



ZOobytes

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Cheetah.jpg retrieved from Wikimedia Licensed under CC BY-SA

CHEETAH REINTRODUCTION IN INDIA

Eight Cheetahs reintroduced in the Kuno National Park, Madhya Pradesh, India in September, 2022. After many decades of the Cheetahs going extinct in India, the 'Action Plan for Introduction of Cheetah in India' has proved to be an important initiative to restore balance in the ecosystem.

EDITORIAL

It is our privilege to present to the readers the second issue of our departmental newsletter "Zoobytes".

The newsletter provides a platform for highlighting the activities and achievements of the faculty of department of Zoology and the undergraduate students of Zoology; and also recent advances in the field of Zoology.

The second issue emphasizes on all of the above. The articles in the issue are mainly focused on Soil, soil as a habitat, soil fauna and its conservation. As presently there is a global revolution started for the conservation of soil for saving the ultimate existence of life on earth.

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Faculty Achievements

- Mr. G.P.P. Khanolkar is a member of Board of Studies in the subject of Zoology.
- Mrs. Teja Gramopadhye, Mrs. Vihswal Kunkolienkar and Dr. Socorrinha D'Costa participated in the workshop on NEP 2020 - Research, Innovation and ranking (online) held on 14/11/2022 organised by UGC- HRDC, Goa university.
- Dr. Deeparani Prabhu attended International conference from 16th to 19th Nov 2022 on "Environmental Sustainability and Biotechnology: opportunities and challenges, organised by P.E.S's RSN College of Arts and Science, Ponda- Goa in collaboration with Government college of Arts, Science and Commerce, Khandola, Goa jointly with Society for Environment Sustainability, Lucknow at Ravindra Bhavan, Margao, Goa. She presented a poster under green technology at the above conference titled "Mosquito Larvicidal activity of *Piper nigrum* against *Ades aegypti* and *Culex quinquefasciatus*."
- Dr. Deeparani Prabhu is a Life member of society for environmental sustainability Lucknow and member of Goa chapter of the society.
- Dr. Kiran Gaude has been elected as Chairperson of Biodiversity Management Committee of Curti-Khandepar panchayat for the term of 5 years.
- Dr. Kiran Gaude is elected as a member of Village developmental committee of Curti-Khandepar panchayat for the term of 5 years.
- Dr. Kiran Gaude and Ms. Supriya Gawde attended and successfully completed 116th Faculty induction programme from 8/11/2022 to 13/12/2022, organised by UGC-HRDC, Goa University.
- Dr. Socorrinha D'Costa and Ms. Karishma Naik attended and successfully completed Refresher course in Life Science from 10/01/2022 to 23/01/2022, organised by UGC-HRDC, Goa University.

Departmental News

- Dr. S. H. Bhosale, Associate Professor; Department of zoology, superannuated on 1st September 2022 after serving the PES college for last 31 years. His area of specialization were Entomology, environmental toxicology, Animal physiology, endocrinology, During his teaching tenure, he has departed knowledge and influenced more than 5000 undergraduate students. .
- Ms. Shweta R. S. Sangaonkar; M.Sc. Zoology MH-SET; joined as Assistant Professor in Zoology .

Student Achievements

- Ms. Shreyasi Singdikar and Master Supreet Naik participated and secured third place in the Quiz competition based on the theme "World Wildlife and Ecology" organized by Forest department of Goa as a part of celebration of Wildlife Week. 
- Ms. Vinita V. Naik and Ms. Samrudhi S. Phadte; students of B.Sc. Semester IV zoology participated in a One day State level workshop on Advanced technology in Wildlife research on 06/01/2023, organized by Ganpat Parsekar College of Education, Harmal and Directorate of Higher Education, State of Goa. 
- A group of 14 Zoology student of B.Sc. semester II and IV attended the lecture series on "Recent Advances in Life Sciences" organized by Department of Zoology ,Government College of Arts Science and Commerce, Quepem on 12th and 13th January 2023.



FAUNAL INHABITANTS OF SOIL

Soil fauna includes animals which pass one or more stages of their lifecycle in soil ecosystem. Some may be temporary occupants of this soil habitat while most are permanent. Soil animals participate in the genesis of the habitat in which they live. Soil organisms are found in all soil types, varying in species composition, diversity, abundance and functions in accordance to the changing soil types.

Rough estimates indicate several thousand invertebrate species as well as unknown levels of microbial and protozoan diversity. Soil ecosystem generally contain a large variety of animals, which include both Chordates and Non-chordates. Based on their size, soil fauna are classified into four groups – Microfauna (5 – 120µm, e.g. protozoa, nematodes); Mesofauna (80 µm – 2 mm, e.g. collembolans, acari); Macrofauna (500 µm – 50 mm, e.g. earthworms, termites) and Megafauna (>50mm, eg. rodents, reptiles and amphibians).

Soil organisms are involved in different processes such as decomposition of organic matter, formation of humus and nutrient cycling. The detritus food chain takes an essential role within the soil as it forms the base of food web. The soil molluscs and earthworms also helps in assisting stability of soil and making it less vulnerable to soil erosion.

In recent years, there has been a decline of soil biodiversity as a result of anthropogenic activities and use of modern agricultural practices. Abundance, biomass and diversity of soil fauna is influenced by wide range of management practices like treatment of pasture, crop residues and crop rotation which can affect soil fauna.

Sustainable agricultural practices may aid in conserving soil fauna and soil habitat. Limited use of tilling practice can avoid soil compaction and soil erosion; thereby allowing the soil fauna to flourish.



Ruchita R. Pai
S.Y.B.Sc.

EARTHWORM - THE SOIL ECOSYSTEM ENGINEERS

"WOVEN INTO THE DIRT, NEVER RUDE NOR CURT, IT PERFORMS ITS WORK UNSEEN". This little phrase may be humorous but it is also truthful. Earthworms play a very important role in creating and maintaining healthy soil. They carry out tilling of soil, thereby breaking down organic material into valuable nutrients and integrating them into the soil, so that plants can utilize it. Earthworms influence the supply of nutrients through their feeding habit and also largely through their burrowing activities. The stability and the concentration of organic matter impact soil physical properties and its dynamics.

Earthworms are divided into three main eco-physiological categories – Epigeic worms or surface dwellers; Endogenic worms and Anecic worms. Firstly, the Epigeic earthworms live on the soil surface and feed on the leaf litter. Endogenic earthworms live in the soil and produce horizontal tunnels while feeding on mineral soil and partially decomposed material, being then geophagous. Anecic earthworms produce permanent vertical burrows and feed on the litter to be pre-decomposed by microorganisms.

Earthworms have a direct and important effect on the soil microbiota through their nutrition, food preference, ingestion and assimilation. Thus decreasing microbial biomass, especially that of fungi. The physiology, morphology and behaviour of earthworms is essential to understand their effect on soil functions. However, there is increasing evidence that the effect of earthworms on soil functions may be mediated through soil microbial communities. If we create a healthy soil environment, earthworms will flourish and we will be rewarded with a healthier, fertile soil and green earth.



Shejal Naik
S.Y.B.Sc.

SOIL WATER FOR SUSTAINABLE FUTURE

With an ever-increasing demand for water, it's only natural that water conservation measures would grow in importance. One of such method is ground water recharge, which replenishes aquifers. Instead of waiting for time and mother nature to absorb and filter surface water, artificial ground water recharge may performed. This is done by channeling surplus surface water deeper into the ground.

Groundwater is the underground water present in the deeper layers of soil. Groundwater recharge helps in improving infiltration and reducing surface runoff and increasing ground water levels quality. The estimated quantity of additional recharge from 100 sq.m. roof top area is 55.000 liters. It also reduces water logging.

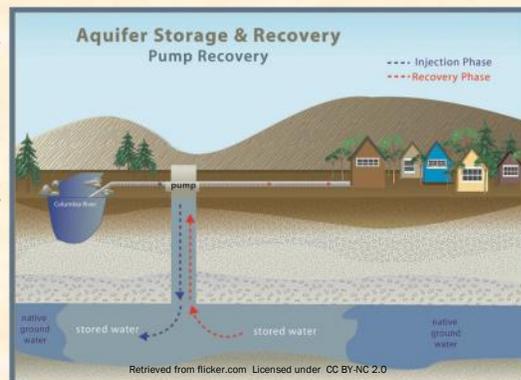
Developing of artificial underground reservoir by artificial recharging for storing water underground is called as recharging of underground water. There are various methods of groundwater recharging such as Spreading method; recharge through borewells; use of recharge pits; artificial reservoirs etc.. In urban areas various methods are carried out to increase ground water recharge such as water spreading technique, rooftop collection of rainwater, road top collection of rainwater and induced recharge from surface water bodies. In induced infiltration method the water table gradient is increased from source of recharge. For this special type of wells are constructed near the banks of river having radial collector. The percolating water is collected from radial collector and the discharge as recharge in to lower-level aquifer.

Groundwater recharge is an important process for sustainable groundwater management, since the volume-rate abstracted from an aquifer in the long term should be less than or equal to the volume-rate that is recharged. It can help move excess salts that accumulate in the root zone to deeper soil layers, or into the groundwater system.

Less groundwater recharge leads to a drop in the groundwater table, which will have a negative impact on soil vegetation. Groundwater recharge is an important component of sustainable groundwater management, as increasing the amount of recharge can help improve conditions in over drafted basins, or allow for additional pumping in basins that are not experiencing chronic declines in groundwater levels.

Samrudhi Phadte

S.Y.B.Sc.



ROLE OF TERMITES IN SOIL FORMATION

Termites commonly called as white ants, belong to Kingdom Animalia, Phylum: Arthropoda, Class: Insecta and Order: Isoptera.

Termites live in colonies and are best known for building nests in woods and earth by creating tunnels. Termites are highly resistant to the high temperature. Some termite species make tunnels in the ground, they destroy roots of grasses, vegetation and crops. Termites are among the most destructive insects as far as humans are concerned.

Being detritivorous insects, they do feed on plants directly or on fungus growing on decaying and dead material. Termites themselves do not actually digest the wood, although they feed on cellulose within woods. Instead their gut is loaded with microorganisms such as bacteria, fungi, protozoa which release various cellulose degrading enzymes. Later parasites living inside termite's digestive tract assist in further metabolic processes and produces byproducts that both organisms can digest. This symbiotic association benefits both termites and microorganisms living within insect hosts.



The process of breakdown of detritus into smaller particles is called fragmentation. After fragmentation water soluble inorganic nutrients go down into the soil horizon and get precipitated as available salts. This is known as Leaching. The bacterial and fungal enzymes degrade detritus into simpler inorganic substances by catabolic pathways. All these processes occur simultaneously which lead to humification which means accumulation of dark coloured amorphous substance called "humus". The humus is highly resistant to microbial action and undergoes decomposition at an extremely slow rate, thus contributing in soil conservation and increasing the soil fertility. Termites show large impact on formation of soil and also plays a major role in the flow of energy through soil ecosystem.

Kalpana Goanjar

T.Y.B.Sc.

Results of Competition conducted by Zoology Study Forum

- As a part of celebration of Azadi ka Amrut Mahotsav, Department of Zoology under the auspices of Zoology study forum organised a **Photography competition** on the theme "**Monsoon Fauna**" for the students of our college. A total of 24 students participated in the competition. **The winners of the competition were** First Place - Parth Prabhu Velguenkar ;Second Place - Govard Naik ;Third Place - Diya Janglye; First consolation - Saideep Maradkar and Second consolation - Anvish Prasad.
- E-poster competition** was organised on the theme **Flight against Mosquitoes** on 17th August 2022. The winners were Ms. Tamanna Saudagar (S.Y.B.Sc.) secured first place, Ms. Diya Janglye (F.Y.B.Sc.) secured second place and Mr. Sagar Hedgo (F.Y.B.Sc.) secured third place.
- As a part of Wildlife Week Celebration 2022, a **Poster Making Competition** on the theme "**Importance of keystone species for Ecosystem Restoration**" was organized under the auspices of Zoology Study forum. Ms. Saloni Sailesh Naik (F.Y.B.Sc.) secured First Prize and the second prize was secured by Veron Fernandes (F.Y.B.Sc.)



Activities of Zoology Study Forum

- The P.E.S Alumni Association in collaboration with Zoology Study Forum, Department of Zoology organised an interactive talk on the occasion of Wildlife Week 2022 for the students of our college, entitled "**Scope, Management and Career Opportunities in Forest and Wildlife**" on **3rd October 2022**. The resource person for the talk was **Mr. Damodar Salelkar, Assistant Conservator of Forest, Forest Department, Government of Goa**. The resource person Mr. Damodar Salelkar explained the various management practices used in the protected areas of Goa and other parts of India. He also discussed the career opportunities in forest department and Indian forest services, qualifications required and how a B.Sc. graduate can go about preparations for answering Indian and State services competitive exams. The talk was attended by 289 zoology students of B.Sc. semester I, III and V.



- Department of Zoology and Botany, under the auspices of Zoology Study Forum and Botany Colloquium, organized a talk cum interactive session on "**Nutrition for Teenagers**" by **Ms. Nityashri Iyer, Nutritionist, Diet and Nutrition clinic, Ponda Goa** on 19/08/22 at 10:30 am for the students of our college. The resource person was introduced by Dr. Socorrinha D'Costa. Ms. Nityashri Iyer highlighted the importance of water, nutrients, balanced diet, sleep and stress management.



First issue of the biannual wall-paper "**MAYUR**" was released on 15th August 2022.



Farewell to Dr. Subhash H. Bhosale



FACULTY OF DEPARTMENT OF ZOOLOGY

Mr. G.P.P. Khanolker	Ms. Deepa Fernandes (HOD)
Mrs. Teja Gramopadhye	Dr. Deeparani Prabhu
Mrs. Vishwal Kunkolienkar	Dr. Socorrinha D'Costa
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DISCLAIMER

The opinion and news appearing herein are those of editor and not necessarily those of the principal or the management. The information given here are only for general reading. - Editor. Contact us at: pesdeptzoology@gmail.com

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