the substances responsible for the medicinal effects of *Bacopa monnieri* are alkaloids, saponins, and sterols. The purpose of this investigation is to determine whether *Bacopa monnieri* shields mice against liver damage brought on by synthetic pyrethroids (cypermethrin). Mice were used in the study and randomly assigned to one of four groups, including Group I which is the control group. Mice in Group II (the Cypermethrin-exposed group) received an oral dose of 15 mg/kg of Cypermethrin (BW). Group III (CYP and *Bacopa monnieri* administrated group) received CYP followed by *Bacopa monnieri*. Group IV (*Bacopa monnieri* group) received 200 mg/Kg body weight (BW) by oral dose. Then animals were vivisected. For Biochemical examination, the liver was dissected. The Biochemical parameters revealed that CYP-induced a significant increase in hepatic markers enzymes (ALT, AST, and ALP) and elevation in MDA ($***p < 0.001$) concomitant with a significant decrease of SOD ($***p < 0.001$) and Catalase ($*p < 0.05$) levels compared to the control group, Whereas the co-administration of *Bacopa monnieri* significantly decrease the level of hepatic marker enzymes and a significant decrease in the MDA ($***p < 0.001$) concentration with a significant increase in SOD ($**p < 0.01$) and Catalase ($**p < 0.01$) activity as compared to control group and showed therapeutic efficacy in the *Bacopa monnieri* co-administered group as compared to control and treated groups. The results of the present study showed phytoremediation of *Bacopa monnieri* on hepatic toxicity due to synthetic pyrethroid (cypermethrin). The medicinal application of this plant and its countless possibilities for investigation still remain in relatively newer areas of its function. Hence, the phytochemicals of this plant will enable the exploitation of its therapabstracteutic use.

Keywords: : Cypermethrin, *Bacopa monnieri*, Hepatic toxicity, Synthetic pyrethroid.



INDO-POLAND INTERNATIONAL CONFERENCE ON EVOLUTIONARY BIOLOGY



4th October, 2023

Programme Schedule and Inaugural Session

Garlanding of Goddess Sarswati and founder of the University, Dr. Sir Harisingh Gour

Welcome of dignitaries

Address by Prof. Shweta Yadav, Head Dept of Zoology

About: Introduction to the Indo-Poland Research Collaboration

Address by Prof. Naveen Kango

Director, Academic Affairs

About: The need of Academic Collaborations

Guest of Honour

Dr. A.A. Ansari, IFS

Divisional Forest Officer, Nauradehi Wild Life Sanctuary, Sagar

Special Address by Prof. Piotr Swiatek, University of Silesia, Katowice, Poland

About: Research Collaboration and Activity of their University

Presidential Address

Prof. Neelima Gupta

Hon'ble Vice-Chancellor, Dr. Harisingh Gour Vishwavidyalaya, Sagar

Vote of Thanks

Prof. Versha Sharma

Dean, School of Biological Sciences

Break

Chairman: Dr. Malvika Sikdar

Co-chairman: Dr. Deepali Jat

Recorder: Dr. Raj Kumar Koiri

Lecture by

Prof. Swiatek, University of Silesia, Katowice, Poland

"Organization of Ovary"

Presentation and Discussion by Scholars and Delegates

Vote of Thanks

Dr. Deepali Jat

National Anthem

Programme was convened by Garima Stephen, Research Scholar, Dept of Zoology.



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