ZOOLIFE

VOL. 10TH (2024)

Department of Zoology
CMP PG College,
Prayagaj - 211002

Glimpses of Departmental Activities

Faculty Members of Department of Zoology

Faculty Members of Department of Zoology

Faculty Members with Non Teaching Staff of Department of Zoology

लाक्ष उत्पादन तकनीक एवम् उनके गुणवत्ता युक्त उत्पादों पर कार्यशाला आयोजित

Invited Lecture on Lac Culture - 2024

सीएमपी महाविद्यालय में पोस्टर प्रतियोगिता आयोजित

Glimpses of Departmental Activities


केचुआ खाद एक सम्पूर्ण जैविक खादः डॉ. माथुर

Short - Term course on Vermicompost (Department of Zoology)

Invited lecture Delivered by Dr. Ravi Rani Mishra on Hepatitis - 2024.

Alumni Meet - 2024

IT DOES NOT MATTER HOW SLOWLY YOU GO

Research Scholars of Department of Zoology with Faculty Members

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Letter No.

Date .....

Dr. Sushil Kumar Sinha
President

Message

I am delighted to go through the special edition of Departmental Magazine Zoo-Life Vol. 8th & 9th and noted that Vol.10th is under publication.

I found "Zoo-Life" magazine is having a great educative value in enhancing the knowledge of young students and encourage them to think and pen-down. It will also help in generating innovative ideas and thoughts which will certainly contribute towards nation building.

I wish all the success for the publication of **"Zoo-Life".**

(Dr. Sushil Kumar Sinha)
Chairperson, Governing Body
CMP Degree College

Prof. Ajay Prakash Khare
Principal
C.M.P. P.G. College, Prayagraj
(A Constituent P.G. College of University of Allahabad)

MESSAGE

This gives me immense pleasure to learn that Zoology department of College is publishing its departmental magazine "Zoo-life" for the academic year 2024.

I am convinced that this annual magazine of the department will bring to light the various academic and other activities of the department before students and faculty alike. The topics covered in the magazine will definitely iignite the spirit of enquiry and promote critical thinking among the students.

I congratulate Special appreciation to the assiduous editorial board and students who have endeavoured in the task of keeping Zoo-Life current and vibrant.

I wish all the success for the publication of Zoo-life"

25/10/2024

(Prof. Ajay Prakash Khare)
Principal

Dr. Vinita Jaiswal
Convener
Department of Zoology
CMP PG College
Prayagraj - 211002, (U.P.), India

MESSAGE

I am very happy to know that the magazine " Zoolife" is being published by the Department of Zoology. I am indeed delighted to note that the magazine is appearing as Vol. 10th (2024) which is "for the students, by the students and of the students".

The magazine is voice of the teachers and students of the Department as well as a platform for their free expressions. It enhances writing skills and level of subject knowledge and thereby helps improving the personality.

In this issue I have noticed a variety of contents and this diversity of topic is praise worthy.

I congratulate the teachers, students and the editorial group for their sincere efforts in bringing out this magazine.

Wish Goodluck & Best wishes,

(Dr. Vinita Jaiswal)
Convener

Dr. Hemlata Pant
Assistant Professor
Department of Zoology
CMP PG College, Prayagraj - 211006,
(U.P.), India

MESSAGE

Dear readers,

It is my pleasure to introduce the latest edition of our departmental magazine. This magazine is a culmination of the hard work and creativity of our talented students and faculty members. I extend my warm greetings and comment the creativity and aesthetic sensibility of all those who have contributed to yet 10th edition of Zoolife magazine. Today, higher education is going through a transition phase of academic innovation which has been made student oriented, then teacher oriented. Hence the role of students becomes more pivotal in this changing academic scenario. This requires students to be active, responsible participants in their own learning and with their own pace of learning. This is turn that will help the students in the future to develop skills which will be better to equip them for their professional careers. I want to extend my gratitude to everyone who has contributed to this magazine including the writers, artists, editors and advisors. Their dedication and hard work are evident on every page.

Thank you for reading and I hope you enjoy this edition of the departmental magazine.

(Dr. Hemlata Pant)
Editor

Dr. Jyoti Verma
Asst. Prof.
Department of Zoology
CMP Degree College, (Allahabad University)
Prayagraj - 211006

MESSAGE

I am writing to express my strong interest in the position of Associate editor for Zoo-life, the magazine introduced by the Department of Zoology at CMP College. I am truly impressed by how Zoo-life successfully balances in-depth scientific exploration with engaging content that appeals to a diverse audience.I appreciate the magazine's commitment to enhancing understanding of the animal kingdom and the natural world. It serves as a valuable resource for students, researchers, and anyone interested in zoology. I extend my best wishes to the entire editorial team for their hard work and dedication in contributing to this publication.I eagerly anticipate each new issue of Zoo-life and look forward to the insightful content it offers. I am excited about the possibility of contributing to one of the leading magazines in the field of zoology and advancing zoological education.

Dr. Jyoti Verma
Associate Editor

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CONTENT

Healths Perspectives of Astaxanthin, An Antioxidant

Metabolic syndromes are a cluster of metabolic disorders in the same individual. The risk factors associated with this syndrome such as atherosclerosis, hypertension, dyslipidemia, and hyperglycemia are the main reasons for increasing medical issues in industrialized countries. Oxidative stress is the main reason that causes metabolic syndrome. Oxidative stress leads chronic inflammatory and increased level of reactive oxygen species (ROS) that causes damage to DNA, proteins, and lipids.

Human body is constantly exposed to various types of agents which results in the production of reactive species known as free radicals, ROS (Reactive Oxygen Species) or RNS (Reactive Nitrogen Species) that by relocating of their free unpaired electron caused the oxidation of the cells. Oxidative damage is initiated by free radicals or Reactive Oxygen Species. These molecules have very high reactivity and are produced by normal aerobic metabolism in organisms. Excessive oxidative molecules may react with proteins, lipids and DNA through chain reaction, to cause protein and lipid oxidation and DNA damage which are associated with various disorders.

In order to counter the lethal effects of such activities the human has got endogenous antioxidant system or it obtains exogenous antioxidants from diet that neutralizes such species and keeps the homeostasis of body. An antioxidant is a molecule which can inhibit oxidation and help protect our cells from damage. Antioxidants maintain and support cell health during exposure to harmful molecules i.e. free radicals, which can accumulate in our body due to factors like pollution, stress and poor diet. Too many free radicals can lead to a state called oxidative stress, which has been linked to chronic health concerns.

ASTAXANTHIN

Astaxanthin is a lipophilic carotenoid, which is a type of pigment found in variety of plants, algae and certain kinds of seafood (crustaceans, shells, crab, salmon, trout, shrimps, crayfish). The commercial Astaxanthin is obtained mainly from *Phaffia* yeast, *Haematococcus* and through chemical synthesis. Astaxanthin produced from *Haematococcus pluvialis*, a green microalga, is a main source for human consumption. It is used as a source of pigment in the feed for salmon, trout and shrimp. For dietary supplement in human and animals, Astaxanthin is obtained from seafood or extracted from *H.pluvialis*. The consumption of Astaxanthin can prevent or reduce risk of various disorders in human and animals.

ASTAXANTHIN AS ANTIOXIDANT

It has an antioxidant activity as a scavenger of free radicals and a quencher of ROS, thereby protective native molecules (i.e. fatty acids) and cellular membranes from oxidation. Astaxanthin is considered as "Super antioxidant" because it is thought to be significantly more potent than other carotenoids like beta-carotene and lycopene. It is an antioxidant that protects the cell from damage by attenuating the reactive oxygen species due to which it has immense potential to protect the skin and other allied cells.

The antioxidant capacity of Astaxanthin is related to its unique molecular structure. It has a conjugated double bond chain, and the unsaturated ketone and hydroxyl groups, which are responsible for the high antioxidant properties. This type of conjugated double bond acts as a strong antioxidant either by attracting unpaired electrons or by donating/ provides the electrons to the free radicals to convert them to be more stable product and terminate free radical chain reaction. Thereby act as an antioxidant against free radicals. Astaxanthin showed better biological activity than other antioxidants, because it could link with cell membrane from both inside to outside.

OTHER HEALTH BENEFITS OF ASTAXANTHIN

Astaxanthin plays a key role in maintaining health in a variety of different

ways. Astaxanthin, used as a nutritional supplement, antioxidant and anticancer agent, prevents diabetes, cardiovascular diseases, and neurodegenerative disorders, and also stimulates immunization.

a. **Eye health:** Astaxanthin is known for its ability to help maintain the health of the retina and help support healthy vision.

b. **Skin health:** Astaxanthin's antioxidant properties help support skin during exposure to UV radiation. It supports normal healthy skin by improving skin elasticity and moisture and reducing wrinkle formation.

c. **Immune function:** Immune system cells are very sensitive to free radical damage. Astaxanthin offer protection against free radical damage to preserve immune system defenses. Astaxanthin can maintain the proper activity of certain immune cells. It is one of the important immune potentators in aquaculture.

d. **Brain health:** Astaxanthin can support brain functioning by maintaining cognitive health, helping to keep our mind sharp and agile. As Astaxanthin is capable of crossing the blood-brain barrier and its intake could have a healing effect on brain aging.

e. **Anti-diabetic activity:** Generally, oxidative stress levels are very high in diabetes mellitus patients. The risk of diabetes increases due to hyperglycemia and other metabolic syndromes which also stimulate ROS production in mitochondria. Astaxanthin could reduce the oxidative stress caused by hyperglycemia in pancreatic β- cells and also improve glucose and serum insulin levels. Astaxanthin can protect pancreatic β- cells against glucose toxicity.

f. **Cardiovascular disease prevention:** Astaxanthin is a potential antioxidant with anti-inflammatory activity and its effect has already examined in both experimental animals and human subjects. Oxidative stress and inflammation are patho-physiological features of atherosclerotic cardiovascular disease. Astaxanthin is a potential therapeutic agent against

atherosclerotic cardiovascular disease.

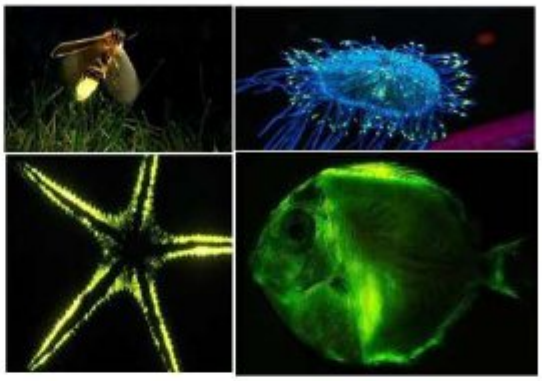
g. **Anticancer activity:** Reactive oxygen species such as superoxide, hydrogen peroxide and hydroxyl radical are generated in normal aerobic metabolism. These oxidants contribute to aging and degenerative diseases such as cancer through oxidation of DNA, proteins and lipids. Antioxidant compounds decrease mutagenesis and carcinogenesis by inhibiting oxidative damage to cells.

CONCLUSION

Astaxanthin has a powerful antioxidant property, plays a crucial role in supporting various aspects of health. Astaxanthin rich food particularly certain types of seafood and algae, offer a natural way to incorporate this beneficial compound in our diet. The significant antioxidant, anti-inflammatory, neuro-protective, skin-protective, immune modulator, antimicrobial, and anticancer activity, as well as the ability to improve lipid metabolism, make Astaxanthin a promising compound for the prevention or even treatment of different health conditions.

Dr. Uma Rani Agrawal
Retired Associate Professor,
Department of Zoology, CMP College
(A constituent college of University of Allahabad),
Prayagraj.

Bioluminiscence (Life In Darkness)



What is Bioluminescence?

When a living organism produces & emits light as a result of a chemical reaction, the process is known as Bioluminescence. It is a naturally occurring form of chemi luminescence where light energy is released by a chemical reaction. It is a cold light. The chemical reaction can occur either inside or outside the cell. All light producing organisms have light emitting pigment Luciferin & enzyme Luciferase.

Wide distribution–

Bioluminescent organisms are found throughout the biosphere but only in lower animal groups.

Some17 phyla & approx.700 genera contain luminous species. Bioluminescence has been demonstrated in cephalopods, copepods, ostracods, amphipods, many fishes, annelids & jellyfishes are few to name as marine example. On land, bioluminescent insects are fireflies, glow-worms, beetles & some Dipterans.

Bioluminescent bacteria are found both on land as well as in sea.

The tissue distribution of the bioluminescent system within an organism is variable. The key organ for bioluminescent is Photophore. It is made up of complex light emitting cells. These are found in stomach, liver and secretary organs. That is why, in dark bioluminescence is seen in various parts of body.

How does bioluminescence work – All bioluminescence reaction involve oxidation of an organic molecule – Luciferin. The reaction is catalyzed by an enzyme – Luciferase and ATP and cofactor Ca^{2+} or Mg^{2+} ions are required to enhance the reaction.

$$\text{Luciferin} + \text{ATP} + O_2 \xrightarrow[Ca^{2+}]{\text{Luciferase}} \text{oxy-Luciferin} + CO_2 + \text{AMP} + \text{PP} + \textbf{Light energy}$$

What colour is Bioluminescence - Light travels in waves. Different wave length of light gives different colour. When light wave enters our eyes they are translated into different colours by our brain. The wave lengths that our eyes can see are known as the visible light spectrum and we can see all colours of this spectrum as light travels through the air above land.

But light travels differently under water because larger wavelengths cannot travel far. Most of the bioluminescence produced in the ocean is in the form of blue – green light. This is because these colours have shorter wavelength of light.

Why animals light up – Some of the functions of bioluminescence are luminous lure, communication in dark, mating, camouflage and schooling of fish.

Applications of Bioluminescence –

1. Impact on molecular biology- The calcium dependent photo protein Aequorin from the jelly fish (Aequore avictoria) is a good example in understanding the intensity of its luminescence which varies with calcium concentration. Aequorin is used in monitoring cell calcium.
2. The Green-Fluorescent Protein (GFP) is the most famous protein in Biology. GFP is an excellent gene tag or protein tag. Its fluorescence helps in tracking protein of interest within the cell, its location and its behavior.
3. Luminescent trees are developed by incorporating genes responsible for bioluminescence. Such trees glow in the dark. Bacterial Lux Operon of photo bacterium is incorporated in plants; as a result plants produce luciferase and luciferin, resulting in a glowing plant.

Dr. Vandana Mathur
Ret. Asso. Professor
Department of Zoology, CMP College, Prayagraj

सूक्ष्म जीवों की पहचान एवं प्रकृति

वे जीव जिन्हें हम सूक्ष्मदर्शी की सहायता के बिना नही देख सकते, सूक्ष्मदर्शी यन्त्र की सहायता के बिना नही देख सकते, सूक्ष्मदर्शी कहलाते हैं। इसाके अन्तर्गत बैक्टीरिया, फंजाई, आर्कैया, प्रोटोजोआ, एल्गी तथा रोटीफर आते हैं। बहुत से अन्य जीवों के तथा पौधों के शिशु भी सूक्ष्दमर्शी होते हैं।

सर्वप्रथम एन्टोन वान ल्यवेनहक ने सूक्ष्मदर्शी से सूक्ष्मजीवों की पहचान की थी । लुईस पाश्चर तथा राबर्ट कोच ने कुछ बीमारियों के कारक के रूप में सूक्ष्मजीवियों की पहचान की थी । सूक्ष्मजीवों की दुनिया अनोखी है। सूक्ष्मजीवी हर के उस स्थान पर पाए जाते हैं, जहाँ थोड़ी सी भी नमी हो यथा वायु, जल, मिट्टी, पौधों व जानवरों के शरीर में तथा अनेक खाद्य पदार्थों में । इन जीवों में एक विशेष गुण होता है जिसके कारण ये जीव हर प्रकार के वातावरण के अनुरूप अपने को ढाल लेते हैं। सूक्ष्मजीवियों के रहने तथा पनपने के स्थान के अनुसार इन्हें कई भागों में विभाजित किया जा सकता है। जैसे :

१. वायु में पाए जाने वाले सूक्ष्मजीवी -

यद्यपि वायु सूक्ष्मजीवियों के रहने का प्राकृतिक स्थान नही है परन्तु फिर भी विभिन्न प्रकार के सूक्ष्मजीवी वायु में पाए जाते हैं। उनकी उपस्थिति वातावरण के तापमान, नमी, वर्षा होना आदि कारकों तथा वायु का खनिज व कार्बनिक पदार्थों से प्रदूषित होने पर निर्भर करती है ।

धूल तथा धुएं से प्रदूषित वायु में बहुत बड़ी संख्या में सूक्ष्मजीवी पाए जाते हैं। ये सूक्ष्मजीवी धूल व धुएं के कणों की सतह के द्वारा सोख लिए जाते हैं । लम्बे समय तक हवा में रहने पर बीमारी फैलाने वाले सूक्ष्मजीवी वायु के द्वारा ही एक स्थान से दूसरे स्थान तक पहुंच जाते हैं। पौधों, जानवरों तथा मिट्टी के द्वारा सूक्ष्मीजवों को वायु में प्रवेश मिलता है। पैनिसिलियम, यीस्ट, बैसिलस, स्ट्रेपटोमाइसिस आदि अक्सर वायु में पाए जाते हैं।

२. जल में पाए जाने वाले सूक्ष्मजीवी -

मीठे पाने जैसे नदी, झरने, झील आदि खारे पानी जैसे समुद्र तथा प्रदूषित पानी या सीवेज में कई प्रकार के सूक्ष्मजीवी पाए जाते हैं। बैसिलस स्यूडोमोनास, क्लोसट्रीडियम नाक सूक्ष्मजीवी मीठे पाने में, बैक्टीरिया, प्रोटोजोआ, एल्गी, मोल्ड्स व यीस्ट समुद्री पाने में तथा एल्गी, फंजई, बैक्टीरिया, प्रोटोजोओ आदि प्रदूषित पानी में पाए जाते हैं ।

३. मृदा अथवा मिट्टी में पाए जाने वाले सूक्ष्मजीजवी -

मृदा की ऊपरी सतह में बड़ी संख्या में सूक्ष्मजीवी पाए जाते हैं । इनकी संख्या मिट्टी के मल द्वारा प्रदूषित होने उर्वरक के प्रकार तथा अन्य कार्बनिक पदार्थों की उपस्थिति पर निर्भर होती है । इसके अतिरिक्त नमी, हवा, तामपान, अम्लीयता या क्षारीयता, मृदा में सूक्ष्मजीवियों की संख्या व प्रकार को निर्धारति करती है मृदा में बैक्टीरिया की संख्या सर्वाधिक होती है। वायुजीवी, अवायुजीवी, सेल्यूसोज, पात्रक, प्रोटीन पाचक, नाइट्रीकारी, नाइट्रोजन फिक्सिंग, कार्बन आक्सीडाइजिम

सल्फर आक्सीडाइजिंग बैक्टीरिया मृदा में पाए जाते हैं। स्ट्रेपटोमाइसिस तथा नोकार्डिया नामक बैक्टीरिया शुष्क तथा गर्म मिट्टी में पाए जाते हैं। ये बैक्टीरिया जटिल रसायनिक पदार्थों का सरल पदार्थों में

बदलने तथा कुछ पदार्थों के मिट्टी में पुनर्चक्रण का मुख्य कार्य करते हैं। ताजे जुते हुए खेतों में मिट्टी की सोंधी खुशबू के लिए भी ये बैक्टीरिया जिम्मेदार हैं।

मिट्टी में फंजाई या कवक की संख्या सूक्ष्मजीवियों में दूसरे नम्बर पर है। भूमि की सतह पर, जहाँ वायु उपस्थित हो, वहाँ मोल्ड्स की कई प्रजाति पाई जाती है। ये पौधों के सेल्यूसोज़ व सिग्निन को अपघटित करने का कार्य करते हैं। मिट्टी के कणों को बांधने का कार्य माइसीलियम करते हैं।

हरी शैवाल या एल्गी, नीली-हरी शैवाल नाइट्रोजन की स्थिर करती है तथा मृदा में कार्बनिक पदार्थ बढ़ाती है जिससे उसकी उर्वरता बढ़ जाती है।

मनुष्य के शरीर में पाए जाने वाले सूक्ष्मजीवी -

मनुष्य के शरीर में कई प्रकार के सूक्ष्मजीवी पाए जाते हैं। एन्टामीबा जिन्जीवेलिस, स्ट्रेपटोकोकस माइक्रोकोकिस आदि मनुष्य की मुखगुहा में पाए जाते हैं। न्यूमोकोकस, स्टेफाइलोकोकस मुख की श्लेष झिल्ली में पाए जाते हैं। दांतों की जड़ों में, दाँतों के बीच के स्थान में, टान्सिस्स में बहुत अधिक सूक्ष्मजीजवी पाए जाते हैं। मनुष्य की बड़ी आंत में क्लोस्टरीडियम, स्ट्रेप्टोकोकस, प्रोटियस आदि बड़ी संख्या में पाए जाते हैं। श्वसन नलिका के ऊपरी भाग में स्ट्रेपटोक्रोकस, डिप्थीरायड्स नामक सूक्ष्मजीवी तथा आँख की श्लेष्म झिल्ली में स्टेफाइलोकोकस, माइक्रोप्लाज्मा, नामक सूक्ष्मजीवी निवास करते हैं। मनुष्य की त्वचा में मोल्ड्स, यीस्ट आदि बीमारी फैलाने वाले सूक्ष्मजीवी पाए जाते हैं। जो कि त्वचा की मृत कोशिकाओं तथा निमलने वाले स्राव से अपना भोजन प्राप्त करते हैं।

५. दूध में पाए जाने वाले सूक्ष्मजीवी -

माइक्रोकोस, स्ट्रेप्टोकोकास, क्लेस्ट्रीडियम आदि सूक्ष्मजीवी दूध में पाए जाते हैं जो दूध के स्वाभाविक गुण को बदल देते हैं। इसके अतिरिक्त सासमेनेला माइक्रोबैक्टीरियम आदि रोगाणु भी दूध में पाए जाते हैं।

६. खाद्य पदार्थों में पाए जाने वाले सूक्ष्मजीवी -

स्यूडोमोनास, क्लोस्ट्रीडियम, बैसिलस, पौनिसिलियम आदि सूक्ष्मजीवी खाद्य पदार्थों में पाए जाते हैं और उन्हें सड़ाने / खराब करने के लिए उत्तरदायी हैं।

डॉ. नीरजा कपूर
पूर्व विभागाध्यक्ष (उ.प्र.) एवम् एसोसिएट प्रोफेसर,
जन्तु विज्ञान विभाग
सी.एम.पी. पी.जी. कॉलेज, प्रयागराज, (उ.प्र.)

Do You Know ?

☞ Father of parasite

-- Francesco Redi

☞ Biggest Parasite

-- Tapeworm Tetragonoporus Calyptocephalus (parasite of sperm whale) Guinea worm (Dracunculus medinensis) are the largest tissue parasites that affects human (as opposed to intestinal parasite such ar tape worm).

☞ Father of Insects

-- Jean - Henri Fabre

☞ Mother of Entomology

- Maria Sibylla Merian

☞ Father of Indian Entomology

--V. Ramakrishna

☞ Who coined the term Nematology / Who is the founder of Nematology

-- Cobb

☞ Who discovered first Nematode disease

--- Goeze ,1782.

☞ Real name of Nematodes

-- Round worm/ Eel worms

☞ Father of Indian Nematology

--Abrar Mustafa Khan

☞ Father of American Nematology and Father of Modern Nematology

---Nathan Augustub Cobb.

☞ Who identified first Nematode in India

-- Prasad, Mathur and Sehgal (1959).

☞ Who is the father of European Nematology

-- Tom Goodey.

☞ Filaria worm is

--- Wuchereria bancrofti

☞ Largest known Nematode

-- Placentonema giigantissima

☞ Smallest nematode

---+ Root - knot nematode.

☞ Largest Nematode to man

---- Dioctophyme (-Dioctophyma) renale , the giant kidney

☞ Who discovered golden cyst Nematode

-- Jones (1961).

☞ **Barber (1901) made first record of a plant parasitic nematode in kerela(India) , citing root- knot nematode.**

☞ Father of Morden Entomology

--- Reverend William Kirby

☞ Who was the First Entomologist of India

--- Lionel Niceville (appointed by Govt of India , 1901.

☞ Who was the world's greatest Entomologist

---Alfred Russel Wallace.

☞ Who discovered the first Nematode

- Steiner as Aplectana Krussei (Steinenrma Krussei in 1923).

☞ Who described the first Nematode disease

--Needham 1743 (Nematodes in wheat galls).

☞ Who gave name Anguina tritici

--- Chitwood (1935).

☞ Borellus (1653) was the first to observed and described a free living Nematode.

Which is the longest Plant - parasitic nematode

- Longidorus (Micoleljky 1922).

☞ Which is largest Nematode in intestine

- Ascaris lumbricoides.

☞ Who first discovered Nematode fungus interaction

- Atkinson (1892).

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Nutrition and Foraging Requirements of Honeybees

Introduction

Honeybees, scientifically known as *Apismellifera,* are not only diligent pollinators but also valuable honey producers, serving as linchpins in both natural ecosystems and agricultural landscapes worldwide. Their pivotal role in pollination directly impacts the health and productivity of numerous plant species, making them indispensable contributors to global food security and biodiversity conservation efforts.

The intricate relationship between honeybee foraging behaviour and their nutritional requirements underscores the delicate balance necessary for colony health, productivity, and overall survival. As honeybees traverse diverse landscapes in search of nectar and pollen, their foraging decisions are guided by an intricate interplay of factors, including floral abundance, quality, and accessibility. These foraging choices are not merely instinctual but are also influenced by the nutritional needs of the colony.

Nutrition stands as a cornerstone of honeybee health, exerting profound effects on various physiological aspects, including longevity, immunity, and reproductive success. A well-rounded diet comprising carbohydrates, proteins, lipids, vitamins, and minerals is essential for sustaining the diverse metabolic demands of honeybee individuals and colonies alike. Insufficient or imbalanced nutrition can compromise immune function, increase susceptibility to diseases and parasites, and impede overall colony growth and productivity.

Efficient foraging behaviour is paramount for honeybee colonies to thrive, as it directly impacts resource acquisition and colony sustainability. Honeybees exhibit remarkable cognitive abilities and communication mechanisms to optimize foraging efficiency, with scout bees scouting out the most lucrative floral resources and relaying pertinent information to their nestmates through intricate waggle

dances. By strategically allocating foraging efforts based on resource availability, proximity, and quality, honeybee colonies can maximize their resource intake while minimizing energy expenditure.

In this chapter, we delve into the multifaceted interplay between honeybee nutrition and foraging optimization, exploring how these fundamental aspects contribute synergistically to enhanced foraging efficiency. Through a deeper understanding of honeybee dietary needs, foraging behaviours, and ecological dynamics, we can uncover strategies to support thriving honeybee populations and bolster their invaluable contributions to agriculture and ecosystems worldwide.

Nutritional Requirements of Honeybees

Macronutrients: Honeybees require carbohydrates for energy, proteins for growth and repair, and lipids for energy storage and hormone production.

Micronutrients: Essential vitamins, minerals, and amino acids obtained from floral sources are crucial for various physiological processes, including enzymatic reactions and antioxidant defence mechanisms.

Hive Resources: Honey, pollen, royal jelly, and bee bread provide essential nutrients for honeybees, with each resource offering a unique nutritional profile and role in colony development.

Honeybee nutrition encompasses a broad spectrum of macronutrients and micronutrients essential for their growth, development, and defence mechanisms. Macronutrients such as carbohydrates, proteins, and lipids form the foundation of their dietary requirements, while micronutrients including vitamins, minerals, and amino acids play crucial roles in supporting various physiological processes.

Carbohydrates serve as the primary source of energy for honeybees, fuelling their metabolic activities and flight. Nectar, transformed into honey by bees, represents a rich carbohydrate source within the hive. This concentrated energy reserve sustains bees during periods of foraging scarcity or inclement weather, ensuring their vitality and survival.

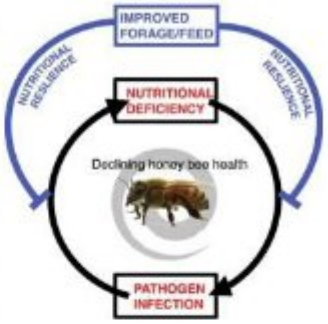
Proteins are indispensable for honeybee growth, tissue repair, and the production of essential enzymes and hormones. Pollen, collected by forager bees from flowering plants, serves as the primary protein source in the hive. As bees consume pollen, they extract amino acids necessary for larval development, adult tissue maintenance, and immune function. The proteinaceous royal jelly, secreted by nurse bees, further contributes to the growth and nourishment of young larvae, fostering their transformation into robust adult bees.

Lipids play multifaceted roles in honeybee nutrition, serving as energy reserves, structural components of cell membranes, and precursors to hormone synthesis. Bees obtain lipids primarily from pollen and nectar-derived honey, utilizing these fatty acids for flight, thermoregulation, and brood rearing. Stored in specialized cells within the hive, lipid reserves provide bees with a vital energy source during periods of foraging scarcity or hive maintenance.

Micronutrients, including vitamins, minerals, and certain amino acids, are essential for various physiological functions within the honeybee colony. Floral sources such as pollen and nectar contribute diverse micronutrient profiles, supplying bees with essential nutrients for enzymatic reactions, antioxidant defence mechanisms, and overall health maintenance. For example, pollen contains a plethora of vitamins and minerals crucial for bee health, including vitamin C, vitamin E, calcium, and zinc.

Within the hive, honeybees access a diverse array of nutritional resources to meet their dietary needs. Honey, with its concentrated carbohydrates and trace micronutrients, serves as a vital energy source and antimicrobial agent. Pollen, rich in proteins, lipids, vitamins, and minerals, provides essential nutrients for larval development, adult longevity, and immune function. Royal jelly, a protein-rich secretion produced by nurse bees, supports the growth and differentiation of young larvae into adult bees. Bee bread, a fermented mixture of pollen and honey, enhances nutrient bioavailability and storage efficiency within the hive, ensuring sustained colony health and productivity.

By understanding the intricate interplay between honeybee nutrition and hive resources, beekeepers and researchers can develop strategies to optimize colony health, resilience, and productivity. Through targeted nutritional supplementation, habitat enhancement, and sustainable beekeeping practices, we can safeguard honeybee populations and their invaluable contributions to ecosystems and agriculture.



Foraging behaviour and Optimization:

- **Foraging Dynamics:** Foraging involves scouting, resource location, collection, and return to the hive, with older workers predominantly engaging in these activities.
- **Waggle Dance Communication:** The waggle dance communication system enables foragers to convey crucial information regarding the location and quality of food sources to their nestmates, thereby facilitating efficient resource exploitation. This dance allows for precise communication of food source details, optimizing the utilization of available resources within the colony.
- **Energy Efficiency:** Honeybees strategically plan their flight paths and foraging routes to minimize energy consumption while maximizing resource acquisition. They achieve this by employing energy-efficient flight patterns, assessing risks, and engaging in collective decision-making processes to optimize foraging efficiency.
- **Risk Assessment:** Foragers assess risks such as predation, resource competition, and weather conditions when selecting foraging sites.

Foraging behaviour within honeybee colonies involves a series of distinct stages, beginning with orientation flights and progressing through scouting, resource collection, and communication. Honeybees employ a range of strategies to enhance foraging efficiency, including adopting energy-saving flight patterns, evaluating

risks, and engaging in cooperative decision-making processes.

During orientation flights, young bees acquaint themselves with their surroundings, mapping out landmarks and memorizing spatial cues to navigate effectively. Subsequently, scout bees venture out on exploratory missions to locate potential food sources. These scouts meticulously evaluate the risks and rewards associated with various foraging sites, considering factors such as the presence of predators, the abundance of flowers, and the accessibility of resources.

Once a lucrative food source is found, scout bees return to the hive and utilize the waggle dance communication system to convey detailed information about the location and quality of the newfound resource to their fellow nestmates. Through complex dance movements and pheromonal signals, scout bees communicate the distance, direction, and richness of the food source, enabling other foragers to make well-informed decisions regarding which sites to exploit. By exchanging vital information through the waggle dance, honeybees coordinate their foraging efforts as a collective, ensuring the efficient utilization of available resources. Foragers adjust their flight paths based on the communicated details, prioritizing visits to high-quality foraging sites while conserving energy during transit. Furthermore, honeybees optimize foraging efficiency by continuously assessing environmental conditions and adapting their foraging strategies accordingly. They capitalize on temporal and spatial variations in floral resource availability, maximizing resource acquisition during peak foraging periods while minimizing exposure to adverse weather conditions or potential threats from predators. In summary, honeybee colonies integrate a combination of energy-efficient flight techniques, risk assessment protocols, and collaborative decision-making processes to optimize foraging efficiency. These adaptive behaviours enable honeybees to effectively exploit available resources, contributing to the overall health and sustainability of the colony. Foraging behaviour involves multiple stages, including orientation flights, scouting, resource collection, and return to the hive.

Enhancing Foraging Efficiency: Enhancing honeybee foraging efficiency encompasses a range of strategies aimed at maximizing resource acquisition and supporting colony health and productivity.

1. **Habitat Management:**

- Planting diverse flowering plants provides honeybees with abundant and nutritious forage throughout the foraging season. This diversity ensures a continuous supply of nectar and pollen, essential for colony development and maintenance.
- Minimizing pesticide usage reduces the risk of exposure to harmful chemicals that can disrupt honeybee foraging behaviour and negatively impact colony health. Organic farming practices or targeted pesticide application can help create safer foraging environments for bees.

2. **Supplemental Feeding:**

- During periods of floral dearth, when natural forage may be limited, supplemental feeding with protein or carbohydrate-rich supplements ensures honeybees have continuous access to essential nutrients. These supplements can help sustain colony populations and maintain foraging efficiency until natural forage becomes available again.

3. **Genetic Selection:**

- Breeding programs focused on selecting honeybee traits associated with efficient foraging contribute to colony productivity and resilience. Traits such as foraging behaviour, navigation abilities, and resistance to environmental stressors are targeted for improvement through genetic selection. By breeding honeybee colonies with a propensity for efficient foraging, beekeepers can enhance overall colony performance and increase their ability to thrive in changing environmental conditions.

4. **Providing Forage Resources:**

- Creating bee-friendly landscapes by preserving natural habitats and

incorporating bee-friendly plants into urban and rural environments can expand foraging opportunities for honeybees.

- Beekeepers can establish dedicated forage areas with a diverse mix of flowering plants to supplement natural forage sources and support honeybee colonies, especially in areas with limited floral resources.

5. Education and Outreach:

- Educating beekeepers, farmers, and the general public about the importance of honeybee foraging and the role they play in pollination and ecosystem health can foster greater awareness and support for honeybee-friendly practices.
- Outreach programs that provide resources and guidance on habitat management, pesticide reduction, and sustainable beekeeping practices can empower individuals and communities to take proactive steps to support honeybee foraging. By implementing these strategies, beekeepers, conservationists, and policymakers can enhance honeybee foraging efficiency, strengthen colony health, and contribute to the conservation of pollinators and biodiversity.

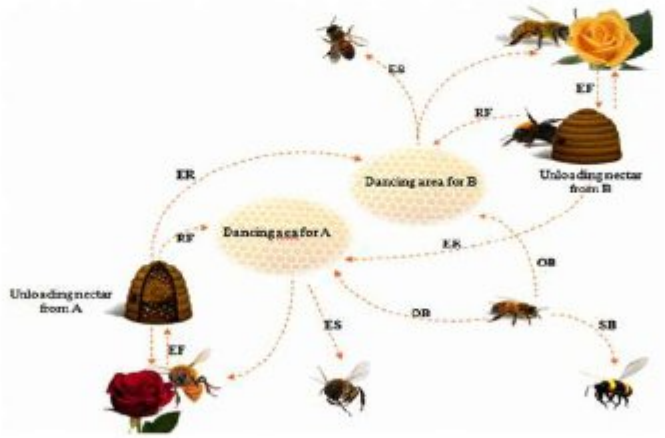


Fig: - Behaviour of Honeybee Foraging for nectar

Effects of Nutrition on Foraging Behaviour:

Cognitive Function: Adequate nutrition enhances cognitive abilities, including learning, memory, and spatial orientation, improving foraging efficiency and navigation skills.

Health and Longevity: Optimal nutrition promotes individual health and longevity, reducing susceptibility to pathogens and environmental stressors.

Behavioural Plasticity: Nutritional deficiencies or imbalances can impair foraging behaviour, leading to decreased productivity, increased mortality, and colony decline.

Supplementary Feeding: Supplementing hive resources with protein or carbohydrate-rich supplements during periods of dearth improves honeybee nutrition and foraging performance.

Pollinator Gardens: Establishing pollinator-friendly gardens with diverse flowering plants provides abundant and nutritious forage for honeybees.

Seasonal Management: Adapting management practices based on seasonal variations in floral availability and colony requirements optimizes foraging efficiency and resource utilization.

Microbial Symbiosis: Investigating the role of gut microbiota in honeybee nutrition and foraging behaviour offers potential avenues for enhancing foraging efficiency through probiotic interventions. Probiotic interventions targeting gut microbiota improve honeybee digestion and nutrient absorption, enhancing foraging efficiency and overall colony health. Seasonal management practices, including adjusting hive nutrition and forage availability based on seasonal variations, optimize foraging efficiency and resource utilization.

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The Role of Diatom-Based Biomonitoring in Sustaining River and Ecosystem Health

Introduction

Diatoms, a group of single-celled algae belonging to the class Bacillariophyta, have emerged as vital bioindicators in freshwater biomonitoring. Their sensitivity to environmental changes makes them excellent candidates for assessing water quality and ecosystem health. This chapter explores the methodologies of diatom biomonitoring, their ecological significance, and their application in maintaining river and ecosystem health.

The Importance of Diatoms in Biomonitoring

Diatoms are ubiquitous in aquatic environments and possess a rapid generation time, allowing them to respond swiftly to changes in physical, chemical, and biological conditions. They are particularly effective in indicating water quality due to their sensitivity to pollutants such as heavy metals and organic matter. Compared to other organisms like macroinvertebrates, diatoms can reveal shifts in water quality more promptly, making them indispensable for timely ecological assessments.

Methodologies for Diatom Sampling

Traditionally, diatom sampling has involved multi-substrate periphyton collection, a method that is labor-intensive and time-consuming. Recent studies have introduced the benthic kick-net technique, commonly used for macroinvertebrate sampling, as a viable alternative for bulk-sampling diatoms. This approach not only streamlines the sampling process but also allows for the simultaneous collection of both diatoms and macroinvertebrates from a single site.

Key Sampling Techniques:

Multi-Substrate Periphyton Collection: Involves collecting diatoms from various substrates, which can be labor-intensive.

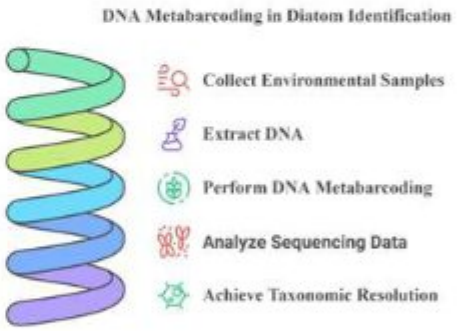
Benthic Kick-Net Method: A more efficient technique that captures diatoms along with macroinvertebrates, enhancing data collection efficiency while maintaining ecological integrity.

DNA Metabarcoding in Diatom Identification

The advent of DNA metabarcoding has revolutionized the identification process of diatom communities. This molecular technique allows for high-throughput sequencing of environmental samples, providing a comprehensive view of biodiversity within a habitat. By employing metabarcoding alongside traditional sampling methods, researchers can achieve greater taxonomic resolution and data accuracy.

Ecological Applications of Diatom Biomonitoring

Diatom indices have been developed to quantify water quality based on diatom community composition. These indices classify water bodies into different ecological statuses (e.g., good, fair, poor) based on the presence or absence of specific indicator species. Such classifications are crucial for informing management strategies aimed at restoring and maintaining river health.



Benefits of Diatom Biomonitoring:

Rapid Response to Pollution: Diatoms can indicate changes in water quality due to pollution faster than many other taxa.

Comprehensive Ecological Assessment: By integrating diatom data with other biological indicators like macroinvertebrates, a more holistic understanding of ecosystem health can be achieved.

Cost-Effectiveness: The use of kick-net techniques combined with DNA metabarcoding reduces labor costs associated with traditional sampling methods while increasing the volume and quality of data collected.

Conclusion

Diatom-related biomonitoring plays a critical role in maintaining river and ecosystem health. Their rapid response to environmental changes makes them invaluable for assessing water quality and informing management practices. As methodologies continue to evolve with advancements like DNA metabarcoding, the potential for diatoms to serve as robust indicators of ecological integrity will only increase. By leveraging these tools, conservationists and ecologists can better protect freshwater ecosystems against the lots of challenges they face today.

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Scientific Approach of Indian knowledge system (IKS)

The Indian knowledge system (IKS) is a holistic approach that integrates various aspects of human life especially mental, physical and spiritual status. It is the name actually given to entire knowledge which is accumulated by the Indians over thousands of years.IKS is a broad term that includes Jnan, Vignan and Jeevan darshan which shows evolutionary significance in terms of experimentation, observation and their interpretation. It encompasses subject diversification such as philosophy, religion, literature, art, music, dance, science and mathematics. IKS has been bestowed upon us or by our ancestors in oral, written and artistic forms although it is evolving according to the requirement of the society. It has been transmitted intergenerationally through oral traditions, written records and artistic representation. This is dynamic and ongoing tradition that constantly develops to meet the evolving demands of society. Mainly it is based upon the passing of knowledge and methodology. In the realm of scientific exploration where curiosity fuels the understanding achievements of Indian resonates like a cosmic symphony. It has strong history of scientific innovations, discoveries including vedic science& the concept of mathematics. Ancient Indian scholars and practitioners have provided a broad spectrum of valuable contributions to diverse scientific disciplines. From the prior discoveries in mathematics and astronomy by ancient scholars like Aryabhatta, Chanakya and Brahmagupta to the holistic understanding the concept of Universe in the Upanishads therefore IKS weaves a strong threads of ancient history and scientific pursuits.

"The pursuit of Indian knowledge system is the most divine pursuit in human endeavors".

Some noteworthy instances to showcase the wide ranging IKS includes- the Earth's rotation on its axis was known to "Varahamihira" and its revolution around the sun. Discovery of measurement of time and discovery of nomenclature of days, months and years and invention of calendar making was made in India. Sidhanta Latadeva (505 AD) divided the year into 12 months, seven planets of the solar system affect

the earth`s atmosphere and their names were added to the seven days of the week which was accepted all over the world. Shiromani Bhaskaracharya mentioned the force of attraction resembling gravity, discovered centuries later by Newton. The art of navigation was born in river Sindh (India) 600 years ago.

Aryabhatta (an ancient Indian astronomer), Indian played a vital role in the development of the concept of zero (0) and the decimal system which are astronomical computations. Brahmagupta was the first mathematician to treat zero as number and showed its mathematical operations. India is the birthplace of the concept of negative numbers and the use of the zero symbol. Arithmetic was discovered by Indians in about in Bhaskaracharya`s book "Lilavathi". The Arablearnt and adopted it from India and spread it to Europe. Indian mathematics has made notable progress in the fields of algebra, geometry and trigonometry. The value of pi (π) was first calculated by Budhayana and quadratic equation was discovered by Sridharacharya in India in the 11thcentury. The brick work of Harappa and Mohenjodaro excavations shows that the people of ancient India (2500 BC) possessed knowledge of geometry. Aryabhatta formulated the rules for finding the area of a triangle which led to the origin of trigonometry.

"The weights used by the Indus Valley (2500 BC) followed a binary system and measurement based on the decimal system"

Thomas Arya

The word Ayas occurs in the four vedas which denotes iron, Ashoka pillar in New Delhi is the proof of India`s metallurgical heritage. Indian metallurgists pioneered the method of extracting and purifying metals like iron, copper and zinc. They achieved a significant milestone with the production of high quality steel commonly referred to as wootz steel. The copper and bronze artefacts date back to the Indus Valley civilization. Chemistry known as Rasayan Shashtra was invented in India. Elphinston mentioned the concept of chemistry in terms of preparation of sulphate of copper, zinc and iron and carbonates of lead and iron in his book history of India. Ayurveda is the earliest school of medicine known to mankind. Ayurveda, the ancient Indian medical system priorities comprehensive wellness and employ natural therapies. It is widely acknowledged that the concept of psychosomatic

medicine emphasizes the impact of the mind on physical health. Ancient engineers built remarkable edifices such as temples, bridges and irrigation systems. The applications of advanced architectural techniques like corbelled arches and domes demonstrates their exceptional engineering skills. The social organization of knowledge is a fascinating aspects. Knowledge in India prevails and it is expressed at various levels in different areas. Research of traditional knowledge is the center of interest in the field of science and technology through innovations. IKS aims to promote traditional knowledge and native education methodologies in various disciplines such as mathematics, astronomy, philosophy, yoga, architecture, medicine, agriculture, engineering, languages, literature, sports, music, governance, politics and conservation. Furthermore, it encompasses education on indigenous ethno-medical practices, sustainable forest management and organic farming techniques. The discipline of ancient Indian scientific traditions can fulfill the role of a source of inspiration for novel problem solving methodologies and foster creativity. Gaining insight into the progression of IKS offers a more profound framework for better understanding in the advancement of scientific observations. Acquiring knowledge of about other scientific traditions cultivates feelings of global citizenship. Exposure to Indian scientific traditions augments comprehensive knowledge of scientific concepts and their awareness of the surrounding world. IKS into education enhances comprehension of science, promoting intellectual advancement and personal growth in an inclusive manner.

"India is the cradle of human race, the birthplace of human speech, the mother of history, the grandmother of legends and great grand mother of all world traditions."

Mark Twain

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Cancer

(The leading cause of death worldwide)

A non-infectious disease that is a leading cause of death globally. Cancerous Cells vs. Normal Cells Cancerous cells are characterized by uncontrolled growth, a loss of contact inhibition, and the ability to invade and damage other tissues. They can spread to distant sites through a process called metastasis. Normal cells have regulated growth, contact inhibition, and do not spread to other tissues.Types of Tumors Benign tumors: Confined to their original location, grow slowly, and cause little damage. Malignant tumors (Cancer): Invade and damage surrounding tissues, grow rapidly, and can metastasize to distant sites.Cause of Cancer Normal cells can transform into cancerous cells through the influence of various agents called carcinogens. These include: Physical agents: Ionizing radiations (X-rays, gamma rays), non-ionizing radiations (UV rays)Chemical agents: Tobacco smokeBiological agents: Oncogenic viruses (carry viral oncogenes)Diagnosis and Detection Early detection is crucial for successful treatment. Various techniques are used for diagnosis, including: Biopsy Blood and bone marrow testsRadiography (X-rays)Computed tomography (CT)Magnetic resonance imaging (MRI)Molecular techniquesAntibody-based testsTreatment Approaches Surgery: Physical removal of the tumor. Radiotherapy: Irradiating the tumor cells to kill them.Chemotherapy: Using drugs to kill cancer cells, often with side effects like hair loss and anemia. Immunotherapy: Stimulating the immune system to attack cancer cells. Prevention Education: Raising awareness about cancer and its risk factors. Healthy lifestyle: Avoiding smoking, limiting alcohol consumption, maintaining a healthy weight, and engaging in regular physical activity. Regular check-ups: Early detection through screening tests. Vaccinations: Some vaccines can protect against certain types of cancer, such as HPV-related cancers.

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Effect of Arsenic in Human Health and Plants

Introduction

Arsenic is a naturally occurring ,semimetallic element that is toxic to humans and can be found in the earth crust, air,water ,and soil . It is very toxic for human health and plants in a number of ways.

Effect in human health-

Arsenic caused many dangerous diseases such as-

1-Cancer-

Arsenic is a known carcinogen that can cause skin, lung, bladder, kidney, and liver cancer.

2-Cardiovascular disease-

Arsenic exposure can lead to cardiovascular disease, including stroke, ischemic heart disease ,and peripheral vascular disease.

3-respiratory disease-

Arsenic exposure can lead to chronic bronchitis, bronchiectasis, chronic obstructive pulmonary disease [COPD], and respiratory disease mortality.

4-Other health issues-

Arsenic exposure can also weakness , anorexia, colitis , loss of reflexes, weight loss, hair loss, and other issues.

Effect in plants-

Arsenic can cause a range of issues in plants such as-

1-Decreased yield-

Arsenic exposure can lead to a decrease in plant yield and loss of plant biomass .

2-Physiological alterations-

Arsenic exposure can lead to physiological alterations,including oxidative surge, essential biomolecule oxidation , cell permeability, and electrolyte imbalance.

3-Metabolic changes-

Arsenic exposure can impact oxidative carbon metabolism, amino acid and protein relationships , and nitrogen and sulphur assimilation pathways.

Summary-

Arsenic is present in the environment in small quantities in rock, soil, air ,and water . It can become toxic when present above permissible levels. Humans can absorb arsenic through drinking polluted water and consuming contaminated food . Plants are more susceptible to arsenic poisoning because they obtain arsenic through their roots.

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Women have been Breaking Barriers and Excelling in Diverse profession in the 21st Century

In the 21st century, the female role in zoo life has expanded to encompass various key areas, reflecting a more diverse and inclusive approach to wildlife management and conservation. Women are increasingly involved in not just animal care and conservation efforts but also in research, education, and advocacy within the zoo community. Female zoologists and researchers are conducting groundbreaking studies on animal behaviours, genetics, biochemistry and ecology, contributing valuable insights to our understanding of wildlife biology. Their research finding help inform conservation strategies, captive breeding programs, and habitat restoration initiatives aimed at preserving endangered species and biodiversity.

Moreover, women in zoo education and outreach are playing a pivotal role in fostering public awareness and engagement with wildlife issues. Through innovative educational programs, interactive exhibits, and outreach initiatives, they are working to inspire a sense of wonder and appreciation for the natural world among zoo visitors al all ages. By connecting people with nature and promoting conservation values, these women are helping to cultivate a new generation of environmentally conscious citizens. In additions, female leaders in the zoo industry are driving position change and setting a new standard for zoo management and operation. Women in executive roles, such as zoo directors and curators, and reshaping organizational policies, promoting sustainable practices, and advocating for animal welfare and conservation ethics. Their strategic vision and commitment to excellence are reshaping the zoo landscape, ensuring that zoos remain relevant and impactful in the face of increasing global environment challenges.

Overall, the female role in zoo life in the modern era is characterized by a deep passion for wildlife, a commitment to excellence, and a dedication to conservation. Women in zoo community are contributing their unique perspectives, skills, and expertise to advance the mission of zoos as centers of excellence in animal care, conservation, education, advocacy and specially in research. As the field of zoology continues to evolve, women in continue to play a vital role in

shaping the future of zoolife and working towards a more sustainable and harmonious relationship between human and animal kingdom.

Here are a few notable women who have made significant contributions to the field of zoology in the 21st century:

1. Dr. Jane Goodall - Primatologist known for her work with chimpanzees.

2. Dr. Sylvia Earle – Marine biologist and oceanographer advocating for marine

3. Dr. Hope Jahren –Geobiologist known for her work on plants and environment.

4. Dr. Birute Galdikas –Primatologist studying orangutans in Borneo.

5. Dr. Michelle Larue- Conservation biologist studying Antarctic wildlife.

Women in india have made significant strides in various fields including education, business, science, politics and more. Notable figure like **Chanda Kochher** (banking), **Indra Noyi**(former CEO), **Dipa Karmaker**(gymnast), **Kiran Mazumber-shaw**(biotech), **Kalpana Chawla** (astronaut), **Mithali Raj** (cricket) have made substantial contributions.

Last but not the least there are many wonderful Female professors in our Zoology department who are contributing in the field of Zoolife research, Notable figures like **Dr. Vinita Jaiswal, Dr. Sudhi Srivastava, Dr. Hemlata Pant, Dr. Jyoti Verma, Dr. Nidhi Tripathi, Dr. Anuradha and Dr. Charu Tripathi.**

These women have shattered glass ceiling and paved the way for future generation of Indian females to pursue their dreams and make a mark in the world. overall ,**Indian women have been breaking barriers and excelling in diverse professions in the 21st century.**

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Reg. No. 128/RES/24/Add.
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The Mesentery: A Newly Recognized Organ Revealing New Insights into Human Anatomy

For centuries, the human body has been a subject of constant study and exploration. Even with advancements in medical research, human anatomy's complexities frequently reveal new levels of intricacy. The mesentery, a structure that has been recognized as a separate organ and is providing fresh insights into human anatomy and its activities, is one such recent discovery.

What is the Mesentery?

In the past, the mesentery was thought to be a passive connective tissue that held the intestines in place and served as a conduit for blood vessels and nerves. However, new research has changed our perspective on this structure.In 2016, Dr. J. Calvin Coffey, a professor of surgery at the University Hospital Limerick in Ireland, presented compelling evidence that the mesentery is not just a collection of tissues but a distinct organ in its own right. This reclassification is based on a detailed examination of the mesentery's structure and function.

Structure and Function:

The mesentery is a fold in the peritoneum, or serous membrane that lines the abdominal cavity. It connects the intestines to the abdomen wall and contains a system of blood vessels, lymphatic vessels, and nerves. The continuous, structured nature of the mesentery, as well as its unique activities in the body, led to its identification as an organ.

The mesentery is divided into several segments, including the mesenteric root, which connects the mesentery to the abdominal wall, and the mesenteric leaves, which attach to the intestines. This organization allows it to support the intestines while also performing essential roles in digestion and immune function

Implications for Medical Science:

1. **Digestive Health:** The mesentery is important for gastrointestinal health because it supports the intestines and houses blood vessels. Disorders of the

mesentery may have an impact on nutrient absorption and digestion, emphasizing the need for additional study into disorders linked with this organ.

2. **Surgical Procedures**: Knowledge of the mesentery's anatomy could improve surgical techniques, particularly those involving the intestines.
3. **Disease Research:**The mesentery's participation in immunological responses implies that it may play a role in inflammatory and autoimmune diseases. Further research may reveal its significance in Crohn's disease and other gastrointestinal illnesses.
4. **Cancer Studies:**The mesentery's lymphatic vascular network plays an important role in cancer dissemination. Understanding its structure may provide insights into cancer spread and lead to better early diagnosis and treatment options.

Future Directions:

Research opportunities are expanded by the mesentery's new categorization as an organ. Researchers are exploring how this structure affects general health and how disruption may lead to a number of disorders. Further research into the functions and interactions of the mesentery inside the body is essential to improve medical interventions and expanding our knowledge of human anatomy.

In conclusion, the mesentery's reclassification as a distinct organ marks a significant milestone in anatomical science. As research progresses, this newfound knowledge promises to deepen our comprehension of the human body, ultimately leading to enhanced medical practices and better health outcomes.

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Genetic Diversity Loss Across the Globe: A Looming Threat to Ecosystems and Human Societies

The natural world is facing an unprecedented crisis. Human activities such as deforestation, pollution, climate change, and overexploitation of resources are leading to a catastrophic decline in genetic diversity across the globe. This loss of genetic diversity has far-reaching consequences, not only for the health and resilience of ecosystems but also for human societies that depend on them.

What is Genetic Diversity?

Genetic diversity refers to the variety of genes within a species or population. It is the raw material for evolution, allowing species to adapt to changing environments, resist diseases, and evolve new traits. Genetic diversity is essential for the long-term survival and health of populations, as it provides the necessary variation for natural selection to act upon.

The Extent of Genetic Diversity Loss

A recent study published in the journal Science revealed that genetic diversity is declining at an alarming rate across the globe. The study analyzed genetic data from over 2,000 species of plants and animals, including iconic species such as the African elephant, the Amur leopard, and the mountain gorilla. The results showed that genetic diversity has declined by an average of 15% over the past few decades, with some species experiencing declines of up to 50%.

Causes of Genetic Diversity Loss

The main drivers of genetic diversity loss are human activities that alter or destroy natural habitats. Deforestation, urbanization, and infrastructure development have led to habitat fragmentation, isolating populations and reducing gene flow. Climate change is also altering the distribution and abundance of species, leading to genetic changes and reduced diversity. Overexploitation of resources, such as overfishing and overhunting, has also contributed to genetic diversity loss.

Consequences of Genetic Diversity Loss

The loss of genetic diversity has severe consequences for ecosystems and human societies. Reduced genetic diversity makes populations more vulnerable to extinction, as they are less able to adapt to changing environments and resist diseases. This, in turn, can have cascading effects on ecosystems, leading to reduced biodiversity and ecosystem function.

Genetic diversity loss also has significant implications for human societies. Many crops and livestock rely on genetic diversity to maintain their productivity and resilience. Reduced genetic diversity in these species can lead to reduced crop yields, decreased livestock productivity, and increased vulnerability to disease.

Conservation Efforts

While the situation may seem dire, there are conservation efforts underway to protect and restore genetic diversity. These efforts include:

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ऑर्गेनिक फूड (जैविक खाद्य), इसकी कृषि,महत्व एवम् विस्तार-

ऑर्गेनिक फूड (जैविक खाद्य) से तात्पर्य है 'बिना किसी केमिकल, पेस्टिसाइड या फर्टिलाईजर के उपयोग के बिना उगाई गई फसलें'।

जैविक खाद्य का उत्पादन जैविक कृषि विधि अर्थात ऑर्गेनिक फार्मिंग मेथड के द्वारा किया जाता है। जिसमें सब्जियां (ब्रोकली,पत्तागोभी,शतावरी), फल (सेब,केला, स्ट्राबेरी, किवी इत्यादि), अनाज (गेंहू, धान, जौ इत्यादि) का उत्पादन किया जाता है। डेयरी उत्पाद भी जैविक खाद्य में शामिल हो सकते हैं।

1.केरल की एंडोसल्फान त्रासदी:-

केरल के कासरगोड जिले में एंडोसल्फान के हवाई छिड़काव से होने वाली त्रासदी को केरल एंडोसल्फान त्रासदी के नाम से जाना जाता है।

पेस्टीसाइड तथा अन्य रासायनिक तत्व हमारे लिए कितने घातक साबित हो सकते हैं इस बात का अनुमान इस त्रासदी से लगाया जा सकता है।

एंडोसल्फान एक प्रतिबंधित कीटनाशक है जो कीट एवम स्तनधारियों के लिए न्यूरोटॉक्सिक है।

इस कीटनाशक का इस्तेमाल **1980** और **1990** के दशक में बड़े पैमाने पर किया जाता था। बाद में यह मानव एवं पर्यावरण के लिए जहरीला साबित हो गया। जिसके परिणाम स्वरूप कई गंभीर बीमारियां शुरू हो गई जैसे त्वचा में जलन, तंत्रिका ऊतकों का विनास, मानव एवं जानवरों में प्रजनन एवं विकास संबंधी क्षति शामिल हैं।

2. जैविक कृषि का विस्तार:-

FibL (Forschungsinstitut Für biologischenLandbau) के अनुसार वर्तमान में **188** देशों में जैविक कृषि की जाती है और **9** करोड़ **60** लाख **(96** मिलियन) हेक्टेयर से अधिक कृषि भूमि का प्रबंधन कम से कम **45** लाख **(4.5** मिलियन)किसानों द्वारा जैविक रूप से किया जाता है। **2022** में जैविक खाद्य और पेय की वैश्विक बिक्री लगभग **135**विलियन यूरो तक पहुँच गई।

3. जैविक खेती के लिए शीर्ष **5**देश:-

यदि हम प्रथम पांच जैविक खेती करने वाले देशों की बात करें तो ऑस्ट्रेलिया प्रथम स्थान पर है। **2022** में **53** मिलियन हेक्टेयर के साथ दुनिया का सबसे बड़ा जैविक कृषि भूमि क्षेत्र ऑस्ट्रेलिया में था।

2022 में भारत **4.73** मिलियन हेक्टेयर भूमि के साथ दूसरा सबसे बड़ा जैविक कृषि भूमि क्षेत्र था। भारत में जैविक खाद्य उत्पादकों की संख्या भी सबसे अधिक थी.

वहीं अर्जेंटीना, चीन व फ्रांस क्रमशः तीसरे, चौथे और पांचवे स्थान पर हैं।

निष्कर्ष:-

जैविक खेती के कई फायदे हैं जैसे- मृदा की उर्वरता बढ़ाना, कीटनाशकों का कम इस्तेमाल होना, खाद्य पदार्थ ज्यादा पौष्टिक, स्वादिष्ट एवं गुणवत्ता युक्त होना।

इसमें किसानों की कम लागत व ज्यादा आय होती है। जो रोजगार सृजन में काफी मददगार साबित हो सकता है।

जैविक खेती में पशुओं के अपशिष्ट को खेतों में वापस खाद के रूप में उपयोग किया जा सकता है साथ ही यह भूमि के क्षरण और दोहन को रोकने में काफी मददगार साबित हो सकती है।

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1. Habitat preservation and restoration: Protecting and restoring natural habitats is essential for maintaining genetic diversity.
2. Species reintroduction programs: Reintroducing species into areas where they have become extinct can help restore genetic diversity.
3. Genetic monitoring and management: Monitoring genetic diversity and implementing management strategies can help maintain healthy populations.
4. Assisted colonization: Assisted colonization involves moving species to new areas to help them adapt to changing environments.

Conclusion

Genetic diversity loss is a pressing issue that requires immediate attention. Human activities are driving this loss, and it is essential that we take action to protect and restore genetic diversity. Conservation efforts, such as habitat preservation and restoration, species reintroduction programs, genetic monitoring and management, and assisted colonization, can help mitigate the effects of genetic diversity loss. However, it is crucial that we address the root causes of genetic diversity loss, including deforestation, pollution, climate change, and overexploitation of resources. Only by working together can we protect the natural world and ensure the long-term health and resilience of ecosystems and human societies.

Poornima Yadav
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Type I interferon activity in bacterial infection

Interferon's (IFNs) are cytokines that are crucial for immune responses, especially against intracellular infections. They interact with diverse cell-surface receptors and can be classified into two separate categories based on their structural and functional differences. Classically, type I IFNs are potent antiviral immunoregulators, whereas the type II IFNs enhances antibacterial immunity. However,in addition to type I IFNs produced in response to infection with other pathogens. An increasing number of researches indicate that type I IFNs is also critical to the host's defense against bacterial infection. Stunningly, their activity can be either favourable or detrimental, and can influence various immune effector mechanisms. Type I interferons (IFNs), a family of around 20 members, were originally described as antiviral cytokines. A family of about 20 molecules known as type I interferons (IFNs) was first identified as an antiviral cytokine. Type I IFNs have been found to have an impact on immune responses to bacteria according to more recent research. When a cell is invaded by bacteria, Toll-like receptor 4 (TLR4) or TLR9 are activated, which results in the production of IFNs in response to the infection. Stimulation of type I IFN genes by bacteria and their products requires activation of IFN regulatory factor 3 (IRF3) and/or IRF7. Prior to transcribed majority of type I IFN genes in response to infection, most body cells must raise IRF7 levels. This occurs through Janus kinase (JAK)–signal transducer and activator of transcription (STAT) signalling by the type I IFN receptor (IFNAR), which is stimulated by low amounts of type I IFNs produced at the onset of infection. Specialized cells known as IFN-producing cells (IPCs) constitutively express IRF7 and immediately produce large amounts of type I IFNs in response to bacterial signals. These cells rapidly activate IRF7 after TLR signalling. Type I IFNs increase immunity to some Gram-negative bacteria by stimulating IFN-γ production. Some studies suggest that type I IFNs inhibit the invasion of epithelial cells and that this activity limits the ability of enteric bacteria to cross the intestinal

epithelium. They influence maturation, activation, migration and survival of dendritic cells (DCs) byy regulating DC activity, they can indirectly enhance both T cell and B cell-mediated adaptive immunity to bacteria. Type I IFNs exert adverse effects during infection with at least some intracellular bacteria (*Listeria monocytogenes* and under some circumstances also *Mycobacterium tuberculosis*). This activity can be attributed to a sensitization of effector cells to bacteria-induced death.

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Udbodhan & Teachers Day Function 2024

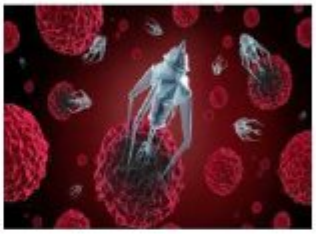





Nanobot Technology

Nanobot technology is a branch of nanotechnology that deals with the creation, manufacturing, and management of tiny machines that operate at the nanoscale. These machines are also known asnanomachines, nanorobots, or nanobots. They are tiny, ~50–100 nm wide robots that perform a specific, highly specialized task. This device can be used for a variety of purposes, including:

Medicine:



Nanobots can be utilized for precise surgery, medicine delivery, and tissue and cell healing. For instance, nanobots can be programmed to target particular medications and can use MRI and ultrasonic waves to move around the body.

Environmental monitoring:

Nanobots can be used to monitor and remediate the environment.

Cancer treatment:

The multiplication of cancer cells can be inhibited by using nanobots to identify and eliminate harmful RNA strands in genes.

Some other examples of nanobot technology include:

Carbon nanotubes:

These examples of nanotechnology exhibit distinctive mechanical, electrical, physical, and chemical characteristics that provide strength and conductivity.

Chemotaxis-driven nanobots:

These nanobots are intended to pass through blood vessels without causing damage to the vessel walls, and they are being developed for use in thrombolytic therapy.

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Marine life in deep sea ocean

Deep sea is a mysterious and fascinating place, home to a variety of unique and strand creatures. The deep ocean mirrors the depths of human curiosity and the desire to explore the unknown. Since more is known about outer space than the deep sea, it remains a symbol of mystery and discovery. The ocean, a vast expanse of saltwater, encompasses nearly 71% of the Earth's surface and homes close to one million identified species and many of which remain undiscovered. It plays a crucial role in sustaining life on our planet by regulating climate, supplying oxygen, and supporting the livelihoods of countless individuals. Oceans absorb about 25% of the CO2 humans produce, and they help regulate the Earth's temperature by absorbing heat from the sun. A large portion of the deep sea's old, dark waters contain enough oxygen. This is so because shallow polar seas are typically the source of the deepest waters, and colder water has a greater capacity to dissolve oxygen than warmer water.The Pacific, Atlantic, Indian, Arctic, and Southern oceans are the five main dimensions of oceans. In terms of volume and surface area, the Pacific Ocean is the biggest, and the Arctic Ocean is the smallest. The deep ocean is home to a wide variety of marine species, such as: Benthic creatures these creatures, which include huge tubeworms, black coral, anemones, lobsters, crabs, and yeti crabs, are found on the ocean floor and spend most of their lives on the oceans floor. Some benthic organisms, like lobster and crabs, can freely move around the ocean floor. Others, like anemones, attach themselves to the ocean floor. Examples of benthic organisms in the deep sea include: Yeti crabs, Giants tubeworms, Black corals. Whereas, pelagic organisms actively swim in the water column. Some creatures, such as zooplankton, mostly just float through space. Pelagic organisms in the deep sea include, for example: Whales, Colossal lantern, Fish squid.

Many deep-sea creatures have developed unique adaptations to survive in the harsh environment, such as bioluminescence (the ability to produce light) and the ability to withstand extreme pressure. The deep sea is home to many species of anglerfish, which use a glowing lure to attract prey in the dark. The deep sea is home to the vampire squid, which has large red eyes and a cloak-like webbing around its arms. The deep sea is also home to the Dumbo octopus, which has ear-like fins above its eyes that resemble the Disney character Dumbo. Deep-sea gigantism is a phenomenon where some species, like giant squids and amphipods, grow much larger than their shallow-water relatives. This might be an adaptation to the scarcity of food, allowing them to travel greater distances or store energy more efficiently.Since light is scarce, many deep-sea animals rely on heightened senses. Some have sensitive eyes capable of detecting faint light, while others, like certain fish and crustaceans, use vibration or chemical cues to navigate and hunt.

The deep ocean is one of the least explored places on Earth. From underwater mountains and volcanoes to deep trenches, the ocean floor is as diverse as the surface of the Earth. The Mariana Trench, for example, is deeper than Mount Everest is tall. Mystical Phenomena like glowing plankton that light up shores at night to the mesmerizing patterns of waves, oceans are filled with natural wonders that evoke a sense of awe and beauty. Oceans have been central to human exploration, trade, and culture for centuries, from ancient sea routes to modern-day scientific discoveries.

Only a small fraction of sunlight penetrates the ocean, and beyond 200 meters (the "twilight zone"), almost no light reaches. As a result, the deep ocean reflects an eerie darkness, creating a world vastly different from the surface. In deep waters, sound waves travel much farther than they do in the air, and they often reflect off underwater mountains, ridges, or even temperature layers, leading to phenomena like the "SOFAR" channel, used by marine animals and submarines for communication.

The deep ocean holds a kind of "magic" that fascinates scientists, explorers,

and dreamers alike:

1. *Bioluminescence*: One of the most magical aspects of the deep ocean is bioluminescence. Many creatures in the deep sea, like jellyfish, anglerfish, and plankton, produce their own light in the dark abyss. These glowing organisms create mesmerizing displays, lighting up the darkness with flashes, sparkles, and eerie glows. This "living light" can be used to attract mates, lure prey, or deter predators.

2. *Alien-like Creatures*: The deep ocean is home to bizarre, almost alien-looking life forms.

3. . *Hydrothermal Vents*: Deep beneath the ocean, hydrothermal vents spew mineral-rich water heated by Earth's internal heat. These vents create unique ecosystems, where strange creatures like giant tube worms, crabs, and shrimp thrive in the absence of sunlight. These deep-sea oases are powered not by photosynthesis, but by chemosynthesis, turning chemical energy into life — a process that feels magical, given how different it is from life on land.

4. *Underwater Volcanoes and Mountains*: The deep sea is home to enormous underwater volcanoes, mountain ranges, and trenches, including the Mariana Trench, the deepest part of the world's oceans. These underwater landscapes are largely unexplored and feel like magical, hidden worlds that we've barely begun to uncover.

5. . *Natural Phenomena*: The deep ocean also creates magical phenomena like glowing waves caused by bioluminescent plankton or the "milky seas" effect, where vast stretches of ocean surface glow in the dark, observed by sailors for centuries.

6. *Awe-inspiring Silence*: There's a magical quality to the deep ocean's silence, which contrasts with the noisy, chaotic world above. The deep-sea is a place of stillness and tranquility, interrupted only by the occasional sounds of marine life or shifting geological activity.

Life in the deep ocean is both astonishing and resilient, thriving in one of the

most extreme and inhospitable environments on Earth. With no sunlight, freezing temperatures, and crushing pressures, creatures of the deep sea have evolved extraordinary adaptations to survive, diverse ecosystems, unique species, feeding strategies, survival in harsh condition, reproduction and longetivity. Scientists believe that a significant percentage of deep-sea species remain undiscovered. Every time new technology enables us to explore deeper, new creatures are found, many of which are completely unlike anything seen before.

With only a fraction of the ocean floor mapped or explored, the deep ocean remains one of the last frontiers on Earth. Submersibles like Alvin and ROVs (remotely operated vehicles) have made incredible discoveries, but much of the deep sea is still a mystery. The Bermuda Triangle, a region in the western part of the North Atlantic Ocean, has long been associated with mysterious disappearances of ships and planes. Some speculate that deep ocean currents or underwater anomalies could be responsible for these phenomena, though no concrete evidence has been found while much of the legend can be attributed to navigational errors or natural events, the deep waters in this area still evoke a sense of mystery. Strange sounds have been detected in the deep ocean that scientists have yet to fully explain. One of the most famous is the "Bloop," a powerful, ultra-low-frequency sound recorded in 1997. Initially thought to be generated by a massive unknown creature, it is now believed to have been caused by icebergs breaking apart. Other unexplained deep-sea noises, such as the "Julia" and the "Upsweep," continue to puzzle scientists, adding to the aura of mystery surrounding the ocean's depths.

Whale falls, or dead whale falls, produce an ecosystem that can endure for many years as the carcass of the whale sinks to the bottom. An array of specialized organisms and scavengers, many of which are relatively new, can be found living in these whale falls. Deep-sea ecosystems remain mysterious because more remains to be discovered about the life cycle of a whale fall, from the first scavengers to the microbes that eventually break down the bones. Especially through fishing and aquaculture, the oceans supply a large amount of the world's food. For billions of

people around the world, fish and seafood are important sources of protein and essential nutrients. Fishing, aquaculture, and seafood processing are among the sectors of the ocean economy that provide a living for millions of people globally. Oceans are crucial for researching the effects of climate change. Scientists can forecast and address climate-related issues by keeping an eye on ocean temperatures, sea level rise, and currents. Mineral resources found in the oceans are valuable and include rare minerals, gas, and oil. The resources used in offshore mining and drilling are vital for technology and energy. Oceans have the capacity to produce renewable energy, including wave, tidal, and ocean thermal energy, all of which can support environmentally friendly energy sources.

To sum up, the deep ocean is one of the last uncharted territories on Earth and a place of great mystery and unrealized potential. There is still much to learn about its immense depths, despite its vital role in maintaining biodiversity, controlling climate, and providing hints about the origins of life. Scientists are still fascinated and perplexed by the peculiar life forms and ecosystems that have evolved as a result of the extreme pressure, darkness, and cold of the deep sea. The mysteries of the deep ocean remind us of the boundaries of human knowledge and the countless possibilities that still lie beneath the waves, from alien-like creatures to hidden geological wonders.

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Happy Hormones

What are "Happy Hormones"? when we ask ourselves what makes us happy, we often think of the circumstances, possessions, or people in our lives. In reality happiness is largely a chemical experience. people have lots of problem in their life and due to which stress affecting them adversely. Now a days stress affecting our mental health. Mental health issue been always there in our society and will continue to do so in days to come.

Mental Health is a very important aspect of a healthy life. But what does actually Mental Health mean? Mental health refers to cognitive, behavioural and emotional well-being. It is all about how people think, feel, and behave. People sometimes use the term "mental health" to mean the absence of a mental disorder. Mental health can affect daily living, relationships, and physical health. However, this link also works in the other direction. Factors in people's lives, interpersonal connections, and physical factors can all contribute to mental health disruptions. Looking after mental health can preserve a person's ability to enjoy life. Doing this involves reaching a balance between life activities, responsibilities, and efforts to achieve psychological resilience. Conditions such as stress, depression, and anxiety can all affect mental health and disrupt a person's routine.

According to World Health Organization, "Mental health is a state of well-being in which an individual realizes his or her own abilities, can cope with the normal stresses of life, can work productively, and is able to make a contribution to his or her community". There islack of awareness among the people when it comes to issues related to Mental Health.

A lot of people are suffering silently and one must understand that mental health problems are as damaging to one's health as physical ailments and sickness. We must also understand that Mental Health problems can lead to serious health problems if not addressed at the right time. However, there are several ways to treat

mental health problems readily available be it through medical practitioners and medications, regular sessions with trained psychiatrists, psychologists, psychotherapists, etc. But the most important thing we all should know is that mental health is a very personal affair and no matter what it all boils down to the individual himself and when it comes to treating mental health issues self- help is the best help. Now this brings us back to the "Happy Hormones".

Mental Health is a very important aspect of a healthy life. But what actually does Mental Health mean? Mental health refers to cognitive, behavioural, and emotional well-being. It is all about how people think, feel, and behave. People sometimes use the term "mental health" to mean the absence of a mental disorder.Mental- health can affect daily living, relationships, and physical health. However, this link also works in the other direction. Factors in people's lives, interpersonal connections, and physical factors can all contribute to mental health disruptions. Looking after mental health can preserve a person's ability to enjoy life. Doing this involves reaching a balance between life activities, responsibilities, and efforts to achieve psychological resilience. Conditions such as stress, depression, and anxiety can all affect mental health and disrupt a person's routine.

According to World Health Organization, "Mental health is a state of well-being in which an individual realizes his or her own abilities, can cope with the normal stresses of life, can work productively, and is able to make a contribution to his or her community."

Now coming back to the overall situation at the moment in Nagaland we can definitely say there is a total lack of awareness among the people when it comes to issues related to Mental Health. The current ongoing pandemic has also contributed a lot to mental stress and anxiety among the people. A lot of people are suffering silently and one must understand that mental health problems are as damaging to one's health as physical ailments and sickness. We must also understand that Mental Health problems can lead to serious health problems if not addressed at the right time. However, there are several ways to treat mental health problems readily

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In reality, happiness is largely a chemical experience. Four main neurochemicals, hormones, and neurotransmitters generated in the brain are fundamentally responsible for creating the sensations and emotions we've come to associate with happiness. Serotonin, dopamine, oxytocin, and endorphins are famously happy hormones that promote positive feelings like pleasure, happiness, and even love. Now let us further delve into more details about these four happy hormones.

Endorphins are opioid neuropeptides, which means they are produced by the central nervous system to help us deal with physical pain. They also make us feel lightheaded, and even giddy at times. One non-painful (well, not too painful) way to induce endorphins is exercise. Endorphins are released after both aerobic and anaerobic exercise. In one study, as little as 30 minutes of walking on a treadmill for 10 days in a row was sufficient to produce a significant reduction in depression among clinically depressed subjects.

Serotonin may be the best-known happiness chemical because it's the one that antidepressant medication primarily addresses. Serotonin is neurotransmitter that is naturally triggered by several things we can do each day. Exposure to bright light, especially sunshine, is one way to increase serotonin. Exercise and happy thoughts also stimulate production of this chemical. Some research has found that a higher intake of tryptophan-heavy foods, relative to other foods in the diet, may do the trick as well.

Dopamine is a neurotransmitter often referred to as the "chemical of reward." When you score a goal, hit a target, or accomplish a task, you receive a

pleasurable hit of dopamine in your brain that tells you you've done a good job. But you can also get a natural dose of dopamine when you perform acts of kindness toward others. Volunteering has been shown to increase dopamine as well as have other long-term health benefits. And some research has even found that it only takes thoughts of loving kindness to bring on the dopamine high.

Mothers may be familiar with oxytocin, the hormone produced in abundance during pregnancy and breastfeeding. Oxytocin is primarily associated with loving touch and close relationships. This hormone provides a multiple whammy of warm fuzzies, by stimulating dopamine and serotonin, while reducing anxiety. To get your hit of oxytocin spend quality time with your loved ones, even spending time and playing with pets definitely helps.

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Digitalization : A Necessary Evil in This Modern World

Imagine waking up to the gentle buzz of your smart phone, the device that has replaced alarm clocks, calendars, and even physical wallets. In this modern world, digitalization is no longer a choice; it has seeped into every corner of our lives, from the way we communicate to how we shop, work, and even relax. Yet, while the marvels of digital progress are undeniable, one must ask: at what cost?

On one hand, digitalization has simplified tasks that once required immense time and effort. Need groceries? A few taps on an app, and they're delivered to your doorstep. Planning a trip? Digital maps and online booking systems make it effortless. Even education has transformed, with virtual classrooms bringing knowledge to anyone, anywhere. These conveniences make life smoother, offering a sense of control over time and resources.

But on the other hand, the digital world has blurred the line between work and leisure, public and private. Many of us are perpetually tethered to our devices, checking emails during dinner or scrolling through social media before bed. This constant connectivity, while enabling, is also draining. Mental health experts warn about the rising tide of anxiety, depression, and burnout stemming from digital fatigue.

Consider the irony of a family dinner where everyone's eyes are glued to their screens rather than engaging in conversation. Or the frustration of being inundated with notifications that demand immediate attention, robbing us of the ability to focus deeply. These are the silent costs of a life dominated by digitalization.

Moreover, the digital realm has cultivated a culture of instant gratification. A

video buffers for two seconds, and we're annoyed. A text goes unanswered for five minutes, and we're anxious. This dependency on speed and immediacy has eroded our patience and, to an extent, our ability to savor life's slower moments.

Yet, can we entirely shun digitalization? Likely not. It's the backbone of global economies, modern healthcare systems, and even environmental conservation efforts. The challenge lies in finding balance—embracing the good it offers while mitigating its pitfalls. Maybe it's about setting boundaries: no screens at meals, designated digital detox hours, or simply rediscovering the joy of a handwritten letter.

Digitalization is, indeed, a necessary evil. It's a double-edged sword that can either cut us free from inefficiencies or entangle us in its complexities. The key is to wield it wisely, remembering that the most meaningful aspects of life—relationships, mindfulness, and personal growth—still exist outside the glow of a screen.

Ayesha Rais
Research Scholar
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University of Allahabad, Prayagraj, (U.P.)

Rangoli Competition

Some Interesting and Amazing Facts of Moths:

- Their wings are made up of millions of microscopic scales.
- Generally Adult moths do not have jaws.
- Moths are one of the most significant pollinator species, second only to bees and butterflies in their contribution to seed and food output.
- We are more familiar with moths found in the shape of insects, which constitute a very small portion of the moths discovered.
- They are also eaten by birds, foxes, and other animals.
- Moths are typically discovered at twilight, but some species can also be found during the day.
- It is so much in number that if we catch 10 species, 9 of them are moths and 1 butterfly.
- There is a lot of difference in their physical size. Their size can range from 3 millimetres to 28 centimeters.
- Male moths are extremely sensitive to scent.
- Moths are more attracted towards light bulbs, bananas and beer.

Measures for Moth's Conservation:

- Grow regional and indigenous flora in your yard, and encourage others to do the same.
- Protect the wild region where milk grass grows.
- People should be made conscious of their importance and protection.
- Gardening should not involve the use of insecticides.
- Expand the number of blooms you plant in your yard.
- Use light only when essential.

Shivanshu Rathaur
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University of Lucknow, (U.P.)

The Power of Knowledge and Education

Beneath the sky, where dreams reside,
Education blooms, our humble guide.
A candle's glow in the darkest night,
The beacon of hope, a source of light.
It starts with a word, a curious mind,
A quest for answers, truths to find.
From letters and numbers to worlds unknown,
Through books and lessons, the seeds are sown.
A child's laughter, the teacher's care,
A classroom's wisdom, beyond compare.
With every question, every spark,
We light a path through shadows dark.
The power to dream, to stand and speak,
To rise above, to learn and seek.
It builds a bridge, it mends the wall,
Education, the greatest gift of all.
For young and old, for rich and poor,
It opens windows, unlocks the door.
To lands of science, art, and lore,
A boundless ocean, a timeless shore.
So, cherish the books, the teachers' voice,
The chance to learn, the precious choice.
For in its roots, we find our place,
A better world, a human race.
Let education shine, a sun so bright,
Guiding us all from dark to light.

A timeless treasure, forever new,
The power of knowledge belongs to you.

Education gives us, the ability to understand,
the mysteries of life apart from knowledge.
Education is just like the first milk of
mother, gives immunity,but knowledge,
is just like the roar voice of lions.
The education is just, like a weapon,
Decide you how to use is.

Pushpendra Yadav
Research Scholar
(Aligarh Muslim University), Aligarh, (U.P.)

Other Activities

दैनिक जागरण प्रयागराज, 05 दिसंबर, 2024

सीएमपी डिग्री कालेज में आयोजित डायमंड जुबली फेस्ट में मंचासीन अतिथि • लो कालेज

सीएमपी कालेज में डायमंड जुबली फेस्ट का आयोजन

प्रयागराज : सीएमपी कालेज के वनस्पति विज्ञान विभाग में गोल्डन जुबली फेस्ट का आयोजन हुआ। संयोजक डा. अमिता पांडेय और आयोजक डा. कीर्ति राजे सिंह एवं डा. पल्लवी राय ने आयोजन में भूमिका निभाई। छात्रों के विकास के लिए वाद-विवाद, रंगोली और स्केच आदि प्रतियोगिताओं का आयोजन किया जाएगा। पहले दिन आयोजित विज्ञान प्रतियोगिता में सभी विभागों के छात्र-छात्राओं ने भाग लिया। कार्यक्रम में जज डा. हेमलता पंत, डा. निधि त्रिपाठी तथा डा. विजय प्रताप सिंह आदि शामिल रहे।

Title and conclusion of the work carried out (Maximum 300 words):

CSTUP-SRFP Project Report

Department of Civil Engineering Indian Institute of Technology (IIT) Roorkee

1. Determination of moisture content (MC) in soil of river Yamuna (15 samples) and Lake Sanjay (15 samples)

Titles along with Conclusion

In 2 months of srfp program I go through with quality analysis of various soil and water sample, belongs to river Ganga, Yamuna and lake Sanjay. The moisture content of soil along the Yamuna River and near Sanjay Lake can vary significantly depending on several factors such as location, season, weather conditions, and human activities samples are typically tested in a laboratory to determine the precise moisture content.

* **Heavy metal contamination in the Ganga River** aims to analyze the concentration of heavy metals along stretches of the Ganga River Water samples were collected from multiple locations along the river's course. The samples underwent vacuum filtration to isolate particulate matter and dissolved heavy metals quantify the levels of heavy metals, including lead (Pb), cadmium (Cd), arsenic (As), mercury (Hg), and chromium (Cr). The results indicate spatial variations in heavy metal concentrations, with higher levels detected in industrial and urban areas.

Additional study investigates **the identification and quantification of microplastics in water samples** This multi-faceted approach allowed for accurate detection and characterization of microplastics, ranging in size, shape, and polymer type, like beads, fragments, fibers in water bodies and in aquatic organisms.

Further **Total Organic Carbon (TOC) determination study presents a detailed methodology for the quantification of TOC in water samples collected from Yamuna River** Results indicate elevated TOC levels in areas impacted by agricultural runoff, industrial discharges, and urban wastewater, suggesting a strong correlation with land use practices and pollution sources. Here I use Walkley-Black method," which is a titration-based technique used to estimate soil organic carbon (SOC).

Student's remark on how this training will be useful in his/her studies and career(Maximum 100 words):

The journey of summer research fellowship Training Program has been started from 5 June 2024. First of all, this provide a golden opportunity to work with experienced Professors of the prestigious college {Indian Institute of Technology Roorkee (IITR) Uttarakhand} where I get chance toutilize my maximum potential in terms of knowledge and experience. this program was exclusively helpful for the future perspective as well, by this training I learned all related things regarding my field. This was also helpful to get pre- experience about research. The wonderful part of srpfis,it's financially supported their students which facilitates the study and training program specially for the girls. Thanks to srpfcstup and the respected members for all these arrangements.

Shreshthata Srivastva

Guide: Prof. Bhanu Prakash Vellanki

M.Sc.: Zoology Department

CMP Degree College (University of Allahabad)

Prayagraj

Plastic Pollution in Oceans and Plastic Eating Fungi:

Introduction:

Plastic is a synthetic, organic polymer made from fossil fuels, such as gas and petroleum. Over 460 million metric tons of plastic are produced every year for use in every sectors worldwide(According to United Nation Environment Program). An estimated 20 million metric tons of plastic litter end up in the environment every year. The amount is expected to increase significantly by 2040.Plastic pollution affects all land, freshwater, and marine ecosystems. It is a major driver of biodiversity loss and ecosystem degradation and contribute to climate change. As plastic pollution is a transboundary issue, a global plastics treaty is needed to ambitiously reduce plastic production, phase out harmful subsides, eliminateproducts and chemical of concern, and adopt strong national plans and rigorous reporting and compliance mechanism. Due to solar radiation, wind current and other natural factors, plastic break down in smaller plastic particles known as microplastic(smaller than 5 mm in size) and nanoplastic(smaller than 100 nm in size) particles. Primary microplastic particles are also shed by products such as synthetic textile and tyres, through abrasion. Nanoplastic are able to cross cell membrane walls and enter living organisms.

What is the source of plastic pollution?

Fishing Waste-

Rivers are the main source of ocean plastic pollution, but there is another major source of plastic in the Great Pacific Garbage Patchfishing gear. Where most plastic in the coastal waters comes from land- based sources, the Great Pacific Garbage Patch is different. Infact, research shows that about 80% of the plastic in the GPGP comes from fishing activities at sea. By- catch problem is also one of the causes of ocean plastic pollution.

Microplastic Sources-

Microplastic are much more difficult to clean up, and because of their small

size, their bioavailability increases, meaning they can potentially impact more species than larger objects. The Ocean Cleanup remove plastic object from the ocean while they are still at a larger macroplastic size, to prevent these objects from breaking into smaller pieces and eventually forming microplastic.

Land- Based Sources (80% of Ocean Plastic)-

These are the leading contributors to ocean plastic pollution.

- **Urban Runoff:** Trash and plastic waste from cities are carried to rivers and oceans through storm drains.
- **Mismanaged Waste:** Poor waste management, especially in developing countries, leads to plastic being dumped in waterways.
- **Littering:** Improperly discarded plastic items such as bottles, bags and wrappers are carried by wind or rain into water system.

Trapped in the Gyres-

It can take years for a plastic piece to break free from these coastal waters and be carried out to the open ocean- but once it's out there,it can stay therefor a long time. Plastic accumulates in the huge subtropical oceanic areas called gyres- massive circular currents that trap the floating plastic for decades, if not centuries. There are five gyres in our oceans. The most polluted -and best studied- is the infamous- GREAT PACIFIC GARBAGEPATCH, located in the North Pacific Ocean, between Hawaii and California.

Where does plastic pollution go?

Most plastic either sinks or beaches within a month-

Nearly half of the plastic sinks directly because of its low buoyancy. Of the other half which float, research shows most of it doesn't go far out in the ocean- about 80% of floating plastic will beach on a coastline within a month of leaking into the ocean.

If we take a PET bottle as an example; it is likely to sink as it fills up with water, but the cap, which is made of different type of plastic (HDPE), will stay afloat for much longer. High density polyethylene(HDEP) products are most likely to travel long

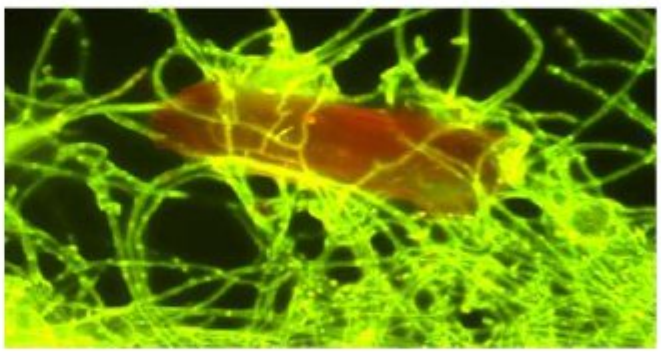
distances.

The closer the plastic is to a river, and the closer that river is to the ocean, the greater the chances that the plastic will reach the ocean. **Therefore, coastal cities in middle income countries are the world's plastic emissions hotspots.**All these factors taken into account led to our study from 2021 identifying 1000 rivers worldwide representing almost 80% of ocean plastic emissions.

All About Plastic Eating Fungi-

Researchers found that the fungus ***Parengyodontium album*** degrades UV-exposed polyethylene in the ocean, suggesting that similar fungi might also break down plastics in deeper waters. Researchers, including those from NIOZ, have discovered that a marine fungus can decompose the plastic polyethylene after it has been exposed to UV radiation from sunlight. Their findings, published in the **Journal Science of the Total Environment**, suggest that numerous other fungi capable of degrading plastic likely reside in the deeper regions of the ocean.

The fungus *Parengyodontium album* lives together with other marine microbes in thin layers on plastic litter in the ocean. Marine microbiologists from the Royal Netherlands Institute for Sea Research (NIOZ) discovered that the fungus is capable of breaking down particles of the plastic polyethylene (PE), the most abundant of all plastics that have ended up in the ocean. (The NIOZ researchers cooperated with colleagues from Utrecht University, the Ocean Cleanup Foundation and research institutes in Paris, Copenhagen, and St Gallen, Switzerland).



Researchers have found that the marine fungus Parengyodontium album can break down polyethylene in the ocean when exposed to UV light, suggesting the presence of more plastic-degrading fungi in deeper waters. A plastic particle (red) is

colonized by the marine fungus Parengyodontium album. Credit: Annika Vaksmaa/NIOZ

How actually they have studied this?

The researchers went to find the plastic-degrading microbes in the hotspots of plastic pollution in the North Pacific Ocean. From the plastic litter collected, they isolated the marine fungus by growing it in the laboratory, on special plastics that contain labelled carbon. Vaksmaa: "These so-called 13C isotopes remain traceable in the food chain. It is like a tag that enables us to follow where the carbon goes. We can then trace it in the degradation products." Vaksmaa is thrilled about the new finding: "What makes this research scientifically outstanding, is that it can quantify the degradation process." In the laboratory, Vaksmaa and her team observed that the breakdown of PE by *P. album* occurs at a rate of about 0.05 percent per day. "Theirmeasurements also showed that the fungus doesn't use much of the carbon coming from the PE when breaking it down. Most of the PE that *P. album* uses is converted into carbon dioxide, which the fungus excretes again." Although CO2 is a greenhouse gas, this process is not something that might pose a new problem: the amount released by fungi is the same as the low amount humans release while breathing.

Conclusion-

Inconclusion, plastic pollution is a growing environmental crisis that poses significant risks to ecosystems, wildlife, and human health. The widespread use and persistence of plastics in nature have led to a build-up of non-biodegradable waste that takes centuries to decompose, causing harm to oceans, soil, and wildlife. However, the discovery of plastic-eating fungi offers a promising potential solution to this escalating problem.

BY-

Garima Singh

M.Sc., Zoology Department

CMP Degree College (University of Allahabad)

Prayagraj

Tips for maintaining a healthy lifestyle

Staying healthy involves a mix of physical, mental, and social well-being, like

Physical Health

1. **Balanced Diet:** Focus on whole foods like fruits, vegetables, whole grains, lean proteins, and healthy fats. Limit processed foods and added sugars.

2.Regular Exercise: Aim for at least 150 minutes of moderate aerobic activity or 75 minutes of vigorous activity each week, along with strength training twice a week.

3.Hydration: Drink plenty of water throughout the day. Limit sugary drinks and excessive caffeine.

4. Sleep: Aim for 7-9 hours of quality sleep each night. Establish a regular sleep schedule and create a restful environment.

Mental Health

1. Mindfulness and Meditation: Practice mindfulness or meditation to reduce stress and improve focus.

2. Stay Connected: Maintain relationships with friends and family. **Social support is vital for mental well-being.**

3. Limit Screen Time: Reduce time spent on screens, especially social media, to avoid negative comparisons and stress.

Preventive Care

1.Regular Check-ups: Visit your healthcare provider for routine screenings and vaccinations.

2. Listen to Your Body: Pay attention to any changes in your health and seek help when needed.

Lifestyle Choices

1. Limit Alcohol and Avoid Smoking: These can have significant long-term health impacts.

2. Stay Educated: Stay informed about health and wellness and adapt to new information and guidelines.

Incorporating these habits gradually can lead to a healthier lifestyle.

Rupal

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Natural Products In Medicine focusing on use of *Nigella sativa* also known as kalonji or black seed or Mangrel or fennel seeds in battling against dengue fever

Natural Products are compounds derived from living organisms they are vital source of drugs and have been used in traditional medicine for centuries.It's major contribution to drug discovery are Penicillin an antibiotic was originally derived from a fungus.Morphine a powerful pain reliever was derived from opium poppy.

A recent study reveals that seeds of ***Nigella sativa*** contains a minute compound called Dithymoquinone. This compound is believed to be beneficial in the battle against dengue fever the compound could eliminate the **DENV-3 NS5 MTase** Utilising advanced computational methods a showdown between **Dithymoquinone and DENV-3 NS5 MTase** active site was orchestrated.

The mosquito vector ***Aedes aegypti*** spreads infectious illness dengue. Dengue illness is widespread in more than 100 countries and millions of new cases are reported each year. Hospitalisation and symptoms such as dengue hemorrhagic fever (DHF). Intense joint and muscular agony that seems to be breaking bones is also one of the symptoms, hence the term 'break-bone fever'.

There are four distinct but closely related serotypes of Dengue virus (DENV), which is a genus of flavivirus and a member of the Flaviviridae family. These serotypes are DENV-I, DENV-II, DENV-III and DENV-IV. Seven non-structural (NS) proteins make up the dengue virus: NS-1, NS-2a, NS-2b, NS-3, NS-4A, NS-4B and NS-5.The NS-5 exhibits methyltransferase activity at its N-terminus and RNA-dependent RNA polymerase (RdRp) activity at its C-terminus, making it a major drug target.The ideal target for developing inhibitors for flavivirus infections is NS-5 protease due to its significant role in viral replication. There are two types of DENV NS-5 RdRp inhibitors: nucleoside inhibitors, which

serve as an RNA chain terminator by interfering with the polymerase's binding site, and non-nucleoside inhibitors, which exhibit enzymatic activity by acting at the allosteric site of the protease (NS-5).

New medications to treat a variety of ailments are increasingly being developed using natural items as a source. Plants including *Momordicacharanthia* (bitter melon),*Carica papaya* (papaya)are said to have anti-DENV effects. The plant ***Nigella Sativa*** has historically been used as a natural treatment for a variety of disorders such as inflammations, asthma, hypertension, bronchitis, diabetes. Quinones are secondary metabolites derived from plants that fall into one of four categories: benzoquinone, naphthoquinone, phenanthrenequinone and anthraquinone. These categories are based on the number of fused benzene rings in the structure of the compound. Using in silico methods the anti-DENV NS55 MTase activity of quinones of ***N. Sativa*** are examined. Three main quinones from ***N. Sativa*** have viable anti-DENV effects since they attach to the active region of target protein. The secret to preventing viral reproduction and replication is to inhibit this enzyme or protease. Based on the estimated binding energy value. Dithymoquinone had the highest binding energy (-43.6164 kcal/mol) studies have demonstrated that all molecules can be used as potential drug candidates for the treatment of DENV-3 NS5 MTase .The molecular docking results study provided information about the possible effectiveness of quinones from ***N. Sativa*** against DENV-3 NS5 MTase. Dithymoquinone appears to contribute to the anti-DENV effect.

So, the next time you're adding a pinch of ***Nigella Sativa*** to your favorite dish, remember you might just be contributing to the battle against dengue, one savoury meal at a time.

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MSc Zoology IIIrd Semester

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The Photosynthesis Upgrade: Creating Super Crops for a Changing World

(New research reveals how modifying genetic regulators in plants might shift less efficient C3 photosynthesis to the more robust C4 method, offering a promising strategy for improving crop yields in a warming world)

Scientists have traced the evolutionary path from C3 to C4 photosynthesis, discovering key regulatory changes that could enhance crop resilience and efficiency. This groundbreaking research paves the way for agricultural advances that could help combat the effects of global warming.

Photosynthesis Evolution

Over 3 billion years ago, photosynthesis first appeared in ancient bacteria on an Earth completely covered by water. Over millions of years, these bacteria evolved into plants, adapting to changing environments along the way. About 30 million years ago, a significant advancement occurred: some plants developed a more efficient form of photosynthesis. While plants like rice retained the older C3 method, others, such as corn and sorghum, adopted the more advanced C4 photosynthesis.

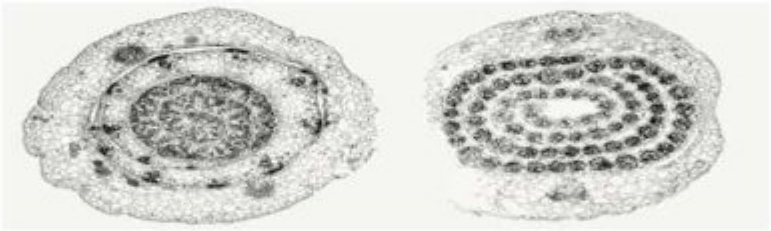
Today, there are over 8,000 species of C4 plants, thriving in hot, dry climates and ranking among the world's most productive crops. Despite this, the majority of

plants still rely on the less efficient C3 process. This raises an intriguing question: how did C4 photosynthesis evolve, and is it possible to bring this efficiency to C3 plants?

Breakthrough in Plant Efficiency Research

Now, for the first time ever, Salk scientists and collaborators at the University of Cambridge discovered a key step C4 plants like sorghum needed to take to evolve to become so efficient at photosynthesizing—and how we could use this information to make crops like rice, wheat, and soybeans more productive and resilient against our warming climate.

"Asking what makes C3 and C4 plants different is not just important from the basic biological perspective of wanting to know why something evolved and how it functions on the molecular level," says Professor Joseph Ecker, senior author of the study, Salk International Council Chair in Genetics, and Howard Hughes Medical Institute investigator. "Answering this question is a huge step toward understanding how we can make the most robust and productive crops possible in the face of climate change and a growing global population."



(Cross sections of C3 rice (left) and C4 sorghum (right) shoots. Both grain crops evolved from a common ancestor, but sorghum evolved to photosynthesize more efficiently.)

Understanding C3 and C4 Photosynthetic Processes

Around 95% of plants use C3 photosynthesis, in which mesophyll cells—green spongy cells that live inside leaves—turn light, water, and carbon dioxide into plant-powering sugars. Despite its high prevalence, C3 photosynthesis

has two major shortcomings: 1) 20% of the time, oxygen is accidentally used instead of carbon dioxide and must be recycled, which slows down the process and wastes energy, and 2) pores on the leaf surface are open too frequently while waiting for carbon dioxide to enter, causing the plant to lose water and become more vulnerable to drought and heat.

Fortunately, evolution has solved these issues with C4 photosynthesis. C4 plants recruit bundle sheath cells, which normally serve as leaf vein support, to photosynthesize alongside mesophyll cells. As a result, C4 plants eliminate those oxygen-use mistakes to conserve energy and keep plant surface pores closed more often to conserve water. The result is a 50% increase in efficiency compared to C3 plants.

Genetic Insights Into C3 to C4 Evolution

But on the molecular level, what made C3 plants turn into C4 plants?

To answer these questions, Salk scientists employed cutting-edge, single-cell genomics technology to look at the difference between C3 rice and C4 sorghum. While previous methods were too imprecise to distinguish neighboring cells like mesophyll and bundle sheath cells, single-cell genomics allowed the team to investigate the genetic and structural changes in each cell type from both plants.

The Future of Photosynthesis in Agriculture

All cells within an organism contain the same genes, but which genes are expressed at any given time is what determines each cell's identity and function. One way that gene expression can be modified is through the activity of transcription factors. These proteins recognize and bind to small stretches of DNA near the genes, called regulatory elements. Once in position at the regulatory element, a transcription factor can help turn the nearby genes "on" or "off."

When measuring gene expression in rice and sorghum plants, the scientists found that a transcription factor family commonly referred to as DOFs was in charge of turning on the genes to make bundle sheath cells in both species. They also

noticed that DOFs were binding to the same regulatory element in both species. However, in C4 sorghum plants, this regulatory element was not only associated with bundle sheath identity genesit was also turning on the photosynthesis genes. That suggested that C4 plants had at some point tacked ancestral regulatory elements for bundle sheath genes onto photosynthesis genes, so that DOFs would turn on both sets of genes at the same time. This would explain how bundle sheath cells in C4 plants gained the ability to photosynthesize.

These experiments revealed that both C3 and C4 plants contain the necessary genes and transcription factors required for the superior C4 photosynthesis process—a promising discovery for scientists hoping to nudge C3 plants to use C4 photosynthesis.

"Now we've got this blueprint for how different plants utilize the sun's energy to survive in different environments," says Joseph Swift, co-first author of the study and a postdoctoral researcher in Ecker's lab. "The ultimate goal is to try to switch C4 photosynthesis on and, in turn, create more productive and resilient crops for the future."

Next on the docket for the team is determining whether rice can be engineered to use C4 photosynthesis rather than C3. This remains a very long-term goal with significant technical challenges that are being addressed by a global collaborative effort known as the "C4 Rice Project." More immediately, the findings will inform the Salk Harnessing Plants Initiative's mission to create optimized crops that simultaneously fight and withstand the threat of climate change. Their single-cell genomics data has also been shared as a resource for scientists around the world, quickly garnering excitement for its answers to this long-standing mystery in evolution.

Anurag Anand

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Understanding Animal Behavior and Communication: A Window into the Natural World

Animal behavior and communication are fundamental aspects of the biological sciences, revealing the intricate ways in which species interact with each other and their environments. By studying these behaviors, researchers gain insights into the survival strategies of animals, the complexities of ecosystems, and the evolutionary pressures that shape them.

The Foundations of Animal Behavior

Animal behavior encompasses a wide range of activities, from foraging and mating to social interactions and territory establishment. Ethology, the scientific study of behavior, focuses on observing animals in their natural habitats to understand how they react to stimuli and make decisions. This discipline emphasizes that behavior is often a response to both internal and external factors, including genetics, environmental conditions, and social structures.

Social Structures and Interactions

Many species exhibit complex social structures that dictate behavior. For instance, primates display intricate social hierarchies, where individuals must navigate relationships through grooming, alliance-building, and communication. Elephants, known for their strong matriarchal bonds, demonstrate empathy and mourning behaviors, showcasing their capacity for emotional expression.

In contrast, certain species, such as solitary predators, exhibit behaviors centered on individual survival. Understanding these varied social dynamics helps researchers unravel the evolutionary significance of different behaviors. For example, pack hunting in wolves enhances the efficiency of capturing prey, illustrating how cooperative behavior can lead to greater survival rates.

Communication: The Language of Animals

Communication is a crucial element of animal behavior, enabling individuals to convey information about resources, threats, and reproductive status. Animals utilize a variety of methods, including vocalizations, body language, and chemical signals. For instance, songbirds use complex songs to establish territory and attract mates, while bees perform intricate dances to inform hive members

about the location of food sources.

Chemical communication is prevalent in many species, particularly in insects. Pheromones play a vital role in mating and social organization. Ants, for example, leave chemical trails that guide their colonies to food, showcasing how non-verbal signals can facilitate complex social interactions.

The Role of Environmental Influences

Environmental factors significantly influence animal behavior. Seasonal changes can trigger migration, hibernation, or breeding cycles. The availability of resources often dictates patterns of foraging and social organization. In recent years, climate change has emerged as a pressing concern, affecting habitats and, consequently, animal behaviors. Understanding these relationships is essential for conservation efforts and species management.

The Impact of Human Activity

Human influence has transformed natural habitats, often leading to behavioral changes in wildlife. Urbanization, habitat destruction, and climate change can disrupt traditional behaviors, forcing animals to adapt in unprecedented ways. For instance, urban-dwelling species may alter their feeding and reproductive strategies to cope with the challenges of city life.

Conclusion

The study of animal behavior and communication provides profound insights into the complexities of the natural world. By observing and interpreting these behaviors, scientists not only enhance our understanding of individual species but also the intricate web of life that connects them. As we continue to explore these dynamics, we gain valuable knowledge that can inform conservation strategies and foster a deeper appreciation for the richness of animal life on Earth. The ongoing dialogue between humans and the natural world is vital for the sustainability of our planet's biodiversity.

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पशु की व्यथा

ओ भाया !
तूने तो खूब अच्छा मेरा साथ निभाया।
मैंने तो तुझे अपना मित्र बनाया,
पर तूने तो समझा मुझे पशु पराया।
तुझे तो बस भायी मेरी काया,
जिसका तूने सदैव भरपूर लाभ उठाया।
अपना प्रेम दिखाकर खूब अच्छा तूने मुझे बहलाया,
और धीरे-धीरे अपने लालच के जाल में मुझको फँसाया।
कभी गर्मी में मुझसे अपना खेत जुतवाया,
और कभी मेरी खाल नोच तूने मुझे खाया।
कभी मेरी सुंदरता को आकर्षण का केंद्र बनाया,
कैद कर दिया चार दिवारी में, और खूब धन कमाया।
हाथी के दाँतों को छीन, तूने उसे अपना वाहन बनाया,
और कई जीवों की खाल का पहनावा ओढ़ तू इतराया।
और उससे भी मन न भरा, तो तूने अपना हथियार उठाया,
छीन लिया मेरा अस्तित्व, और तू महान कहलाया ।
तेरी गुलामी करते करते मैंने तो अपना जीवन गँवाया,
पर याद रखना दोस्त, यह सब केवल है ईश्वर की माया ।
और बस एक बार खुद को मेरी जगह रखो भाया,
मैं जानता हूँ, यह सोचते हुए भी तेरा तन कँपकँपाया।
और मेरी इस व्यथा को तू स्वयं न सह पाया।

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THE त्रिदोष THEORY

शरीर में होते दोष तीन,
कफ, वात और पित्त।

इनका ही असंतुलन करवावे,
रोगों को जागृत।

वायु और आकाश के तत्व बनाएं हैं वात,
अग्नि और जल के तत्व करें पित्त की बात,
जल तत्व और पृथ्वी करे कफ की शुरुवात।

वृद्धावस्था में वात होता है दुखदाई,
युवावस्था में पित्त करे बढ़ाई,
और कफ में बाल्यावस्था ही जाने पीर पराई।

नाभी, हड्डी, पेट, कमर वात को देते शरण,
हार्मोन्स ग्रंथियां, खून और पाचन तंत्र पित्त में दिखाए असर,
कंठ, सिर, वसा और हड्डियों के जोड़ कफ में हो जाए गड़बड़।

तिल तेल की मालिश करे वात को काबू,
देशी गाय का घी होता पित्त में श्रेष्ठ,
कफ हेतु तो शहद है सर्वश्रेष्ठ।

The त्रिदोष theory की जो समझ ले ये बातें,
सदा सुख में ही वो अपना जीवन काटे।

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POEM

Wildlife -Adorable Peace

The heart of the forest where shadows play,
Whispers of life weave through night and day.
Colors of feathers, a dance in the breeze,
Nature's own canvas, alive with such ease.
From the depths of the ocean to mountains so high,
Creatures of wonder beneath the vast sky.
Each leaf tells a story, each stream sings a song,
In the web of existence, where all life belongs.
The roar of the lion, the flutter of wings,
Echoes of nature, the joy that it brings.
In the balance of life, every role is defined,
A tapestry woven, with threads intertwined.
So let us protect this magnificent sphere,
Embrace every creature, hold their essence dear.
For in safeguarding nature, our own lives we save,
In the dance of biodiversity, we find what we crave.

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Exploring the Wonders of Zoology!

Zoology, the scientific study of animals, is a fascinating field that unravels the mysteries of the natural world. From the tiniest insects to the largest mammals, zoology provides a deep insight into the diversity, behavior, evolution, and conservation of animals. This article delves into some of the most intriguing aspects of zoology and its significance in our lives.

The Diversity of Life

The animal kingdom, encompassing millions of species, is an extraordinary tapestry of life. Zoologists categorize animals into various taxonomic groups based on their anatomical, genetic, and behavioral characteristics. For instance, mammals like tigers and whales are warm-blooded and give birth to live offspring, while birds like eagles and penguins are feathered creatures known for their ability to fly or adapt to unique environments.

Understanding this diversity helps us appreciate the interconnectedness of all life forms. Every organism, from coral reefs to apex predators, plays a vital role in maintaining ecological balance.

Behavior and Adaptation

Zoology also examines animal behavior and adaptation. Did you know that meerkats have a complex social structure, or that octopuses use camouflage to escape predators? Studying these behaviors not only reveals the intelligence of animals but also helps humans draw parallels to our own social systems.

Adaptation is another fascinating area. Polar bears have thick fur and layers of fat to survive Arctic conditions, while desert snakes conserve water by excreting highly concentrated urine. Such studies highlight the resilience and ingenuity of life.

Evolutionary Insights

Zoology offers clues to the history of life on Earth. Through fossils and genetic analysis, zoologists trace the evolutionary journey of species, uncovering how modern animals are related to their ancient ancestors. For example, birds are believed to have evolved from *Theropod*Dinosaurs, a discovery that reshaped our understanding of the past.

Conservation and Sustainability

One of the most urgent aspects of zoology today is conservation. Human activities like deforestation, pollution, and climate change threaten countless species. Zoologists work tirelessly to protect endangered species and their habitats. Projects like tiger conservation in India and efforts to save coral reefs worldwide are testaments to the importance of this field.

By studying zoology, we learn how to coexist with nature sustainably. Protecting biodiversity ensures the stability of ecosystems, which, in turn, supports human life.

Zoology in Everyday Life

Beyond academia and research, zoology has practical applications. Veterinary sciences, wildlife management, and even biomimicry—where designs are inspired by nature—draw heavily from zoological studies. Technologies like Velcro, inspired by burdock plant burrs, and drone flight patterns modeled after bird flocking behavior, showcase the influence of zoology on innovation.

Conclusion

Zoology is more than just a branch of biology; it is a gateway to understanding the intricate web of life that surrounds us. As we delve deeper into this field, we not only satisfy our curiosity but also shoulder the responsibility of preserving the delicate balance of nature.

Let us celebrate the wonders of zoology and strive to protect the incredible diversity of the animal kingdom for generations to come.

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"Say No to Drugs"

Drug abuse is a major problem that the world is currently facing.Every nook and corner of newspapers filled with news related to drug abuse cases and how it has been ruining the millennial generation.When we take a look back to the past year it shows a rapid increase in the use of drug.Millennial generation being addicted to drugs are ruining their own life as well as being a threat society itself.It is high that we must say "NO TO DRUGS". It is high time that we warn and make aware the younger generation about drugs as they are the pillars of the nation. We can't just sit around and watch the future of our nation die.It is high time that we must take action instead of just blabbering around. It is time to stand for yourself , stand for your friends and relatives and stand for the society

"SAY NO TO DRUGS" for a better world

Khushi Pandey

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Don't use drugs!

What do I lose If use drugs?Do I really lose my mindand life! Or is it that the world is afaired of the realm of reality that they open?You see clearly into the plan Of an unclean world, You see society as confused creatures They fit on the grid of the generation group To which each person lookedIs kept unconscious of the reality.That they could see The poor souls are lied to...Or perhaps that's just the drugs.

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Vitiligo

Abstract

Vitiligo is a common acquired skin disorder which results from the loss of melanocytes from the epidermis and clinically manifests as well-demarcated white patches on the body. It is a form of autoimmune disorder. There are different theories about the pathogenesis of vitiligo but exact etiology is still unknown.

Introduction

Vitiligo is an acquired pigmentary skin disorder by the absence of pigmentary cells from the epidermis that results in white macules and patches on the body.The condition is usually associated with few autoimmune disorders, with thyroid abnormalities are the commonest one. Vitiligo presents clinically with signs and symptoms of white spots on the body distributed symmetrically and more obvious in people with dark skin. The lesions are characterized by well-demarcated pearly white or depigmented macules and patches, oval, round, or linear-shaped, and the borders are convex, range from the size of few millimeters to centimeters and enlarge centrifugally. There are different clinical variants of vitiligo which are Trichrome, Marginal inflammatory, and Quadrichromevitiligo. Koebner phenomenon is also a common clinical manifestation. Initial lesions occur most frequently on the hands, forearms, feet, and face, favoring a periocular or perioral distribution. On the basis of the distribution, pattern Vitiligo is classified into three types, generalized, segmental, and localized. The severity of the disease is scored by the body surface area affected. The course of the disease is often unpredictable and varies in response to the treatment. Depigmentation often the cause of psychological distress, social stigmatization, and low self-esteem.

Pathophysiology

Vitiligo is commonly known as multifactorial polygenic disorder and has complex pathogenesis. It is commonly associated with both non-genetic and genetic factors.

Treatment/Management

Various types of topical and systemic medications, phototherapy, laser therapy, and surgical therapy are used for the treatment of vitiligo. Topical

treatment, modalities include corticosteroids, calcineur in inhibitors, and vitamin-D analogs. Phototherapy is an effective treatment option. It induces repigmentation in most of the patients with early and localizes the disease. Narrowband UV-B is widely used, mostly two to three times in a week with 311-312nm wavelength. It has largely replaced the psoralenphotochemotherapy because of its toxic side effects. Excimer Laser is used to treating limited, stable patches of vitiligo. In segmental vitiligo which is resistant to most of the treatments, Tacrolimus and systemic corticosteroids can be combined with it. Afamelanotide and JAK inhibitor therapy are emerging treatments. Topical ruxolitinib was also found to be very effective. Surgical treatment options are limited to segmental or localize vitiligo that is limited to a small area. Five basic methods of repigmentation include non cultured epidermal suspensions, thin dermo-epidermal grafts, suction epidermal graft, punch grafting, and cultured epidermis with melanocytes.

Differential Diagnosis

- **Nevus depigmentosus:** It is a circumscribed, segmental depigmented or hypopigmented area present at birth.
- **Idiopathic guttatehypomelanosis:** It is characterized by small, asymptomatic pearly white macules on photo exposed areas. Most of these lesions appear in older age groups.
- **Progressive macular hypomelanosis:** It is clinically present as asymptomatic hypopigmented patches on the trunk of young adults
- **Drug-induced leukoderma:** Potent topical or intralesional corticosteroids can induce hypopigmentation at the site of application. Depigmentation is also noticed in patients treated with the tyrosine kinase and epidermal growth factor receptor inhibitor.
- **Hypopigmented mycosis fungoides:** It is a variant of early-stage MF commonly seen in children and dark-skinned people. It appears as widespread hypopigmented patches with atrophy and scaling and atrophy.

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Uterine Cancer

Cancer of the uterus occurs when abnormal cells develop in the uterus and begin growing out of control. There are two main types of uterine cancer. Endometrial cancers begin in the linning of the uterus (endometrium) and account for about 95% of all cases and uterine sarcomas, which develop in the muscle tissue (myometrium), and is a rarer form of uterine cancer.Uterine cancer is the tenth most commonly diagnosed cancer in Australia, and it is estimated that one in 44 females will be diagnosed by the time they are 85.

Signs and symptoms

Unusual vaginal bleeding is the most common symptom of uterine cancer. Other common symptom may include:

- Heavier than usual periods or a change in your periods.
- Vaginal bleeding between periods. Periods that continue without a break.
- A watery discharge, which may have an unpleasant smell.

Causes of Uterine Cancer

Some factors that can increase your risk of uterine cancer includes: Being postmenopausal or reaching menopause(after age 55).

- A thickened wall lining (endometrial hyperplasia).
- Having high blood pressure or diabetes. Being overweight or obese.
- Family history of ovarian, uterine, cancer
- Previous ovarian tumours or polysystic ovary syndrome.
- Previous radiation therapy to the pelvis..

Diagnosis of Uterine Cancer

Tests to diagnose uterine cancer include:

The doctor may check your abdomen for swelling. To check your uterus, the doctor will place two fingers inside your vagina while pressing your abdomen or

they may use instrument (speculum).

Physical examination

A Pelvic ultrasound will use soundwaves to make a picture of your uterus and ovaries.

Pelvic Ultrasound

For a transvaginal ultrasound you donot need a full bladder. The sonographer willTransvaginal ultrasound insert a transducer wand into your vagina. Blood and urine tests Blood and urine tests may be used to assess your general health and inform treatment decisions.

Treatment for uterine cancer

For most women with uterine cancer, surgery to remove the uterus will be the only treatment required, particularly if the cancer is diagnosed early and has not spread to other parts of the body. Chemotherapy, which uses powerful drugs to destroy cancer cells. Radiation therapy, which sends targeted radiation beams to destroy cancer cells. Hormone therapy, which gives hormones or block them to treat cancer. Immunotherapy, which helps your immune system fight cancer.

Prevation of Uterine Cancer

There are several preventive measures one can follow to reduce the risk:

Keep your weight within a healthy bracket. Control your diabetes level. Avoid intake of hormonal contraceptives without a gynaecologist consultation. Get genetic testing: genetic testing can determine if you have a genetic mutation that puts you at higher risk for uterine cancer.

Submitted by

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The Future of Renewable Energy: Innovations and Challenges in Solar and Wind Power

Advancements in Solar Power Technology

Perovskite Solar Cells: These cells offer higher efficiency and lower production costs compared to traditional silicon-based cells.

Bifacial Solar Panels: They capture sunlight on both sides, increasing energy output by up to 30%. Floating Solar Farms: Installed on bodies of water, they save land space and reduce water evaporation, offering a dual benefit. Solar Paint: A developing technology where paint on surfaces can generate solar power, opening new possibilities for energy production.

Innovations in Wind Energy

Vertical Axis Wind Turbines: These turbines are more compact and can generate power in urban areas with unpredictable wind directions. Offshore Wind Farms: Newer turbines are larger, more powerful, and can be installed farther offshore to harness stronger, more consistent winds. Wind Catching Systems: Innovations like wind-catching panels promise higher energy capture in smaller spaces, improving efficiency. Kite-Powered Wind Turbines: Kites flying at high altitudes capture stronger winds, offering a novel approach to wind energy.

Challenges in Solar and Wind Power

Energy Storage: Storing renewable energy efficiently is still a major challenge, with ongoing research in battery technologies like solid-state batteries and flow batteries.

Intermittency: Solar and wind are dependent on weather conditions, necessitating advancements in grid management and hybrid systems combining multiple energy sources.

Land and Space Use: Solar and wind farms require significant space, which can lead to conflicts with land use for agriculture or conservation.

Supply Chain and Materials: Rare earth materials used in solar panels and wind turbines are often limited and involve complex, unsustainable supply chains.

Future Outlook

Grid Modernization: Smart grids, equipped with real-time data and AI, will improve energy distribution and reduce waste. Hybrid Energy Systems: Combining solar, wind, and other renewable sources with advanced storage solutions will create more reliable energy systems. Global Policy and Investments: Continued government incentives and private investment in renewables will drive technological breakthroughs and infrastructure growth. These advancements and challenges shape the future of renewable energy, pushing the world closer to a sustainable and carbon-free energy future.

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Other Activities

Ichthyology

Ichthyology - मछलियों का अध्ययन करने वाला विज्ञान है। यह जीव विज्ञान की एक शाखा है, जिसमें मछलियों की संरचना, व्यवहार, प्रजनन, विकास और वर्गीकरण का अध्ययन किया जाता है।

Ichthyology - के क्षेत्र में शामिल हैं:

१. मछलियों की वर्गीकरण और नामकरण
२. मछलियों की संरचना और विकास
३. मछलियों का व्यवहार और प्रजनन
४. मछलियों की पारिस्थितिकी और संरक्षण
५. मछलियों की व्यावसायिक और आर्थिक महत्व

Ichthyology - के महत्व:

१. मछलियों की संरक्षण और प्रबंधन
२. मछलियों की व्यावसायिक और आर्थिक महत्व
३. मछलियों की पारिस्थितिकी और पर्यावरणीय महत्व
४. मछलियों की वैज्ञानिक अनुसंधान और शिक्षा
५. मछलियों की स्वास्थ्य और चिकित्सा महत्व

Ichthyology - के कुछ प्रमुख विषय हैं:

१. मछलियों की वर्गीकरण और नामकरण
२. मछलियों की संरचना और विकास
३. मछलियों का व्यवहार और प्रजनन
४. मछलियों की पारिस्थितिकी और संरक्षण
५. मछलियों की व्यावसायिक और आर्थिक महत्व

Ichthyology - के अध्ययन के लिए कई प्रकार के तरीके और तकनीकें उपयोग की जाती हैं, जिनमें शामिल हैं:

१. मछलियों की पहचान और वर्गीकरण
२. मछलियों की संरचना और विकास का अध्ययन
३. मछलियों का व्यवहार और प्रजनन का अध्ययन
४. मछलियों की पारिस्थितिकी और संरक्षण का अध्ययन
५. मछलियों की व्यावसायिक और आर्थिक महत्व का अध्ययन।

अभिनव गुप्ता
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सिल्कवर्म

सिल्कवर्म (Silk Worm) एक प्रकार का कीट है, जो रेशम का उत्पादन करता है। यह कीट बॉम्बि क्स मोरी (Bombyx mori) नामक प्रजाति का होता है, जो कि एक प्रकार का ति तली है।

सिल्कवर्म की वि शेषताएं:

१. यह एक छोटा सा कीट है, जि सकी लंबाई लगभग ५-६ सेंटीमीटर होती है।

२. इसका शरीर सफेद और पीलेरंग का होता है।

३. यह कीट रेशम का उत्पादन करता है, जो कि इसके शरीर सेनि कलनेवालेएक प्रकार के तरल पदार्थ से बनता है।

४. यह कीट अपनेजीवनकाल में चार चरणों सेगुजरता है: अंडा, लार्वा , प्यूपा और वयस्क।

सिल्कवर्म का जीवन चक्र:

१. अंडा चरण: मादा सि ल्कवर्म अपनेअंडेपौधों की पत्ति यों पर रखती है।

२. लार्वा चरण: अंडेसेनि कलनेवालेलार्वा पौधों की पत्ति यों को खातेहैं और बढ़तेहैं।

३. प्यूपा चरण: लार्वा चरण के बाद, सिल्कवर्म प्यूपा चरण में प्रवेश करता है, जि समें यह एक कोकून में बदल जाता है।

४. वयस्क चरण: प्यूपा चरण के बाद, सि ल्कवर्म वयस्क चरण में प्रवेश करता है, जि समें यह एक ति तली के रूप में उड़ता हैऔर प्रजनन करता है।

सिल्कवर्म का महत्व:

१. रेशम का उत्पादन: सिल्कवर्म रेशम का उत्पादन करता है, जो कि एक मूल्यवान और आकर्षक सामग्री है।

२. आर्थिक महत्व: सिल्कवर्म के रेशम का उत्पादन एक महत्वपूर्ण आर्थि क गति विधि है, जो कि कई देशों में रोजगार और आय का स्रोत है।

३. वैज्ञानिक अनुसंधान: सिल्कवर्म का अध्ययन वैज्ञानि कों को जीव विज्ञान, आनुवंशि की और जैव प्रौद्योगि की के क्षेत्र में महत्वपूर्ण जानकारी प्रदान करता है।

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अमीबा (Amoeba) : एक परिचय

अमीबा (Amoeba) एक प्रकार का एककोशिकीय जीव है, जो प्रोटोज़ोआ (Protozoa) वर्ग के अंतर्गत आता है। यह जीव पानी में रहता है और अपने आसपास के वातावरण में मौजूद भोजन को ग्रहण करता है।

अमीबा की विशेषताएं:

१. एककोशिकीय जीव: अमीबा एक एककोशिकीय जीव है, जिसका अर्थ है कि यह एक ही कोशिका से बना होता है।

२. पानी में रहता है: अमीबा पानी में रहता है और अपने आसपास के वातावरण में मौजूद भोजन को ग्रहण करता है।

३. भोजन को ग्रहण करना: अमीबा अपने आसपास के वातावरण में मौजूद भोजन को ग्रहण करता है, जैसे कि बैक्टीरिया, प्रोटोज़ोआ और अन्य छोटे जीव।

४. गति: अमीबा अपने शरीर के आकार को बदलकर गति करता है, जिसे अमीबॉइड गति कहा जाता है।

अमीबा का जीवन चक्र:

१. अंडा चरण: अमीबा का जीवन चक्र अंडा चरण से शुरू होता है, जिसमें अमीबा के अंडे पानी में तैरते हैं।

२. लार्वा चरण: अंडे से निकलने वाले लार्वा अमीबा के वयस्क रूप से मिलते-जुलते होते हैं, लेकिन उनका आकार छोटा होता है।

३. वयस्क चरण: लार्वा चरण के बाद, अमीबा वयस्क चरण में प्रवेश करता है, जिसमें यह अपने वयस्क रूप में विकसित हो जाता है।

अमीबा का महत्व:

१. पारिस्थितिकी तंत्र में भूमिका: अमीबा पारिस्थिनिकी तंत्र में एक महत्वपूर्ण भूमिका निभाता है, क्योंकि यह पानी में मौजूद भोजन को ग्रहण करता है और पारिस्थितिकी तंत्र को संतुलित बनाए रखने में मदद करता है।

२. वैज्ञानिक अनुसंधान: अमीबा का अध्ययन वैज्ञानिकों को जीव विज्ञान, पारिस्थितिकी और प्रोटोज़ोआ के बारे में महत्वपूर्ण जानकारी प्रदान करता है।

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पैलीमोन/झींगा (Palaemon) : एक परिचय

पैलेमन (Palaemon) एक प्रकार का क्रस्टेशियन है, जो कि झींगे के परिवार से संबंधित है। यह एक छोटा सा जलीय जीव है, जो कि मीठे और खारे पानी दोनों में पाया जाता है।

पैलेमन की कुछ विशेषताएं हैं:

- यह एक छोटा सा जीव है, जिसकी लंबाई आमतौर पर १-५ सेंटीमीटर होती है।
- इसका शरीर पतला और लंबा होता है, जिसमें १० जोड़ी पैर होते हैं।
- यह एक मांसाहारी जीव है, जो कि छोटे जीवों और प्लवकों को खाता है।
- यह एक महत्वपूर्ण भूमिका निभाता है जलीय पारिस्थितिकी तंत्र में, क्योंकि यह छोटे जीवों को नियंत्रित करने में मदद करता है।

पैलेमन का उपयोग विभिन्न क्षेत्रों में किया जाता है, जैसे कि:

- जलीय पारिस्थितिकी तंत्र के अध्ययन में
- जलीय जीवों के पालन-पोषण में
- जलीय प्रदूषण के अध्ययन में
- जलीय संसाधनों के प्रबंधन में

यह जानकारी पैलेमन के बारे में है, और मुझे उम्मीद है कि यह आपके लिए उपयोगी होगी।

पैलीमोन का जीवन चक्र

पैलेमन (Palaemon) का जीवन चक्र निम्नलिखित है:

१. अंडे पैलेमन की मादा अपने अंडे पानी में छोड़ती है। ये अंडे आमतौर पर १-२ मिमी के आकार के होते हैं।

२. लार्वा: अंडे से निकलने वाले लार्वा पानी में तैरते हैं। ये लार्वा आमतौर पर १-२ सप्ताह तक पानी में रहते हैं।

३. पोस्ट-लार्वा: लार्वा के चरण के बाद, पैलेमन के बच्चे पोस्ट-लार्वा चरण में प्रवेश करते हैं। इस चरण में, वे अपने शरीर के आकार और रंग में परिवर्तन करते हैं।

४. युवा पैलेमन: पोस्ट-लार्वा चरण के बाद, पैलेमन के बच्चे युवा पैलेमन बन जाते हैं। इस चरण में, वे अपने शरीर के आकार और रंग में और अधिक परिवर्तन करते हैं।

५. वयस्क पैलेमन: युवा पैलेमन चरण के बाद, पैलेमन वयस्क हो जाते हैं। इस चरण में, वे अपने शरीर के आकार और रंग में पूर्ण परिवर्तन करते हैं और प्रजनन करने लगते हैं।

६. मृत्यु: पैलेमन की औसत आयु १-२ वर्ष होती है, लेकिन यह उनके रहने के स्थान और उपलब्ध भोजन पर निर्भर करता है।

यह जीवन चक्र पैलेमन के जीवन के विभिन्न चरणों को दर्शाता है।

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घोंघा (Pila) : एक परिचय

Pila एक प्रकार का जलीय शेलफिश है, जो प्रोटिया (Proteidae) परिवार के अंतर्गत आता है। Pila की कई प्रजातियां पाई जाती हैं, जो विश्व के विभिन्न हिस्सों में पाई जाती हैं।

Pila की विशेषताएं:

१. जलीय जीवन: Pila जलीय जीवन जीता है और ताजे पानी में पाया जाता है।
२. शेलफिश: Pila एक प्रकार का शेलफिश है, जिसका शरीर एक कठोर शेल में ढका होता है।
३. फिल्टर फीडर: Pila एक फिल्टर फीडर है, जो पानी में मौजूद छोटे जीवों और पौधों के अवशेषों को अपने भोजन के रूप में उपयोग करता है।
४. शांत और धीमी गति से चलने वाला: Pila एक शांत और धीमी गति से चलने वाला जीव है, जो अपने शेल के अंदर से अपने आसपास के वातावरण को देखता है।

Pila का महत्व:

१. जलीय पारिस्थितिकी तंत्र में भूमिका: Pila जलीय पारिस्थितिकी तंत्र में एक महत्वपूर्ण भूमिका निभाता है, क्योंकि यह पानी में मौजूद छोटे जीवों और पौधों के अवशेषों को अपने भोजन के रूप में उपयोग करता है।
२. जलीय जीवन का संकेतक: Pila जलीय जीवन का एक संकेतक है, क्योंकि यह जलीय पारिस्थितिकी तंत्र की सेहत को दर्शाता है।
३. वैज्ञानिक अनुसंधान में उपयोग: Pila वैज्ञानिक अनुसंधान में उपयोग किया जाता है, क्योंकि यह जलीय पारिस्थितिकी तंत्र के बारे में महत्वपूर्ण जानकारी प्रदान करता है।

Pila का भोजन।

Pila एक प्रकार का जलीय शेलफिश है, जो अपने भोजन के लिए पानी में मौजूद छोटे जीवों और पौधों के अवशेषों पर निर्भर करता है। Pila का भोजन मुख्य रूप से निम्नलिखित चीजों पर आधारित होता है:

१. छोटे जीव: Pila छोटे जीवों जैसे कि प्लैंकटन, रोटिफर, और अन्य छोटे क्रस्टेशियन को अपने भोजन के रूप में उपयोग करता है।
२. पौधों के अवशेष: Pila पौधों के अवशेषों जैसे कि अल्गी, पौधों की पत्तियां, और अन्य पौधों के अवशेषों को अपने भोजन के रूप में उपयोग करता है।
३. बैक्टीरिया और फंगस: Pila बैक्टीरिया और फंगस को भी अपने भोजन के रूप में उपयोग करता है।
४. जलीय पौधे: Pila जलीय पौधों जैसे कि जलीय अल्गी, जलीय पौधों की पत्तियां, और अन्य जलीय पौधों को अपने भोजन के रूप में उपयोग करता है।

Pila का भोजन उसके आवास और उपलब्ध भोजन के आधार पर भिन्न हो सकता है।

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एफिड (Aphid) : एक परिचय

एफिड (Aphid) एक प्रकार का छोटा सा कीट है, जो पौधों पर रहता है और उनका रस चूसता है। यह कीट पौधों के लिए बहुत हानिकारक होता है, क्योंकि यह पौधों के रस को चूसकर उनकी वृद्धि और विकास को रोकता है।

एफिड की विशेषताएं:

1. छोटा सा शरीर: एफिड का शरीर बहुत छोटा होता है, जो आमतौर पर 1-3 मिमी के आकार का होता है।
2. पौधों पर रहना: एफिड पौधों पर रहता है और उनका रस चूसता है।
3. रस चूसना: एफिड पौधों के रस को चूसकर उनकी वृद्धि और विकास को रोकता है।
4. प्रजनन: एफिड बहुत तेजी से प्रजनन करता है, जिससे इसकी संख्या बहुत जल्दी बढ़ जाती है।

एफिड के प्रकार:

1. हरा एफिड (Green Aphid)
2. काला एफिड (Black Aphid)
3. सफेद एफिड (White Aphid)
4. पीला एफिड (Yellow Aphid)

एफिड के नियंत्रण के तरीके:

1. कीटनाशकों का उपयोग
2. जैविक नियंत्रण
3. पौधों की देखभाल
4. एफिड के प्रजनन को रोकना

एफिड के प्रभाव:

1. पौधों की वृद्धि और विकास को रोकना
2. पौधों के रस को चूसना
3. पौधों को नुकसान पहुंचाना
4. पौधों की गुणवत्ता को कम करना

एफिड (Aphid) का जीवन चक्र-

1. *अंडा चरण*: एफिड की मादा अपने अंडे पौधों की पत्तियों या तनों पर रखती है। ये अंडे आमतौर पर सर्दियों में रखे जाते हैं।
2. *निम्फ चरण*: अंडे से निकलने वाले निम्फ एफिड के वयस्क रूप से मिलते-जुलते होते हैं, लेकिन उनके पंख नहीं होते हैं। निम्फ चरण में एफिड पौधों का रस चूसना शुरू कर देते हैं।
3. *वयस्क चरण*: निम्फ चरण के बाद, एफिड वयस्क चरण में प्रवेश करते हैं। वयस्क एफिड पंखों वाले होते हैं और पौधों से पौधों पर उड़ सकते हैं।
4. *प्रजनन चरण*: वयस्क एफिड प्रजनन करना शुरू कर देते हैं। मादा एफिड अंडे देती हैं, जबकि नर एफिड मादा के साथ मिलकर प्रजनन करते हैं।
5. *मृत्यु चरण*: एफिड का जीवन चक्र पूरा होने के बाद, वे मर जाते हैं। उनके शव पौधों पर या जमीन पर गिर जाते हैं।

एफिड का जीवन चक्र आमतौर पर 7-14 दिनों का होता है, लेकिन यह उनकी प्रजाति, पौधों की प्रजाति और पर्यावरणीय परिस्थितियों पर निर्भर करता है।

निर्मल सिंह

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केंचुआ (Earthworm) : एक परिचय

अर्थवर्म (Earthworm) एक प्रकार का कृमि है, जो मिट्टी में रहता है और मिट्टी की गुणवत्ता में सुधार करने में मदद करता है। अर्थवर्म का वैज्ञानिक नाम लुम्ब्रिकस टेरेस्ट्रिस (Lumbricus terrestris) है।

अर्थवर्म की विशेषताएं:

1. लंबा और पतला शरीर: अर्थवर्म का शरीर लंबा और पतला होता है, जो आमतौर पर 10-30 सेंटीमीटर लंबा होता है।
2. मिट्टी में रहना: अर्थवर्म मिट्टी में रहता है और मिट्टी की गुणवत्ता में सुधार करने में मदद करता है।
3. मिट्टी को खोदना: अर्थवर्म मिट्टी को खोदता है और मिट्टी की गुणवत्ता में सुधार करने में मदद करता है।
4. मिट्टी को हवादार बनाना: अर्थवर्म मिट्टी को हवादार बनाता है, जिससे मिट्टी में ऑक्सीजन की मात्रा बढ़ जाती है।

अर्थवर्म का महत्व:

1. मिट्टी की गुणवत्ता में सुधार: अर्थवर्म मिट्टी की गुणवत्ता में सुधार करने में मदद करता है।
2. मिट्टी को हवादार बनाना: अर्थवर्म मिट्टी को हवादार बनाता है, जिससे मिट्टी में ऑक्सीजन की मात्रा बढ़ जाती है।
3. पोषक तत्वों का चक्रण: अर्थवर्म पोषक तत्वों का चक्रण करने में मदद करता है, जिससे मिट्टी में पोषक तत्वों की मात्रा बढ़ जाती है।
4. मिट्टी की जल धारण क्षमता में सुधार: अर्थवर्म मिट्टी की जल धारण क्षमता में सुधार करने में मदद करता है, जिससे मिट्टी में जल की मात्रा बढ़ जाती है।

Earthworm का जीवन चक्र-

1. अंडा चरण_: अर्थवर्म का जीवन चक्र अंडा चरण से शुरू होता है, जिसमें अर्थवर्म की मादा अपने अंडे मिट्टी में रखती है।
2. लार्वा चरण_: अंडे से निकलने वाले लार्वा अर्थवर्म के वयस्क रूप से मिलते-जुलते होते हैं, लेकिन उनका आकार छोटा होता है।
3. युवा चरण_: लार्वा चरण के बाद, अर्थवर्म युवा चरण में प्रवेश करता है, जिसमें यह अपने वयस्क रूप में विकसित होना शुरू कर देता है।
4. वयस्क चरण_: युवा चरण के बाद, अर्थवर्म वयस्क चरण में प्रवेश करता है, जिसमें यह अपने वयस्क रूप में पूरी तरह से विकसित हो जाता है।
5. प्रजनन चरण_: वयस्क चरण के बाद, अर्थवर्म प्रजनन चरण में प्रवेश करता है, जिसमें यह अपने अंडे मिट्टी में रखता है।
6. मृत्यु चरण_: अर्थवर्म का जीवन चक्र पूरा होने के बाद, यह मर जाता है और मिट्टी में ही रहता है।

अर्थवर्म का जीवन चक्र आमतौर पर 5-7 वर्षों का होता है, लेकिन यह उनकी प्रजाति, मिट्टी की गुणवत्ता और पर्यावरणीय परिस्थितियों पर निर्भर करता है।

राजदेव गौतम

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विलुप्त होती नन्ही गौरैया ।

गौरैया ! जी हां गौरैया वही जो हमारे बचपन में हमें आंगन में बगीचे में छात्रों पर चह-चहाती दिख जाया करती थी प्रायः आज विलुप्त होने की कगार पर है गौरैया की संख्या तेजी से घट रही है इसके कई कारण है।

1. बढ़ता रहन-सहन और विस्तार से प्राकृतिक आवास नष्ट हो रही है।
2. प्रदूषण।
3. अनाज में कीटनाशकों का इस्तेमाल।
4. मोबाइल फोन और टावरों से निकलने वाली सूक्ष्म तरंगे।
5. आहार की कमी।

गौरैया को बचाने के लिए उपाय-

1. घर की छत पर दाना पानी रखें ।
2. घर के आसपास पर पेड़ पौधे लगाए ।
3. मार्केट में बनी आर्टिफिशियल घोसलों लाकर घर की छत पर रखें।
4. बेवजह पेड़ों की छंटाई कटाई ना करें।
5. घरों में अनार करौंदा जैसे कांटेदार पौधे लगाए।

बहुत दिनों से सोच रहा था ।
थोड़ी धरती पाऊं ।।
उसे धरती में बाग बगिया।
जो हो सके लगाऊं ।।
हो सकता है पास तुम्हारे।
अपनी कुछ धरती हो।।
हो सकता है छोटी सी ।
क्यारी हो महक रही हो।।
हो सकता है कहीं सहन में।
पक्षी झूम रहे हो।।
तो विनती है यही ।
कभी मत उसे दुनिया को खोना।।
पेड़ों को मत कटने देना।
मत चिड़ियों को रोना ।।
एक-एक पत्ती पर हम सब।
के सपने सोते हैं ।।
शाखें कटने पर वे भोले।
शिशुओं सा रोते हैं ।।

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बुफो (Bufo)

बुफो (Bufo) एक प्रकार का मेंढ़क है, जो बुफोनिडे (Bufonidae) परिवार के अंतर्गत आता है। बुफो मेंढ़कों की लगभग 150 प्रजातियां पाई जाती हैं, जो विश्व के विभिन्न हिस्सों में पाई जाती हैं।
बुफो मेंढ़कों की विशेषताएं-

1. बड़े आकार के मेंढ़क: बुफो मेंढ़क आमतौर पर बड़े आकार के होते हैं, जिनकी लंबाई 5-15 सेंटीमीटर तक हो सकती है।
2. चिपचिपी त्वचा: बुफो मेंढ़कों की त्वचा चिपचिपी होती है, जो उन्हें अपने शिकार को पकड़ने में मदद करती है।
3. जहरीले ग्रंथियां: बुफो मेंढ़कों की त्वचा में जहरीले ग्रंथियां होती हैं, जो उन्हें अपने शिकारियों से बचाने में मदद करती हैं।
4. जमीन पर रहना: बुफो मेंढ़क जमीन पर रहते हैं और अपना अधिकांश समय जमीन पर ही बिताते हैं।

बुफो मेंढ़कों का महत्व-

1. पारिस्थितिकी तंत्र में भूमिका: बुफो मेंढ़क पारिस्थितिकी तंत्र में एक महत्वपूर्ण भूमिका निभाते हैं, क्योंकि वे अपने शिकार को नियंत्रित करने में मदद करते हैं।
2. जैव विविधता में योगदान: बुफो मेंढ़क जैव विविधता में एक महत्वपूर्ण योगदान करते हैं, क्योंकि वे अपने विशिष्ट लक्षणों और व्यवहार के कारण एक अनोखी प्रजाति हैं।
3. वैज्ञानिक अनुसंधान में उपयोग: बुफो मेंढ़क वैज्ञानिक अनुसंधान में उपयोग किए जाते हैं, क्योंकि वे अपने जहरीले ग्रंथियों और अन्य विशिष्ट लक्षणों के कारण एक महत्वपूर्ण अध्ययन विषय हैं।

Bufo का भोजन-

बुफो (Bufo) मेंढ़कों का भोजन मुख्य रूप से कीटों और अन्य छोटे जीवों पर आधारित होता है। वे अपने शिकार को अपनी जीभ की मदद से पकड़ते हैं और फिर उसे अपने मुंह में ले जाते हैं।
बुफो मेंढ़कों के भोजन में शामिल हैं:

1. कीट: बुफो मेंढ़क कीटों को अपना मुख्य भोजन बनाते हैं, जिनमें शामिल हैं:
- चींटियां - तिलचट्टे - मकड़ियां - मक्खियां

1. अन्य छोटे जीव: बुफो मेंढ़क अन्य छोटे जीवों को भी अपना भोजन बनाते हैं, जिनमें शामिल हैं:
- मोल - स्लग - छोटे कृमि

1. पौधों के अवशेष: कुछ बुफो मेंढ़क पौधों के अवशेषों को भी अपना भोजन बनाते हैं, जिनमें शामिल हैं:
- पत्तियों के अवशेष - तनों के अवशेष - फलों के अवशेष

बुफो मेंढ़कों का भोजन उनके आवास और उपलब्ध भोजन के आधार पर भिन्न हो सकता है।

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Pearl Formation

Pearls are obtained from phylum Mollusca, notallmollusca produces pearls but many species of molluscs produce pearls and among them only few species's pearls are commercially valuable.

'Mollusca' is derived from the Latin word mollis or molluscs which mean soft bodied. This term was first applied by Aristotle to the cuttle fish of the Aegan sea.

Mollusca usually have shell and a characteristic ventral muscular foot. There are 84,978 known living species in this phylum.

Mollusca is the second largest phylum after Arthropoda.

Most of the pearl producing species belong to the class Bivalvia or Pelecypoda, most familiar members of this class are mussels, clams, oysters and scallops. ***Unio*** and ***Lamellidens*** are the common freshwater mussels found in the Indian lakes and rivers.

Shell:-

Shell is composed of three layers.

- The outermost pigmented layer calledperiostracum.
- Below the outer layer is the prismatic layer.
- The inner-most layer is called nacreous or pearly layer.It is made up of conchiolin and calcareous plates running alternately and longitudinally. It is secreted by whole outersurface of mantle and presents alustrous surface. is also called mother of Pearl.

Pearl Culture:-

Pearl is also called 'Moti'.It is white, highly shining globular in shape and made by the clam, a mollusc called Oyesterwithin its shell. Pearls are prized as gems from ancient times. Pearls are among the most beautiful and valuable of our jewels.

Pearl Formation:-

Apearl is a result of an injury to molluscs.It is secreted by the mantle as a

means of protection against some foreign body.Whenever a foreign body such as particle of sand or a small parasite(a trematode or cestode larva), a small animalcule or alga or even bit of shell, gets between the mantle and the shell it becomes enclosed in a sac of mantle epithelium which is this irritated. Irritation stimulates the mantle epithelium to secrete nacre thin concentric layers of mother of pearl all around the foreign body. The amount of deposition is in direct proportion to the degree of irritation. At the end of several years , a pearl is formed.

- The pearls are of variable shapes and sizes.
- Their colour may be white or cream,red or pink red. Spherical pearls of rainbow colour are rarely found.
- The best quality of Pearl is known as **'LINGHA PEARL'** and they are obtained from **marine Oyester**.
- Pearl comprises of water, organic matter, calcium carbonate and the residue. Calcium carbonate is 90%.
- The pearl of ***Unio*** is not commercially precious.
- ***Mytilus*** is commonly known as 'sea-mussel'.

Type of peals:-

- **Natural pearls**

Pearl is formed as a result of nacreous secretion from the mantle around a sand particle.

Pearls are often found in clams and edible oyesters but these are not nacreous and therefore, they are of little value. Most precious pearls are found in **Pearl Oyesters** of the genus ***Pinctada***. Important species for pearls are ***P.vulgaris, P.chemnitzi, P.margaritifera, P.anomioides*** and ***P.atropurpurea*** found in Indian waters ***P.vulgaris*** which is closely allied to freshwater mussel is common species distributed in gulf of Kutch, gulf of Mannar and the Palk Bay and Baroda.

- **Artificial Pearl**

Japanese have developed a technique of producing pearls artificially by inserting foreign bodies, such as glass beads, into the mantle of oyester. Kokichi Mikimoto of Toba (Japan) is known to be the father of Pearl industry. He discovered

a method to induce foreign particle between the mantle and the shell of the Pearl Oyester and thus stimulated pearl formation.

It takes about 3 to 4 years to produce a pearl of considerable size but a large one takes 7 years.

Cultured pearls are genuine pearls but are less valuable than uncultured pearls which can be identified by experts.

Economic Importance of Mollusca Shells:-

- Molluscan shells are used for chank and lime fisheries.
- Shells used as ornaments and for decoration purposes.
- Gastropodanshells are used to manufacture buttons.
- Used as dyes and inks- Originally Indian ink was obtained from the ink of a cuttle-fish, ***Sepia cubrata.*** Nowadays a certain brown finish of photograph is termed as sepia finish. And many more..

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Other Activities

ओयेस्टर मशरूम एवं केंचुए से तैयार किए विभिन्न उपयोगी उत्पाद

अवधनामा संवाददाता

प्रयागराज। चौधरी महादेव प्रसाद डिग्री कालेज प्रयागराज के जंतु विज्ञान विभाग के अंतर्गत उद्यमशीलता की ओर विद्यार्थियों को प्रेरित करने हेतु मशरूम उत्पादन एवं मशरूम के विभिन्न उत्पादों को बनाने का प्रशिक्षण विद्यार्थियों को समय-समय पर दिलाया जाता है। यह कार्य स्वावलंबन नाम से किया जाता है। इस कार्य को जंतु विज्ञान विभाग की असिस्टेंट प्रोफेसर डॉक्टर हेमलता पंत के नेतृत्व में किया जाता है। डॉक्टर पंत ने ओयेस्टर मशरूम, सूखा ओयेस्टर, मशरूम पाउडर, मशरूम बड़ी व मशरूम फेस पैक को तैयार किया है। यह सभी उत्पाद बहुत ही उपयोगी हैं। अभी प्रथम चरण का कार्य पूरा हो गया है। यह कार्य सतत रूप से आगे चलता रहेगा।

जंतु विज्ञान की परास्नातक छात्रा कुमारी कृति ने जंतु विज्ञान से प्रशिक्षण लेकर इसे उद्यम के रूप में शुरू भी कर दिया है और ओयेस्टर मशरूम के साथ-साथ मशरूम कढ़ियों को बनाकर लाभ अर्जित कर रही है।

इसी क्रम में जंतु विज्ञान विभाग में पिछले दो सत्रों 2022 व 2023 में क्रमशः तीन तीन माह के वर्मी कंपोस्ट शॉर्ट टर्म कोर्स के अंतर्गत डॉक्टर हेमलता पंत एवं डॉक्टर ज्योति वर्मा असिस्टेंट प्रोफेसर, जंतु विज्ञान विभाग के नेतृत्व में वर्मी कंपोस्ट (केंचुआ खाद) एवं वर्मिवास उत्पादों को तैयार कर लिया गया है। यह दोनों ही उत्पाद पौधों की वृद्धि एवं मृदा उर्वरता को बढ़ाने का कार्य करेंगे। यह पूरी तरह से जैविक उत्पाद है। जंतु विज्ञान विभाग से प्रशिक्षण प्राप्त कई लोगों ने इन उत्पादों को बनाने की शुरुआत भी कर दी है।

Artificial Nests : A Conservation and Ecological Strategy

Artificial nests, man-made structure designed to mimic the natural nesting sites of birds and other wildlife, are an important tool in conservation efforts. They help address habitat loss, support species recovery, and provide ecological insights.

What are Artificial Nests?

Aartificial nests are structure created to replicate the natural nests used by birds, mammals, repetiles, or even insects. These can range from simple birdhouses to complex nests made to resemble specific species' natural habitats.

Importance of Artificial Nests

1. **Conservation of Endangered Species:** Artificial nests are crucial for the survival of species whose natural nesting habitats have been diminished

2. **Urban Wildlife Support:** As urban areas expand, wildlife such as birds and small mammals often face a lack of natural nestings sites.

Benefits of ArtificialNests

Boostings Breeding Success: Artificial nests can increase the number of safe ne stings sites, boostings the reproduction rates of certain species.

Education and Public Awareness: Installing artificial nests in public parks and urban areas raises awareness about wildlife conservation. It allows people to engage with nature and understand the importance of habitat protection.

Challenges and Considerations

1. Nest Predation: One of the significant risks of artificial nests is that they can make species more vulnerable to predators, particularly if they are placed in accessible locations.

2. Human Intervention: Artificial nests require maintenance, and poorly designed or neglected nests can harm rather than help wildlife.

Case Studies in Artificial Nest Success-

Wood Duck Conservation: In North America, wood ducks, which nest in tree cavities, have benefited greatly from the installation of artificial nest boxes. Conservation programs have successfully increased their population by providing these nests in areas where natural cavaties are scarce.

Conclusion

Artificial nests are a vital tool in modern conservation strategies, supporting species affected by habitat loss, urbanization, and environmental degradation. By balancing artificial interventioons with broader habitat conservation efforts, we can ensure the long-term survival of species and the ecosystems they depend on.

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Mobile Distribution

हेलिक्स (Helix)

हेलिक्स *(Helix)* एक प्रकार का शेलफिश है, जो गैस्ट्रोपोडा (Gastropoda) वर्ग के अंतर्गत आता है। हेलिक्स की कई प्रजातियां पाई जाती हैं, जो विश्व के विभिन्न हिस्सों में पाई जाती हैं।

हेलिक्स की विशेषताएं-

1 शेलफिश: हेलिक्स एक प्रकार का शेलफिश है, जिसका शरीर एक कठोर शेल में ढका होता है।

2. भूमि पर रहना: हेलिक्स भूमि पर रहता है और विभिन्न प्रकार के आवासों में पाया जाता है।

3. शाकाहारी: हेलिक्स शाकाहारी होता है और पौधों के विभिन्न भागों को अपने भोजन के रूप में उपयोग करता है।

4. रात्रि में सक्रिय: हेलिक्स रात्रि में सक्रिय होता है और दिन के समय में अपने शेल में छिपा रहता है।

हेलिक्स का महत्व-

1. पारिस्थितिकी तंत्र में भूमिका: हेलिक्स पारिस्थितिकी तंत्र में एक महत्वपूर्ण भूमिका निभाता है, क्योंकि यह पौधों के विभिन्न भागों को अपने भोजन के रूप में उपयोग करता है।

2. वैज्ञानिक अनुसंधान में उपयोग: हेलिक्स वैज्ञानिक अनुसंधान में उपयोग किया जाता है, क्योंकि यह पारिस्थितिकी तंत्र के बारे में महत्वपूर्ण जानकारी प्रदान करता है।

3. खाद्य स्रोत: हेलिक्स कुछ संस्कृतियों में एक खाद्य स्रोत के रूप में उपयोग किया जाता है।

हेलिक्स का भोजन।

हेलिक्स *(Helix)* एक प्रकार का शेलफिश है, जो शाकाहारी होता है और पौधों के विभिन्न भागों को अपने भोजन के रूप में उपयोग करता है। हेलिक्स का भोजन मुख्य रूप से निम्नलिखित चीजों पर आधारित होता है:

1. पौधों की पत्तियां_: हेलिक्स पौधों की पत्तियों को अपने भोजन के रूप में उपयोग करता है।

2. पौधों के तने_: हेलिक्स पौधों के तनों को अपने भोजन के रूप में उपयोग करता है।

3. फल और सब्जियां_: हेलिक्स फल और सब्जियों को अपने भोजन के रूप में उपयोग करता है।

4. मिट्टी में मौजूद पौधों के अवशेष_: हेलिक्स मिट्टी में मौजूद पौधों के अवशेषों को अपने भोजन के रूप में उपयोग करता है।

5. कवक और लाइकेन_: हेलिक्स कवक और लाइकेन को अपने भोजन के रूप में उपयोग करता है।

हेलिक्स का भोजन उसके आवास और उपलब्ध भोजन के आधार पर भिन्न हो सकता है।

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ऑर्निथोलॉजी (Ornithology)

ऑर्निथोलॉजी (Ornithology) पक्षियों के अध्ययन की विज्ञान है। यह जीव विज्ञान की एक शाखा है, जिसमें पक्षियों की संरचना, व्यवहार, प्रजनन, विकास और वर्गीकरण का अध्ययन किया जाता है।

ऑर्निथोलॉजी के क्षेत्र में शामिल हैं:

1. पक्षियों की वर्गीकरण और नामकरण
2. पक्षियों की संरचना और विकास
3. पक्षियों का व्यवहार और प्रजनन
4. पक्षियों की पारिस्थितिकी और संरक्षण
5. पक्षियों की व्यावसायिक और आर्थिक महत्व

ऑर्निथोलॉजी के महत्व:

1. पक्षियों की संरक्षण और प्रबंधन
2. पक्षियों की व्यावसायिक और आर्थिक महत्व
3. पक्षियों की पारिस्थितिकी और पर्यावरणीय महत्व
4. पक्षियों की वैज्ञानिक अनुसंधान और शिक्षा
5. पक्षियों की स्वास्थ्य और चिकित्सा महत्व

ऑर्निथोलॉजी के कुछ प्रमुख विषय हैं:

1. पक्षियों की वर्गीकरण और नामकरण
2. पक्षियों की संरचना और विकास
3. पक्षियों का व्यवहार और प्रजनन
4. पक्षियों की पारिस्थितिकी और संरक्षण
5. पक्षियों की व्यावसायिक और आर्थिक महत्व

ऑर्निथोलॉजी के अध्ययन के लिए कई प्रकार के तरीके और तकनीकें उपयोग की जाती हैं, जिनमें शामिल हैं:

1. पक्षियों की पहचान और वर्गीकरण
2. पक्षियों की संरचना और विकास का अध्ययन
3. पक्षियों का व्यवहार और प्रजनन का अध्ययन
4. पक्षियों की पारिस्थितिकी और संरक्षण का अध्ययन
5. पक्षियों की व्यावसायिक और आर्थिक महत्व का अध्ययन।

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Root Knot Nematodes

Root-knot nematodes are plant-parasitic nematodes from the genus Meloidogyne. They exist in soil in areas with hot climates or short winters. About 2000 species of plants worldwide are susceptible to infection by root-knot nematodes and they cause approximately 5% of global crop loss.[1] Root-knot nematode larvae infect plant roots, causing the development of root-knot galls that drain the plant's photosynthate and nutrients. Infection of young plants may be lethal, while infection of mature plants causes decreased yield

Domain: Eukaryota

Kingdom: Animalia

Phylum: Nematoda

Class: Secernentea

Order: Tylenchida

Family: Heteroderidae

Genus: *Meloidogyne.*

Apperance-

Root-knot nematodes are about 1/10 the size of a pinhead and are typically embedded inside roots. They are impossible to see with the naked eye. Juvenile root-knot nematodes (both males and females), as well as adult males, are vermiform (i.e., worm-shaped) and live in the soil. Adult females are spherical in shape and live inside roots. Both males and females possess a thin, tube-like structure called a stylet that they use for penetrating root tissue.

Life cycle

All nematodes pass through an embryonic stage, four juvenile stages (J1–J4) and an adult stage. Juvenile Meloidogynes parasites hatch from eggs as vermiform, second-stage juveniles (J2),Newly hatched juveniles have a short free-living stage in the soil, in the rhizosphere of the host plants. They may reinvade the host plants of their parent or migrate through the soil to find a new host root. J2

larvae do not feed during the free-living stage, but use lipids stored in the gut.[3]

Prevention Root-knot nematodes can be controlled with biocontrol agents Paecilomyces lilacinus, Pasteuria penetrans[10] and Juglone.[11]

Economic Empact

Root-knot nematodes (Meloidogyne spp.) are one of the three most economically damaging genera of plant-parasitic nematodes on horticultural and field crops. Root-knot nematodes are distributed worldwide, and are obligate parasites of the roots of thousands of plant species, including monocotyledonous and dicotyledonous, herbaceous and woody plants. The genus includes more than 90 species, with some species having several races. Four Meloidogyne species (M. javanica, M. arenaria.

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टेनिया सोलियम

टीनिया सोलियम (Taenia solium) एक प्रकार का परजीवी कृमि है, जो मानव शरीर में रहता है और उसे नुकसान पहुंचाता है। यह कृमि आमतौर पर मानव आंतों में पाया जाता है और यह विश्व के कई हिस्सों में पाया जाता है।

टीनिया सोलियम के लक्षण:

1. पेट में दर्द
2. दस्त या कब्ज
3. वजन कम होना
4. थकान और कमजोरी
5. खूनी दस्त
6. आंतों में रुकावट
7. पेट में सूजन

टीनिया सोलियम के कारण:

1. दूषित भोजन और पानी
2. खराब स्वच्छता और स्वच्छता की कमी
3. परजीवी के अंडों के संपर्क में आना
4. अनुपचारित सीवेज और मल-मूत्र के संपर्क में आना

टीनिया सोलियम का इलाज:

1. एंटीहेल्मिंटिक दवाएं
2. पैरासाइट को निकालने के लिए सर्जरी
3. स्वच्छता और स्वच्छता की देखभाल
4. दूषित भोजन और पानी से बचना

टीनिया सोलियम की रोकथाम:

1. स्वच्छता और स्वच्छता की देखभाल
2. दूषित भोजन और पानी से बचना
3. परजीवी के अंडों के संपर्क में न आना
4. नियमित रूप से स्वास्थ्य जांच कराना

विवेक चौधरी

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एस्केरिस (Ascaris)

एस्केरिसिस (Ascaris) एक प्रकार का परजीवी कृमि है, जो मानव शरीर में रहता है और उसे नुकसान पहुंचाता है। यह कृमि आमतौर पर मानव आंतों में पाया जाता है और यह विश्व के कई हिस्सों में पाया जाता है।

एस्केरिसिस के लक्षण:

1. पेट में दर्द
2. दस्त या कब्ज
3. वजन कम होना
4. थकान और कमजोरी
5. खूनी दस्त

एस्केरिसिस के कारण:

1. दूषित भोजन और पानी
2. खराब स्वच्छता और स्वच्छता की कमी
3. परजीवी के अंडों के संपर्क में आना

एस्केरिसिस का इलाज:

1. एंटीहेल्मिंटिक दवाएं
2. पैरासाइट को निकालने के लिए सर्जरी
3. स्वच्छता और स्वच्छता की देखभाल

एस्केरिसिस की रोकथाम:

1. स्वच्छता और स्वच्छता की देखभाल
2. दूषित भोजन और पानी से बचना
3. परजीवी के अंडों के संपर्क में न आना
4. नियमित रूप से स्वास्थ्य जांच कराना

एस्केरिसिस (Ascaris) का जीवन चक्र-

1. *अंडे का चरण*: एस्केरिसिस के जीवन चक्र की शुरुआत अंडे से होती है। मादा एस्केरिसिस अपने अंडे मिट्टी में छोड़ती है, जहां वे 2-3 सप्ताह तक विकसित होते हैं।
2. *लार्वा का चरण*: अंडे से निकलने वाले लार्वा मिट्टी में रहते हैं और वे 2-3 सप्ताह तक विकसित होते हैं।
3. *इन्फेक्टिव लार्वा*: लार्वा के चरण के बाद, एस्केरिसिस के लार्वा इन्फेक्टिव हो जाते हैं और वे मानव शरीर में प्रवेश करने के लिए तैयार होते हैं।
4. *मानव शरीर में प्रवेश*: जब मानव मिट्टी में मौजूद इन्फेक्टिव लार्वा के संपर्क में आता है, तो लार्वा मानव शरीर में प्रवेश कर जाते हैं।
5. *लार्वा का विकास*: मानव शरीर में प्रवेश करने के बाद, लार्वा विकसित होना शुरू कर देते हैं और वे 2-3 महीनों में वयस्क एस्केरिसिस में परिवर्तित हो जाते हैं।
6. *वयस्क एस्केरिसिस*: वयस्क एस्केरिसिस मानव आंतों में रहते हैं और वे अपने जीवनकाल में कई अंडे पैदा करते हैं।
7. *अंडे का उत्सर्जन*: वयस्क एस्केरिसिस अपने अंडे मानव मल में छोड़ते हैं, जहां वे मिट्टी में जाकर विकसित होते हैं और जीवन चक्र को पुनः आरंभ करते हैं।

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Chromosome Poem

Each chromosome is home
To many gene
(The body's biological machines)
That tell you if your eyes
Are brown or blue,
Determine sizes
Of your hat, your shoe,

And tell you of your hair
Will wave or frizz.
The chromosomes sort out
The Hers from His
By making you
A Mr. Or a Ms.

Roshni Tiwari
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सीएमपी महाविद्यालय में पोस्टर प्रतियोगिता आयोजित

प्रयागराज । सीएमपी महाविद्यालय के अनुशासनाधिकारी कार्यालय की ओर से आज श्पोस्टर प्रतियोगिता आयोजित की

गई जिसमें करीब 20 छात्रों ने प्रतिभागिता की द्य जिसमें प्रथम पुरस्कार लवली चौरसिया ने प्राप्त किया, द्वितीय स्थान पर रिया निषाद एवं निधि कुमारी रहीं, जबकि तृतीय स्थान को अर्चिता एवं सृजल ने अलंकृत किया। कार्यक्रम का संचालन हेमलता पंत और प्रिया सोनी खरे ने किया द्य इस अवसर पर महाविद्यालय के उपप्राचार्या प्रोफेसर नीता सिन्हा,अनुशासनाधिकारी प्रोफेसर अर्चना त्रिपाठी और प्रोफेसर दीना नाथ उपस्थिति थे द्य निर्णायक मंडल में उपप्राचार्या प्रोफेसर नीता सिन्हा, डॉ शशिबाला और डॉ भास्कर ने पोस्टर प्रतियोगिता में निर्णायक की भूमिका अदा की। प्रतियोगिता में अनुशासन मंडल के सभी सदस्य उपस्थित रहे ।

इंसानों द्वारा किए जा रहे जानवरों और पर्यावरण के प्रति हिंसा:-

एक बार की बात है। ब्रूनो नाम का एक कुत्ता बहुत दुखी और उदास मन लिए हुए रास्ते से जा रहा था। तभी रास्ते में उसका मित्र सिंबा उससे मिला। सिंबा ने जब अपने मित्र के चेहरे पर यूँ उदासी देखी तो उदासी का कारण पूछने लगा तब ब्रूनो ने अपना दुख बयाँ करना शुरू किया।

ब्रूनो बोला:- आज मैं चलते-चलते इतना थक गया था कि मैंने जैसे ही एक छाँव और शांत जगह देखी तोमैं वहाँ सोने चला गया नींद लगते ही कहो किसी ने जोर से डंडे से मार के मुझे वहाँ से जाने को कहा, मैं दर्द के मारे चिल्लाता लेकिन उस इंसान को मेरे ऊपर ज़रा भी तरस नहीं आया।

सिंबा:- फिर तुमने क्या किया?
ब्रूनो:- क्या करता मैं? वहाँ से जल्दी जान बचाकर भागा।

सिंबा:- हम्म्! क्या करें मित्र हम जानवरों की तो ऐसी ही ज़िंदगी है, हमारे लिए तो मानो यह धरती है ही नहीं जैसे।

ब्रूनो:- आखिर हम जाएँ कहाँ इंसानों ने तो हर जगह कब्ज़ा कर लिया है। सारे पेड़ काटे जा रहे हैं अपनी बड़ी-बड़ी इमारतें बनाने के लिए। जंगल में हम जाएँगे तो वहाँ, हमसे बड़े जानवर हमें अपना खाना बना लेंगे बाहर कहीं सो जाओ तो कब इंसान अपने वाहन ऊपर चढ़ा दे पता चढ़ने के बाद लगता है। कल ही हमारे सो रहे मित्र के ऊपर किसी इंसान ने अपना वाहन चढ़ा दिया, जिससे उसकी मृत्यु हो गई।

सिंबा:- आज भी हमारे एक बंदर मित्र की बिजली के तार में उलझने की वजह से मृत्यु हो गई।

ब्रूनो:- और तो और इंसानों की वजह से वातावरण कितना प्रदूषित हो गया है,वायु को प्रदूषित कर दिया है इंसानों ने, जल तक को नहीं छोड़ा,उसे भी अपने फायदे के लिए प्रदूषित कर दिया।

सिंबा:- सही कहा। ना रहने के लिए जगह बची, ना पीने के लिए शुद्ध पानी, ना साँस लेने के लिए शुद्ध हवा। और तो और इनके वाहनों और तेज ध्वनि वाले उपकरणों की जोर-जोर की आवाज़ें, बापरे! लगता है कान से खून निकल के छोड़ेंगे।

ब्रूनो:-और गलती से किसी के घर के आस-पास खाने की तलाश में चले जाएँ तो मार भागते हैं।

सिंबा: - हाँ मित्र। इन्हें कुछ खाते हुए, हम इस आस में देखते हैं किशायद कुछ खाने को हमें भी मिल जाएगा,ना कि इसलिए की इनके खाने को नज़र लग जाएगी।

ब्रूनो:-हम जानवर हैं। हमें नहीं पता कि जो खाने की दुकानों पर इतनी भीड़ लगी होती है, वहाँ कुछ पैसे देने के बाद खाने को मिलेगा हम तो इस आस में उस भीड़ में शामिल हो जाते हैं कि जैसे सबकी बारी आ रही है, शायद हमारी भी बारी आएगी और हमें भी कुछ खाने के लिए मिलेगा।

सिंबा: - हमें क्या मालूम इंसानों के तौर- तरीके और नियम- कानून, एक तरफ एक जानवर को गोद में बिठाकर खिलाएँगे, स्नेह करेंगे और दूसरी तरफ दूसरे को डंडे और पत्थरों से मारेंगे।

ब्रूनो:-हाँ! शायद वह दिखने में हमसे अच्छे हैं इसलिए।

सिंबा:-हम्म्! शायद यह धरती ईश्वर ने सिर्फ इंसानों के लिए ही बनाई है।

ब्रूनो:- हां मित्र।

<u>निष्कर्ष:-</u>

इंसान अपने फायदों के लिए पेड़ काटे जा रहा है,जिससे जानवरों के अपने घर नहीं बचे। ना ही पीने लायक पानी और साफ हवा। वह दिन ज्यादा दूर नहीं जब इंसानों को भी इसका बहुत बड़ा खामियाज़ा भरना पड़ेगा।

हमारे आस-पास जो कुत्ते,बिल्लियाँ आदि जानवर आते हैं वह इसलिए क्योंकि उन्हें भी स्नेह-दुलार अच्छा लगता है, इंसानों की तरह वे भी प्रेम और घृणा का भाव महसूस कर सकते हैं।

Jyoti Yadav
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Biography


Alexander Agassiz

Agassiz was born in Neuchatel, Switzerland, and immigrated to the United States with his parents, Louis and Cecile (Braun) Agassiz ,1846. He graduated from Harvard University in 1855, subsequently studying engineering and chemistry , and taking the degree of Bachelor of science at the Lawrence Scientific School of the same institution in 1857; in 1859 became an assistant in the United States Coast Survey. Thenceforward he became a specialist in marine ichthyology. Agassiz was elected a fellow of the American Academy of Arts and Sciences in 1862. Up until the summer of 1866, Agassiz worked as assistant curator in the museum of natural history that his father founded at Harvard.

E. J. Hulbert, a friend of Agassiz 's brother in-law, Quincy Adams Shaw, had discovered a rich copper lobe known as the Calumet conglomerate on the Keweenaw Peninsula in Michigan. Hulbert persuaded them, along with a group of friends, to purchase a controlling interest in the mines, which later became known as the Calumet and Hecla Mining Company based in Calumet, Michigan. That summer, he took a trip to see the mines for himself and he afterwards became treasurer of the enterprise. Over the winter of 1866 and early 1867, mining operation began to falter , due to the difficulty of extracting copper from the conglomerate. Hulbert had sold his interests in the mines and had moved on to other ventures. But Agassiz refused to give up hope for the mines. He returned to the mines in March 1867, with his wife and young son. At that time, Calumet was a remote settlement, virtually inaccessible during the winter and very far removed from civilization even during the summer. With insufficient supplies at the mines, Agassiz struggled to maintain order, while back in Boston, Shaw was saddled with debt and the collapse of their interests. Shaw obtained financial assistance from John Simpkins, the selling agent for the enterprise to continue operation.

Agassiz continued to live at Calumet, making gradual progress in stabilizing the mining operation, such that he was able to leave the mines under the control of a general manager and return to Boston in 1868, before winter closed navigation. The mines continued to prosper and in May 1871, several mines were consolidated to form the Calumet and Hecla Mining Company with Shaw as its first president. In August 1871, Shaw "retired" to the board of directors and Agassiz became president, a position he held until his death. Until the turn of the century, this company was by far the largest copper producer in the United States, many years producing over half of the total.

Agassiz was a major factor in the mine's continued success and visited the mines twice a year. He innovated by installing a giant engine, known as the Superior, which was able to lift 24 tons of rock from a depth of 1,200 meters (3,900 feet). He also built a railroad and dredged a channel to navigable waters. However, after a time the mines did not require his full-time, year-round, attention and he returned to his interests in natural history at Harvard. Out of his copper fortune, he gave some US$500,000 to Harvard for the museum of comparative Zoology and other purposes.

Shortly after the death of his father in 1873, Agassiz acquired a small peninsula in Newport, Rhode Island, which features views of Narragansett Bay. Here he built a substantial house and a laboratory for use as his summer residence. The house was completed in 1875 and today is known as the Inn at Castle Hill.

He was a number of the scientific –expedition to South America in 1875, where he inspected the copper mines of Peru and Chile, and made extended surveys of Lake Titicaca, besides collecting invaluable Peruvian antiquities, which he gave to the Museum of Comparative Zoology (MCZ), of which was first curator from 1874 to 1885 and then director until his death in 1910, personal secretary Elizabeth Hodges Clark running the day-to-day management of the MCZ when his work took him abroad. He assisted Charles Wyville Thomsom in the examination and classification of the collection of the 1872 Challenger Expedition, and wrote the

Review of the Echini (2 vols., 1872-1874) in the reports. Between 1877and 1880, he took part in the three dredging expeditions of the steamer Blake of the Coast Survey (renamed the United States Coast and Geodetic Survey in 1878), and presented a full account of them in two volumes (1888). Also in 1875, he was elected as a member of the American Philosophical Society . In 1896, Agassiz visited Fiji and Queensland and inspected the Great Barrier Reef, publishing a paper on the subject in 1898. Of Agassiz's other writings on marine zoology, most are continued in the bulletins and memoirs of the museum of comparative zoology. However, in 1865, he published with Elizabeth Cary Agassiz, his stepmother, Seaside Studies in Natural History, a work at once exact and stimulating. They also published, in 1871, marine animals of Massachusetts Bay. He received the German Order Pour le Merite for Science and Arts in Augest 1902. Agassiz served as a president of the National Academy Sciences, which since 1913 has awarded the Alexander Agassiz Medal in his memory. He died in 1910 on board the RMS Agassiz en route to New York from Southampton. He and his wife Anna Russell (1840-1873) were the parents of three sons-George Russell Agassiz(1861-1951) , Maximilian Agassiz (1866-1943) and Rodolphe Louic Agassiz (1871-1933).

Shivam

B. Sc. 2 year

CMP College, Prayagraj, (U.P.), India

Climate Change

Rising temperatures, falling populations: The Impact of climate Change on Wildlife:

Climate change is no longer a distant threat; it's a harsh reality. Rising temperatures are altering ecosystems, disrupting delicate balances, and pushing species to the brink of extension.

The consequences:

1) Habitat Disruption: Changing temperatures and precipitation patterns destroy habitats, leaving animals without shelter and food.
2) Migration and Displacement: Animals migrate to find suitable habitats, leading to conflicts with human settlements.
3) Food Chain Disruption: Chanes in temperature and precipitation impact for food availability, causing population declines.

The Vulnerable:

1) Polar Bears: Sea ice melting threatens their huunting grounds.
2) Corals: Rising ocean temperature cause bleaching.
3) Penguins: Warming waters impact fish populations.

The Solution:

1)Reduce Carbon Footprint: Transition to renewable energy.

2)Conservation Efforts: Protect habitats, restore ecosystems.

3)Climate-Smart Policies: Support sustainable land- use practices.

4)Education and Awareness: Inspire individual action.

Take Action Today:

Every small step counts. Reduce energy consumption, use public transport, support conservation organizations, ams spread awareness.
Lets Unite for a Sustainable Future! Together, We Can Make aBig Difference.
Let's come together to protect our planet's precious biodiversity. Small actions today, a greener tomorrow, join hands make a difference.

Rahul Kumar
B.Sc 2ND year
C.M.P College, Prayagraj, (U.P.)

Beauty of Creature's

In oceans vast, where waves crash free,
I universe of life, beneath thes sea
The lion's rear, the bat's flight,
The shark leap, side by side.
Each species special, standing proud through all.
Each one unique, with fascinating roles.
Everyone their Intrsive values.
Each has a role, a place to fill,
A instict born from nature's will
Zoology studies how all survive.
So, cherish the wonders we have
Wonderful and unique creatures.

Palak Mishra
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CRISPR-Cas 9

"A Gene editing tool"

Jennifer Doudna and Emmanuelle Charpentier discovered CRISPR-Cas9, a gene editing tool that can precisely alter the DNA of animals, plants, and microorganisms.

Doudna and Charpentier were awarded the 2020 Nobel Prize in chemistry for their discovery. This was the first time two women won the Nobel Prize in chemistry.

A "CRISPR"(pronounced "crisper") stands for *Clustered Regularly Interspaced Short Palindromic Repeats.*

CRISPR-Cas9 is the bacterial immune system that can identify and cut DNA it works on

Guide RNA - A small segment of RNA matches a target gene in the genome.

Cas9 - An enzyme acts like molecular scissors to cut the DNA at the target location.

DNA repair - The cell's natural processes repair the cut, which can add or remove base pairs and inactivate genes.

1. Applications:-

Medicine - Correcting genetic mutations causing diseases like cystic fibrosis, sickle cell anemia, and some forms of cancer.

Agriculture - Developing pest-resistant crops and improving food yield.

Ecology - Gene drives to control invasive species or eliminate diseases like *Anopheles mosquitoes* which transmit *malaria.*

Ethical consideration - Containment of synthetic organisms and this potential environmental impact.

2. Epigenetics:-

Epigenetics studies changes in gene expression caused by mechanisms other than alterations in the DNA sequence, such as DNA methylation or histone modifications.

Environmental factors like diet, stress, and pollution can leave epigenetic marks that may be passed to offspring.

Epigenetic therapies are being developed for conditions like cancer where abnormal epigenetic patterns silence tumor suppressor genes.

Example - The Dutch Hunger Winter study showed that prenatal famine exposure led to epigenetic changes affecting metabolism.

3. Synthetic Biology:-

Artificial genomes have been synthesized, such as the minimal bacterial genome created by Craig Venter's team.

"Biofoundries" produce synthesized, such as biofuels and pharmaceuticals, by engineering microbes.

4. Population genetics and conservations:-

Importance - Genetic diversity is critical for species survival and adaptability.

Tools - Genome sequencing and SNP analysis help identify genetic bottlenecks and hybridization events.

Case Study - The use of genetic data to reintroduce genetic diversity into isolated populations like cheetahs or California condors.

DNA barcoding helps identify cryptic species, aiding biodiversity assessments and conservation planning.

5. Human microbiome genetics:-

The human microbiome, particularly the gut microbiota, harbors trillions of microorganisms with their own genomes.

Microbiome diversity is linked with conditions like obesity, diabetes, and mental health disorders.

Example - Fecal microbiota transplants(FMTs) having successfully treated recurrent *Clostridioides difficile* infections.

Single Cell Genomics - Techniques to analyze the genetic activity of individual cells, leading to insights into cancer heterogeneity, embryonic development, and stem cell biology.

Arshiya Ahmad and Rushda Rehana
BSC II Year - B
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Tips for maintaining a healthy lifestyle

Staying healthy involves a mix of physical, mental, and social well-being, like

Physical Health

1. **Balanced Diet:** Focus on whole foods like fruits, vegetables, whole grains, lean proteins, and healthy fats. Limit processed foods and added sugars.

2.Regular Exercise: Aim for at least 150 minutes of moderate aerobic activity or 75 minutes of vigorous activity each week, along with strength training twice a week.

3.Hydration: Drink plenty of water throughout the day. Limit sugary drinks and excessive caffeine.

4. Sleep: Aim for 7-9 hours of quality sleep each night. Establish a regular sleep schedule and create a restful environment.

Mental Health

1. Mindfulness and Meditation: Practice mindfulness or meditation to reduce stress and improve focus.

2. Stay Connected: Maintain relationships with friends and family. **Social support is vital for mental well-being.**

3. Limit Screen Time: Reduce time spent on screens, especially social media, to avoid negative comparisons and stress.

Preventive Care

1. Regular Check-ups: Visit your healthcare provider for routine screenings and vaccinations.

2. Listen to Your Body: Pay attention to any changes in your health and seek help when needed.

Lifestyle Choices

1. Limit Alcohol and Avoid Smoking: These can have significant long-term health impacts.

2. Stay Educated: Stay informed about health and wellness and adapt to new information and guidelines.

Wild Animals Conservation

Wild animals are an essential part of the earth's biodiversity and play a critical role in maintaining ecological balance.Their conservation is vital for the health of our planet, yet human activities such as deforestation, poaching, urbanization, and climate change threaten their existence. Protecting wild animals is not just about preserving individual species but about safeguarding ecosystems and, ultimately, our own survival.

Importance of Wild Animals Conservation

Wild animals contribute to ecological stability by maintaining the food chain and supporting natural processes such as pollination, seed dispersal, and nutrient cycling. Predators regulate prey populations, herbivores shape vegetation, and decomposers recycle organic material into the soil. Losing these species disrupts ecosystems, leading to cascading effects on the environment and human livelihoods. Additionally, wild animals are integral to cultural, scientific, and economic aspects of human society.

Many communities rely on wildlife for tourism, which generates significant income. Research on wild species contributes to scientific advancements, including medical discoveries.

Threats to Wild Animals

1. Habitat Loss: Deforestation for agriculture, urban development, and mining destroys the natural habitats of wild animals.

2. Poaching and Illegal Wildlife Trade: Animals like elephants, tigers, and rhinos are targeted for their valuable body parts.

3. Climate Change: Global warming alters ecosystems, making it difficult for many species to survive.

4. Pollution: Industrial waste, plastic, and chemical pollutants harm wildlife and their habitats.

Conservation Strategies

1. Protected Areas: Establishing national parks, wildlife sanctuaries, and biosphere reserves helps provide safe habitats for wild animals.

2. Laws and Policies: Enforcing strict anti-poaching laws and regulating wildlife trade can curb illegal activities.

3. Community Involvement: Empowering local communities to participate in conservation efforts ensures sustainable practices.

4. Education and Awareness: Educating people about the importance of wildlife can foster empathy and reduce harmful activities.

5. Rehabilitation and Reintroduction: Rescuing injured animals and reintroducing them to the wild helps restore populations.

Conclusion

Wild animals are irreplaceable treasures of nature, and their conservation is a collective responsibility. Governments, organizations, and individuals must unite to protect wildlife and preserve their habitats. By conserving wild animals, we protect our planet's rich biodiversity and ensure a healthier, more sustainable future for all life forms.

Vishal Bharati

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चिड़ियाघर.

चिड़ियाघर में रहने वाले जानवरों की जिंदगी काफी अलग होती है उनके प्राकृतिक आवास से। यहाँ कुछ बाते हैं जो चिड़ियाघर में जानवरों की जिंदगी को परिभाषित करती हैं:

सुरक्षा और देखभाल

- जानवरों को सुरक्षित और स्वच्छ वातावरण मिलता है।
- उनकी देखभाल करने वाले प्रशिक्षित कर्मचारी होते हैं।
- जानवरों को नियमित रूप से भोजन और पानी मिलता है।

पिंजरे और आवास

- जानवरों को विशेष रूप से डिज़ाइन किए गए पिंजरों में रखा जाता है।
- पिंजरे जानवरों की आवश्यकताओं के अनुसार बनाए जाते हैं।

व्यायाम और गतिविधियाँ

- जानवरों को व्यायाम करने के लिए जगह मिलती है।
- उन्हें खेलने के लिए खिलौने और गतिविधियाँ प्रदान की जाती हैं।

सामाजिक संपर्क

- जानवरों को अपनी प्रजाति के अन्य सदस्यों के साथ रहने का मौका मिलता है।
- कुछ जानवरों को मानव संपर्क भी मिलता है।

स्वास्थ्य जांच

- जानवरों की नियमित स्वास्थ्य जांच होती है।
- उन्हें आवश्यक टीकाकरण और उपचार मिलता है।

हालांकि, चिड़ियाघर में जानवरों की जिंदगी के कुछ नुकसान भी हैं:

- प्राकृतिक आवास की कमी
- सीमित जगह
- मानव संपर्क के कारण तनाव

चिड़ियाघरों का उद्देश्य जानवरों की सुरक्षा और संरक्षण करना है, साथ ही लोगों को जानवरों के बारे में शिक्षित करना भी है।

Vishnu Mishra
B.Sc 3rd Year(जंतु विज्ञान).

माइटिलस **(Mytilus)**

माइटिलस *(Mytilus)* एक प्रकार का समुद्री शेलफिश है, जो मोलस्का (Mollusca) वर्ग के अंतर्गत आता है। माइटिलस की कई प्रजातियां पाई जाती हैं, जो विश्व के विभिन्न समुद्रों में पाई जाती हैं।

माइटिलस की विशेषताएं:

1. द्विशेली: माइटिलस एक द्विशेली शेलफिश है, जिसके दो शेल होते हैं जो एक दूसरे से जुड़े होते हैं।
2. फिल्टर फीडर: माइटिलस एक फिल्टर फीडर है, जो पानी में मौजूद छोटे जीवों और पौधों के अवशेषों को अपने भोजन के रूप में उपयोग करता है।
3. समुद्री जीवन: माइटिलस समुद्री जीवन जीता है और समुद्री तटों और चट्टानों पर पाया जाता है।
4. महत्वपूर्ण भूमिका: माइटिलस समुद्री पारिस्थितिकी तंत्र में एक महत्वपूर्ण भूमिका निभाता है. क्योंकि वह अपने शिकार को पकड़ने और अपने शिकारियों से बचने के लिए विभिन्न तरीकों का उपयोग करता है।

माइटिलस का महत्व:

1. समुद्री पारिस्थितिकी तंत्र में भूमिका: माइटिलस समुद्री पारिस्थितिकी तंत्र में एक महत्वपूर्ण भूमिका निभाता है, क्योंकि वह अपने शिकार को पकड़ने और अपने शिकारियों से बचने के लिए विभिन्न तरीकों का उपयोग करता है।
2. वैज्ञानिक अनुसंधान में उपयोग: माइटिलस वैज्ञानिक अनुसंधान में उपयोग किया जाता है, क्योंकि वह अपने जीवन चक्र और व्यवहार के बारे में महत्वपूर्ण जानकारी प्रदान करता है।
3. खाद्य स्रोत: माइटिलस कुछ संस्कृतियों में एक खाद्य स्रोत के रूप में उपयोग किया जाता है।

अभिषेक केशवानी

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CMP College, Prayagraj, (U.P.)

ऑक्टोपस (Octopus)

ऑक्टोपस *(Octopus)* एक प्रकार का समुद्री जीव है, जो सेफैलोपोडा (Cephalopoda) वर्ग के अंतर्गत आता है। ऑक्टोपस की कई प्रजातियां पाई जाती हैं, जो विश्व के विभिन्न समुद्रों में पाई जाती हैं।

ऑक्टोपस की विशेषताएं:

1. आठ टेंटेकल: ऑक्टोपस के आठ टेंटेकल होते हैं, जो उसे अपने शिकार को पकड़ने और अपने आसपास के वातावरण को समझने में मदद करते हैं।
2. बुद्धिमान: ऑक्टोपस बहुत बुद्धिमान होते हैं और वे अपने शिकार को पकड़ने और अपने शिकारियों से बचने के लिए विभिन्न तरीकों का उपयोग करते हैं।
3. रंग बदलने की क्षमता: ऑक्टोपस अपने रंग को बदलने की क्षमता रखते हैं, जो उन्हें अपने आसपास के वातावरण में छिपने में मदद करता है।
4. तेजी से गति: ऑक्टोपस तेजी से गति से चल सकते हैं और वे अपने शिकार को पकड़ने और अपने शिकारियों से बचने के लिए अपनी गति का उपयोग करते हैं।

ऑक्टोपस का महत्व:

1. समुद्री पारिस्थितिकी तंत्र में भूमिका: ऑक्टोपस समुद्री पारिस्थितिकी तंत्र में एक महत्वपूर्ण भूमिका निभाता है, क्योंकि वह अपने शिकार को पकड़ने और अपने शिकारियों से बचने के लिए विभिन्न तरीकों का उपयोग करता है।
2. वैज्ञानिक अनुसंधान में उपयोग: ऑक्टोपस वैज्ञानिक अनुसंधान में उपयोग किया जाता है, क्योंकि वह अपने बुद्धिमान और अनुकूलन क्षमता के कारण एक महत्वपूर्ण अध्ययन विषय है।
3. खाद्य स्रोत: ऑक्टोपस कुछ संस्कृतियों में एक खाद्य स्रोत के रूप में उपयोग किया जाता है।

अनुराग सिंह

B.Sc 1st Year(जंतुविज्ञान)
CMP College, Prayagraj, (U.P.)

UPCST SUMMER INTERNSHI PPROGRAM 2024

INSTITUTE: IIT ROORKEE

I am pursuing my internship in Indiani Institute of Technology Roorkee (IITR) in the department of Environmental engineering under the guidance of Dr. Bhanu Prakash Vellanki. I have a specialisation in M.Sc (Zoology) from CMP Degree College .

This internship report contains many activities which I have done during this period. I have described about experience and knowledge that I got. I have a conclusion on the internship experiences.

I carried out detailed study on the importance of soil and it's contaminants extraction and running it on Liquid chromatography mass spectrophotometry (LCMS) for the determination of the contaminants from the soil samples in the Yamuna river Delhi and Sanjay lake Delhi. The targetcompounds were personal care products and pharmaceuticals (PPCPS) which are polluting the water bodies and river banks soil profile shows various components which get incorporated into the soil and run with life cycle of various organisms and get involved in the food chain. Photo taken during internship.

Next to it I have performed experiments to know the moisture content and Total organic carbon of soil samples . During this period Ico-operate with lab mates, research scholars and faculties and learnt various experimental procedures.

It was a great opportunity for me to work in this lab which is equipped with costly instruments. This internship helped me to learn independently and discipline myself to be patient, self trust, take initiatives and the ability to know about environmental engineering technology.

This internship helped me to learn independently and discipline my sey and endevavoured me to take initative and helped me know abouit evnviron engineer technology.

Thankyou!

Anshika Mishra
(M.Sc Zoology) IVth Sem. 2024
CMP PG College, Prayagraj

The Future of Renewable Energy: Innovations and Challenges in Solar and Wind Power

Advancements in Solar Power Technology

Perovskite Solar Cells: These cells offer higher efficiency and lower production costs compared to traditional silicon-based cells. Bifacial Solar Panels: They capture sunlight on both sides, increasing energy output by up to 30%. Floating Solar Farms: Installed on bodies of water, they save land space and reduce water evaporation, offering a dual benefit. Solar Paint: A developing technology where paint on surfaces can generate solar power, opening new possibilities for energy production.

Innovations in Wind Energy

Vertical Axis Wind Turbines: These turbines are more compact and can generate power in urban areas with unpredictable wind directions. Offshore Wind Farms: Newer turbines are larger, more powerful, and can be installed farther offshore to harness stronger, more consistent winds. Wind Catching Systems: Innovations like wind-catching panels promise higher energy capture in smaller spaces, improving efficiency. Kite-Powered Wind Turbines: Kites flying at high altitudes capture stronger winds, offering a novel approach to wind energy.

Challenges in Solar and Wind Power

Energy Storage: Storing renewable energy efficiently is still a major challenge, with ongoing research in battery technologies like solid-state batteries and flow batteries.

Intermittency: Solar and wind are dependent on weather conditions, necessitating advancements in grid management and hybrid systems combining multiple energy sources.

Land and Space Use: Solar and wind farms require significant space, which can lead to conflicts with land use for agriculture or conservation. Supply Chain and Materials: Rare earth materials used in solar panels and wind turbines are often

limited and involve complex, unsustainable supply chains.

Future Outlook

Grid Modernization: Smart grids, equipped with real-time data and AI, will improve energy distribution and reduce waste. Hybrid Energy Systems: Combining solar, wind, and other renewable sources with advanced storage solutions will create more reliable energy systems. Global Policy and Investments: Continued government incentives and private investment in renewables will drive technological breakthroughs and infrastructure growth.

These advancements and challenges shape the future of renewable energy, pushing the world closer to a sustainable and carbon-free energy future.

Sucheta Upadhyay

B.Sc. 3rd Year

C.M.P. Degree College, Prayagraj

Students Achievements 2023-24

1. **Tahniyat Ansari,** Ph.D. student qualified GATE-XL 2024.
2. **Priyanka Gupta,** Ph.D.student qualified GATE-EY 2024.
3. **Arpita, Ph.D.** student,qualified CSIR-NET, 2024
4. **Chandra Prakash Mishra,** M.Sc. batch 2024 qualified junior research fellowship of CSTUP
5. **Nidhi Gupta,** M.Sc. 2020 batch and JRA qualified CRET 2024.
6. **Twinkle Yadav, Ph.D. student,** presented poster entitled **"Comparative phylogenomic resolution of the *Fusobacterium* genus and insights into the oncogenic potential among the species of *Fusobacterium* genus"** in National Seminar on "Science in Times to Come" organized by S.S. Khanna Degree College, Prayagraj on March, 17-18, 2023
7. **Twinkle Yadav, Ph.D. student,** presented a poster entitled "**Insights into the pathogenicity potential and phylogenomic determination among the spp. of *Campylobacter* genus**" in Second South Asian Symposium on Microbial Ecology **(SASME 2023)** sponsored by International Society for Microbial Ecology (ISME) which is held on 1-3 November, 2023 in Dhulikhel, Nepal.
8. **Twinkle Yadav**, Ph.D. student, awarded by International Travel Support Grant of US $ 300.00 to participate and present research entitled **"Insights into the Pathogenicity Potential and Phylogenomic Determination among the spp. of *Campylobacter* Genus**" in Second South Asian Symposium on Microbial Ecology on 1-03 November in Kathmandu, Nepal, 2023.
9. **Twinkle Yadav**, Ph.D. student, received third best poster presentation award for poster presentation entitled **"Phylogenomic Determination and insight into the Pathogenicity Potential among the Species of**

***Campylobacter* Genus"** in Genvision 2024 that organized by Department of Biosciences and Bioengineering IIT Bombay on 13-14 January, 2024 in Mumbai.

10. **Twinkle Yadav**, Ph.D. student, presented a poster entitled **"Phylogenomic analysis of Campylobacter: Prespectives on Pathogenic Potential"** at the 8th International Conference of Indian Network for Soil Contaminattion Research (INSCR-2024) on "Exploring the Microbial World from Human Health to Environmental Sustainability and 4th International Symposium on Ciliate Biology (ISCB- 2024), organised by INSCR and ArcharyaNarendraDev College, University of Delhi from April 03-05, 2024 at Conference Center, University of Delhi, India.
11. **Twinkle Yadav**, Ph.D. student, presented an oral presentation on **"Phylogenomic resolution of *Fusobacterium* genus: Prospective of pathogenic potential"**in National Conference on "Women in Biotechnology: Contribution in Accelerating Research and Entrepreneurship" in association with the National Academy of Science India (NASI) Luknow Chapter, held at Amity University, Luknow Campus on 22-23 October 2024.
12. **PriyaAgrwal,** Ph.D. student, received second prize for poster presentation on**" Exploring the impact of lead acetate on vital organs of Labeorohita: An in- gel analysis of lactate dehydrogenase and antioxidant enzymes."** In the Sixth International Conference on Biotechnology Intervention for Agriculture, Health, and Circular Economy. My poster received the second prize.
13. **PriyaAgrwal,** Ph.D. student, presented a poster on **"Modulation of enzymatic antioxidant defence system in response to lead (Pb) exposure in Indian major carp Labeorohita"** in international conference on Developments in the science of oxidative stress and redox medicine & 18th Annual meeting of the society for free radical research, India.

14. **RupalShukla, Ph.D. student, presented a poster on "Evolution of FOXP2 Gene Expression in Avian Vocal learners and Humans"** on 13 - 14 January 2024 in "Genvision 2024" organized by the Department of Biosciences and Bioengineering,IIT Bombay.
15. **PoornimaYadav,** Ph.D student, presented a poster on **" Review on Colchicine induced cognitive decline in zebrafish(Daniorerio)"** on 13 - 14 January 2024 in "Genvision 2024" organized by the Department of Biosciences and Bioengineering,IIT Bombay
16. **PoornimaYadav,** Ph.D student,Presented poster on the topic **"A Review on Unraveling the Molecular Mechanisms of Amyloid - Beta Oligomers in Early - Onset Alzheimer's Disease Progression: A single - molecule study"** in National Conference on "Women in Biotechnology: Contribution in Accelerating Research and Entrepreneurship" in association with the National Academy of Science India (NASI) Luknow Chapter, held at Amity University, Luknow Campus on 22-23 October 2024.
17. **AnuradhaYadav**, Ph.D. student, received the Best Oral Presentation Award (2nd position) for outstanding contribution in the field of "Diatom as biomonitoring agent in the assessment of River quality" at the International Conference on Renewable Agriculture and Sustainable Environment organized by the Society of Biological Sciences and Rural Development (SBSRD), Prayagraj, (U.P), India, on March 25th and 26th, 2023.
18. **AnuradhaYadav**, Ph.D. student, awarded the "Raising Women Star Researcher Award – 2024" for outstanding contribution to the field of Environmental Biology at the National Seminar on Inspire Inclusion and NariSammanSamaroh- 2024, March 8, 2024, organized by the Society of Biological Sciences and Rural Development, Jhusi, Prayagraj- 211019, U.P.
19. **AnuradhaYadav**, Ph.D. student received the Best Oral Presentation Award – 2024 for Outstanding Contribution in the field of "Diatom-Based Biomonitoring the Health and Quality of Rivers" at the International

Conference on Environment and Agriculture: New Technological Applications on March 30 & 31, 2024.

20. **Nidhi Gupta,** JRA, awarded with the silver medal in oral presentation in a workshop by Bharat Sarkar Paryavaran, Van avam Jalvayu Parivartan Mantralay, Bhartiya Prani Sarvekshan Madhya Kshetrapradeshik Kendra, Jabalpur (M.P.)
21. **Nidhi Gupta, JRA presented a poster on "**"Entomopathogenic Nematodes- An Insect- Biocontrol Agents" in international conference on "Science, Society and Culture (ICSE-2023)" held on 6-7 October 2023 in Kathmandu.
22. **Nidhi Gupta,** JRA, got Best Oral Presentation Award in an "International Conference on Environment and Agriculure : New Technological Applications" on the topic "Medicinal Plants and its Importance in Making Drugs"held on march 30th & 31st 2024
23. **Priyanka Gupta,** Ph.D. student presented a poster on**"Investigation of antiepileptic drugs on neurodegernative effect in the avian brain"** on 13 - 14 January 2024 in Genvision 2024 organized by the Department of Biosciences and Bioengineering,IIT Bombay.
24. **Lavi Dwivedi,** Ph.D. student, presented a Poster entitled **"Effect of Ter-butylhydroquenone on Reproduction of Prepubertal and Adult female mice"** in National Conference on "Women in Biotechnology: contribution in Accelerating Research and Entrepreneurship" in National Academy of Science India (NASI) Lucknow Chapter, held at Amity University Lucknow Campus on 22-23 October 2024
25. **Simoni Singhal, Ph.D. student, presented research work** in Indo-Canada International Conference on Advances in Research and Development (ICARD 2024) on January 27-28 2024 and organized by All India Institute of Training and Education (AIITE), New Delhi, India, International Skill Development Council (ISDC), New Delhi, India, and Somnogen Canada

Inc, Toronto, Canada, presented an oral presentation on "Botanical oils as Eco-friendly Alternative against Triboliumconfusum on Rice Grains".

26. **Simoni Singhal,** Ph.D. student, presented an oral presentationon **"Assessment of Spatial Distribution and Taxonomic Diversity of Benthic Biota of River Sone"** in International Conference on Environment and Agriculture: New Technological Applications" organized by the Society of Biological Sciences and Rural Development, Prayagraj. (U.P.) in Collaboration with ZSI, Kolkata (W.B.) held from March, 30 & 31, 2024.
27. **Simoni Singhal,** Ph.D. student, presented an oral presentation on **"Environmental Barcoding: A Next Generation Sequencing (NGS) Approach for Bio monitoring of Riverine Diatoms"** in two-day workshop on "Biodiversity and Conservation", organized by the Joint Coordinating Committee of the Zoological Survey of India (ZSI), Hindi Teaching Scheme, Department of Official Language, Ministry of Home Affairs, Government of India, Jabalpur (Madhya Pradesh) and the National Academy of Sciences India (NASI), Bhopal Chapter on 9-10 March 2024.
28. **Simoni Singhal, Ph.D.** student, presented an oral presentation on**"A Review on Ecological Integrity and Pollution Levels of River Sone, A Major Tributary of River Ganga in Madhya Pradesh, India"** in International Conference on "Conservation of Aquatic Biodiversity and Ecosystem Services of Ganga Basin in India, on 21-23 October 2024, Organized by Department of Zoology, Government P.G. College New Tehri, TehriGarhwal, Uttrakhand India.
29. **Simoni Singhal,** Ph.D. student, presented an oral presentation (virtual mode) on**"Assessing River Sone Ecological Integrity and Pollution Levels in the State of Madhya Pradesh: A Review"** in 31st Annual River Symposium 2024, organized on 25th October by River Institute, Cornwall, Canada.

30. **Simoni Singhal,** Ph.D. student, presented an oral presentation on**"A Review on Ecological Integrity and Pollution Levels of River Sone, A Major Tributary of River Ganga in Madhya Pradesh, India"** in GULF4: An International Conference on "Sustainable Management of the Gulf ecosystem health under Climate Change: Regional experiences and global practices," November 26-28, 2024 at Al Ain, UAE.
31. **Simoni Singhal,** Ph.D. student, presented an oral presentation on**"Benthic Macroinvertebrates as Bioindicators of Water Quality: A Comprehensive Review and Comparison of Diversity Indices"** in National Conference on "Challenges to Life Below Water: Achieving Sustainable Development Goals (SDGs)" organized by Sri University and Ministry of Jal Shakti, Cuttack, Orissa from 13-14 December 2024.
32. **Simoni Singhal,** Ph.D. student,Received **"Young Women Scientist Award – 2024"**, for outstanding contribution to the field of Entomology in National Seminar on Inspire Inclusion and NariSammanSamaroh- 2024, March 8, 2024. They were organized by the Society of Biological Sciences and Rural Development, Jhusi, Prayagraj- 211019, U.P., India.
33. **Aditya Sharma,** Ph.D. student, presented an oral presentation on "Nematode Problem in Okra in Indian Scenario" at the International Conference on Science, Society and Culture (ICSC-2023) organized by Nepal Aquaculture Society Kathmandu, Nepal, on October, 6th- 7th 2023.
34. **Aditya Sharma,** Ph.D. student,presented an oral presentation on "Integrated Management of Root-knot Nematode (*Meloidogyne incognita)* on Okra *(Abelmoschusesculentus)"* in the National Seminar on "Biodiversity and Conservation" organized by Government of India Ministry of Environment, Forest and Climate Change, Zoological Survey of India Central Zone Regional Center Jabalpur (M.P.), on the date of March 9th-10th, 2024.

35. **Aditya Sharma,** Ph.D. student,received theBest oral presentation Award in the field of "Efficacy of various oil cakes against Root-knot Nematode (*Meloidogyne incognita*) in okra (*Abelmoschusesculentus*)" in International Conference on "Environment and Agriculture: New Technological Applications" organized by Society of Biological Science and Rural Development, Prayagraj, (U.P), India,, in Collaboration with Zoological Survey of India, Kolkata (W.B.), in March 30 & 31, 2024.
36. **Aditya Sharma,** Ph.D. student,presented an oral presentation on "Pest of Honey Bee and their Management" in the National Seminar on "Recent Advances in Beekeeping" organized by Department of Biological Sciences, SHUATS, Prayagraj, on the date of April 10, 2024.

Achiever

Mr. Chandra Prakash Mishra

M.Sc. Zoology Student, Batch - 2022 to 2024

Appointed JRA in UP CST,

Lucknow, Project, 2024