

PROCEEDINGS



NATIONAL WEBINAR ON ROLE OF BIODIVERSITY CONSERVATION IN ECOSYSTEM FUNCTIONING

Wednesday, 14th December 2022



Prof Neelima Gupta

Hon'ble Vice-Chancellor
Dr. Harisingh Gour Vishwavidyalaya
Sagar (M.P.)



Dr Dhriti Banerjee

Director, ZSI
Ministry of Environment, Forests
& Climate Change, GoI



Prof. Shweta Yadav

Department of Zoology
Dr. Harisingh Gour V.V., Sagar



Dr Anjum Nasreen Rizvi

Zoological Survey of India
Kolkata

Jointly Organized by

Department of Zoology

Dr. Harisingh Gour Vishwavidyalaya, Sagar (M.P.)

(A Central University)

&

Zoological Survey of India, Kolkata

Inaugural Session

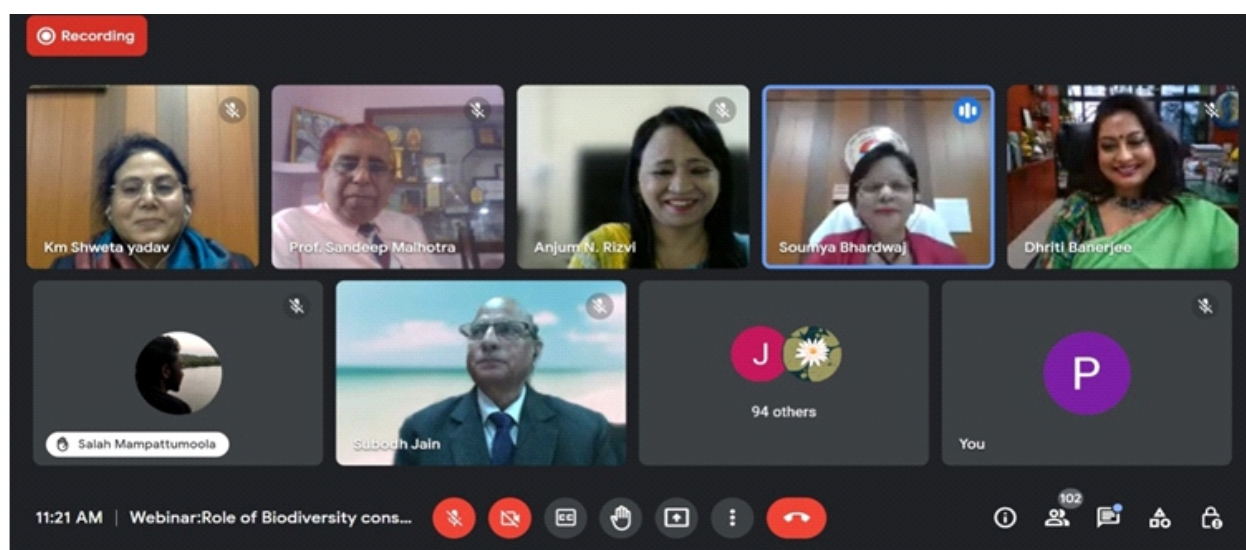
Prof. Shweta Yadav, Coordinator, ZSI and DHSGU Collaboration Activities at Dr. Harisingh Gour Vishwavidyalaya (A Central University), Sagar, gave an introduction to the webinar. She gave an overview of the first activity taken after the two institutes signed the Memorandum of Agreement. 343 participants registered for the webinar using an online google form. To discuss various issues related to the *Role of Biodiversity Conservation in Ecosystem Functioning* with the participants, distinguished scientists from all over the country **Dr. K.A. Subramanian**, ZSI, Southern Regional Centre, Chennai; **Dr. Umesh Tiwari**, Botanical Survey of India, Kolkata; **Dr. Umer Sharif**, Botanical Survey of India, Southern Regional Centre, Coimbatore; **Prof. S. K. Malhotra**, Allahabad University, Prayagraj; **Dr. Rajendra Kumar**, IARI, New Delhi; **Dr. Kamalakannan M.**, ZSI, Western Ghats Regional Centre, Kerala very kindly gave their consent to deliver lectures. They delivered lectures on *Role of Aquatic Insects in Wetland Biodiversity and Conservation*; *Plant Diversity of Arunachal Pradesh and Ecosystem Services*; *Conservation of Biodiversity- A Botanical Survey of India Perspective*; *Nematode Diversity & Invasive Reverse Co-Evolution*; *Unsnarling In Vivo and in vitro Crop Breeding Strategies in Changing Climatic Scenario for Biodiversity Conservation and Boosting Ecosystem Efficacy* and *Role of Mammals in Ecosystem Functioning*. Due to registration of a large number of participants for the Webinar, it was not feasible to accommodate everyone at the Google Meet. As a result, the Webinar was streamlined over the YouTube Channel (https://www.youtube.com/watch?v=2OC_YBSqu6s&t=19387s). The URL was sent to each attendee and was also accessible in the online meeting's chat box. The Feedback link was added to the Chat box prior to the Webinar's two-hour completion time and remained active by 8 PM. Participants could access their electronic certificates by downloading them after providing the necessary information in the feedback form.

Prof Subodh Jain, Dean, School of Biological Sciences and Head, Department of Zoology welcomed Hon'ble **Dr. Dhriti Banerjee**, Director of Zoological Survey of India, Kolkata, Hon'ble Vice Chancellor **Prof. Neelima Gupta**, **Dr. Anjum Rizvi**, ZSI, Kolkata, **Prof. Shweta Yadav**, Convener of the webinar, Resource persons, invited speakers, fellow colleagues, media persons, participants and friends to the webinar on “**Role of Biodiversity Conservation in Ecosystem Functioning**”. Dr. Harisingh Gour Central University, Sagar and Zoological Survey of India, Kolkata signed MoU on **May 25th** this year with the sole efforts of the Hon'ble Vice Chancellor **Prof. Neelima Gupta** with the objectives to exchange students, scholars and scientific staff, exchange of academic information and materials with ZSI Kolkata and any of the 16 regional centres for undertaking doctoral and post-doctoral program by the university, joint research activities, publications, organisation of conference, seminars, lectures etc. so that participants of both the institutions may be benefitted. In order to fulfil the goals of the MoU, **Dr. Anjum Rizvi**, from ZSI, Kolkata and **Prof. Shweta Yadav** from our university are designated as **co-ordinators** of the programs.

Dr Dhriti Banarjee, Director, Zoological Survey of India (Ministry of Environment Forest and Climate Change), Kolkata inaugurated the Webinar. She introduced the motto of Ministry “**Prakriti Rakshati Rakshitah**” (*Nature protects when it is protected*). Protection and conservation of the ecosystem is an integral part of the nature and it needs to be protected for the betterment of our

NATIONAL WEBINAR ON ROLE OF BIODIVERSITY CONSERVATION IN ECOSYSTEM FUNCTIONING

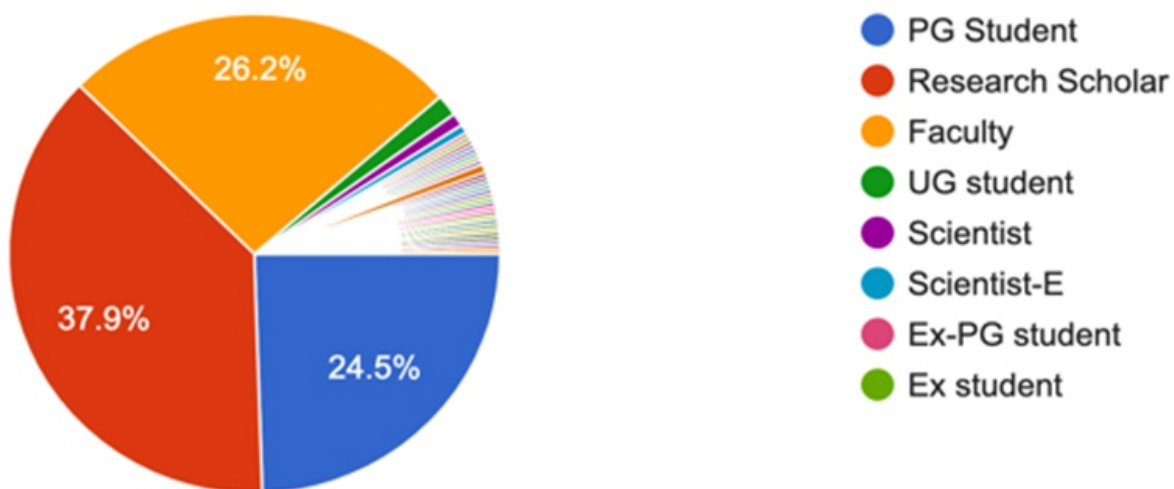
wealth. She gave a brief overview of "**Ecosystem functioning**" and emphasised that it includes various ecosystems individually or collectively to evaluate things like biogeochemical cycles, properties like organic matter pools, goods derived from the ecosystem, food, and medicines, special services like controlling the climate or water, or the temporal resistance or resilience of these factors over time in response to disturbance. Since the middle of the 1990s, a sizable number of high-impact studies have been published about the connection between the abundance of species and the stability and efficiency of the ecosystem. These significant articles claim that a relationship exists between species richness and ecosystem functioning and that relationship can be used to argue for conservation of biodiversity. Now to use function and relationship between ecosystem function and diversity as a foundation for advocating for conservation of biodiversity, a few criteria must be maintained like, maintenance of ecosystem processes must depend on broad area of species such as that the conservation of function embraces the conservation of most of all diversity within the ecosystem. In most of the famous studies done by year around 2000, it was shown that communities are characterized by strong dominance and there are a few species that provide the vast majority of community biomass. Rapid turnover of the species can rescue the concept that the diversity leads to maximum functioning and stability of a set community. The process for community conservation as a whole, the factors that are detrimental to the species in question must be removed over. For this purpose, our country and government and non-profit organizations are working tirelessly. the species that are vulnerable and endangered are used as a marker for conservation of the area, creating a better living situation for them and protecting the complete community as a whole. For further conservation of biodiversity, ZSI has been working countlessly on several platforms in association with international and national systems like CBD (Conservation of Biological diversity), the access benefit sharing, the wildlife protection. From the conservation point of view, it is the need of an hour to research on the relationship between the biodiversity richness and ecosystem which provide as assess to get some great ideas on policies for conservation in future. As the famous author Joel Solation quoted "*The average person is still under the aberrant delusion that food should be somebody else's responsibility until I am ready to eat*". So it is our responsibility to awake the common people and start the awareness about nature's degradation and conservation of our earth before it's too late.



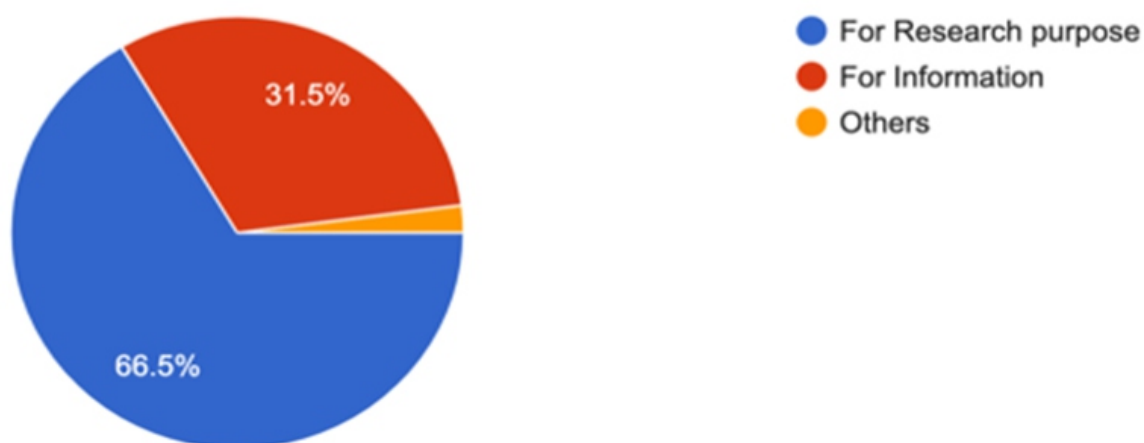
Glimpse of Inaugural Session of the Webinar

Prof Neelima Gupta, Hon'ble Vice Chancellor, Dr Harisingh Gour Vishwavidyalaya (A Central University), Sagar delivered presidential address. She said that the Webinar's topic is important, especially when it comes to nature. We can't ignore biodiversity, and we can't ignore nature if we talk about biodiversity. The two go hand in hand. When we talk about biodiversity, we look back through time and try to remember when life began. About 3.5 billion years ago, life began, and that was the start of all the different kinds of life we see today. We had more species from the zoological group and also more species from the plant group. Some scientists say that out of the 10 million species on the earth, only about 2 million are known. We would say that 80% of species don't have names yet, which is something that needs to be done. On the other hand, about 20 animal and plant species go extinct every day, which is a cause for worry. If we keep going at this rate, about 100 species will die out every day in about 30 years, or around the year 2052, if we don't change. And this is what the webinar is all about. Ecosystem means that all the species must work together. These species could be either plants or animals. The food cycle and food web work together to keep the diversity of species alive. She talked to Research scholars, M.Sc. students, and young people about biodiversity and the need to think and protect it. If we just look at nature, I think we can find the answers there, since we are the ones working on and destroying nature. Because of our actions, nature is getting less and less every day. We can only save biodiversity if we figure out why species are going extinct and then find ways to stop it. So, we should figure out what causes species to go extinct. To do this, we should always remember **"HIPPO"**, where H stands for **"Habitat change"**, like cutting down trees. We are cutting down natural forests to make room for high-rise buildings and industries. This means that forest animals are losing their homes, which will cause their numbers to drop. **"Invasive species"** are those that have moved into an area where they didn't live before. This causes competition between species, which leads to a drop in the number of species. P & P stands for **"Population and Pollution"**. Pollution increases along with the population. When pollution like air pollution, water pollution, or any other kind of pollution goes up, biodiversity goes down. O stands for **"Over exploitation"**. When people use natural things too much, whether it's fishing or hunting wild animals, biodiversity suffers. So, HIPPO tells us that how we are losing biodiversity and that we need to think about all of these things to keep biodiversity safe. Diversity doesn't just mean different kinds of species; it also means different kinds of genes and different kinds of ecosystems. All of these are important parts of biodiversity. It's important to protect biodiversity not only because it's beautiful, but also because we use it for food, fuel, fibre, shelter, air and water purification, stabilising the climate nutrient cycling, soil fertility, pollination, controlling pests, and getting genetic resources. We can't turn a blind eye to biodiversity in any way and capped up the address with a quote **"Nurturing our nature for a better biodiversity in future"**.

Dr Anjum Rizvi, Scientist and Coordinator, DHSGU and ZSI Collaboration Activities at Zoological Survey of India, Kolkata delivered the Vote of Thanks on the behalf of both organizations. She thanked the host, all the invited speakers, all participants and Mr Vikram Jeet Vaidya for technical setup of the webinar. She quoted **"Gratitude is the blossom which springs from the soul that makes both happy, the giver and the taker"**. Success can't be reached without the right help, so Prof. Neelima Gupta, Vice Chancellor of DHSGU, and Dr. Dhriti Banerjee, Director of ZSI, were thanked for encouraging us to hold the webinar and for all the invited speakers from the different Institutes.



Participants' Representations (%) from Various Scientific Communities



Purpose of participants (%) to attend the Webinar

Technical Session

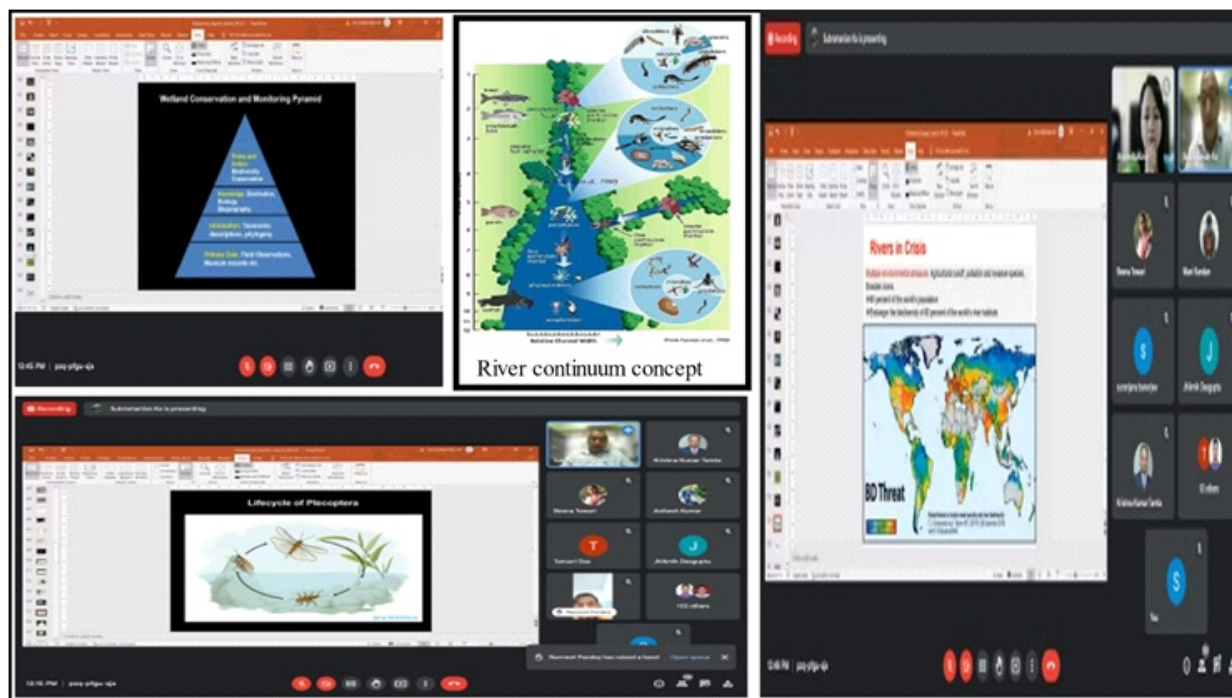
1. Dr. K. A. Subramanian

Scientist and Officer-in-Charge of Southern Regional Centre,
Zoological Survey of India, Chennai



Title: Role of Aquatic Insects in Wetland Biodiversity and Conservation

Concise Summary of the lecture: He discussed total Global Salt and Freshwater Estimates, 20 Freshwater Ecoregions of India, Myristica Swamps, Ecosystem Services of Wetlands, Aquatic Hexapoda of India, Role of Aquatic Invertebrates in Ecosystem, Origin of Aquatic Insects, Food Chain Linkages, River Continuum Concept, Microhabitat used by Aquatic and Semi-Aquatic Heteroptera, Sampling in Lakes and Reservoirs, Freshwater Runaway consumption beyond Biocapacity, rivers in crisis, monitoring methods (bioassessment, toxicity bioassays, behavioural bioassays, bioaccumulation studies), their advantages and disadvantages. the biological scores assigned to the group of organisms by the Biological Monitoring Working Party (BMWP) score, and the Biological Monitoring Working Party Revised by Walley and Hawkes (1997), among other things, are some of the issues that need to be addressed. Further, he described the biological scores that the Biological Monitoring Working Party (BMWP) provided to the group of species and their modification by Walley and Hawkes (1997).



View of slides displayed by Dr. Subramanian during the presentation



View of slides displayed by Dr. Subramanian during the presentation

2. Dr. Umesh Tiwari

Botanical Survey of India,
Kolkata



Title : *Plant Diversity of Arunachal Pradesh and Ecosystem Services*

Concise Summary of the lecture: Dr. Tiwari discussed the floral diversity of Arunachal Pradesh, the reasons why it has a higher level of plant diversity than other parts of India, the role that plants play in the ecological pyramid, nutrient cycling, and environmental preservation, as well as the significance of plant diversity in various aspects of primary production.

The value of plant variety in many elements of primary production, their place in the ecological pyramid, their function in the cycling of nutrients, and their contribution to sustaining the natural environment. Also he explained the role of dominant plant species in maintaining the environmental equilibrium. He gave a brief explanation of ideal conditions and environmental components that are crucial to plant dispersal. He displayed the green forest areas in India's biodiversity hotspots, including the Himalaya, eastern Ghats, and Indo Burma, and he made comparisons between the floristic richness of India and the rest of the globe. He classified several groups of plant species found in India according to their frequency of occurrence, the number of endemic species, and the number of vulnerable species. The distribution of the different Angiosperm species throughout India's several states was subsequently briefly discussed. Arunachal Pradesh has 23.2% of the angiosperm flora in India, followed by Tamil Nadu with 23.62% of the country's total angiosperm diversity. Arunachal Pradesh's altitudinal range, drainage system, physiography, protected areas, population, and culture were all covered by him. Arunachal Pradesh has two national parks, 13 animal sanctuaries, and one biosphere reserve that are all considered protected areas. Due to altitudinal difference and climatic conditions, Arunachal Pradesh has the highest amount of forest cover compared to other states. These forests are classified as Temperate Forest, Sub-Tropical Forest, and Tropical Forest. Various forest zones have different dominating plant species. Lieutenant R. Wilcox and Captain Bedford travelled to the Mishmee Hills and gathered

plants, but were unable to identify them. Griffith published their work as Flora of the Mishmee Hills, identifying 900 species of flowering plants as well as 22 species of ferns and allies. According to him that there are 21984 species of angiosperms throughout India, whereas, there are 5192 kinds in Arunachal Pradesh. In addition to this, he discussed commercially relevant plant species as well as the many applications of these plants. For instance, he discussed the wide variety of plant species that are used as a source of food, the role that rhododendrons and orchids play in the fragrance business, and the usage of calamus as an ornamental plant. He also highlighted ways various plant species contribute to the provision of ecosystem services such as carbon sequestration, water purification, decrease of soil pollution, management of climate, and nutrient cycling, among others.



Slides shown by Dr Tiwari during the presentation

3. Dr. M. U. Sharief

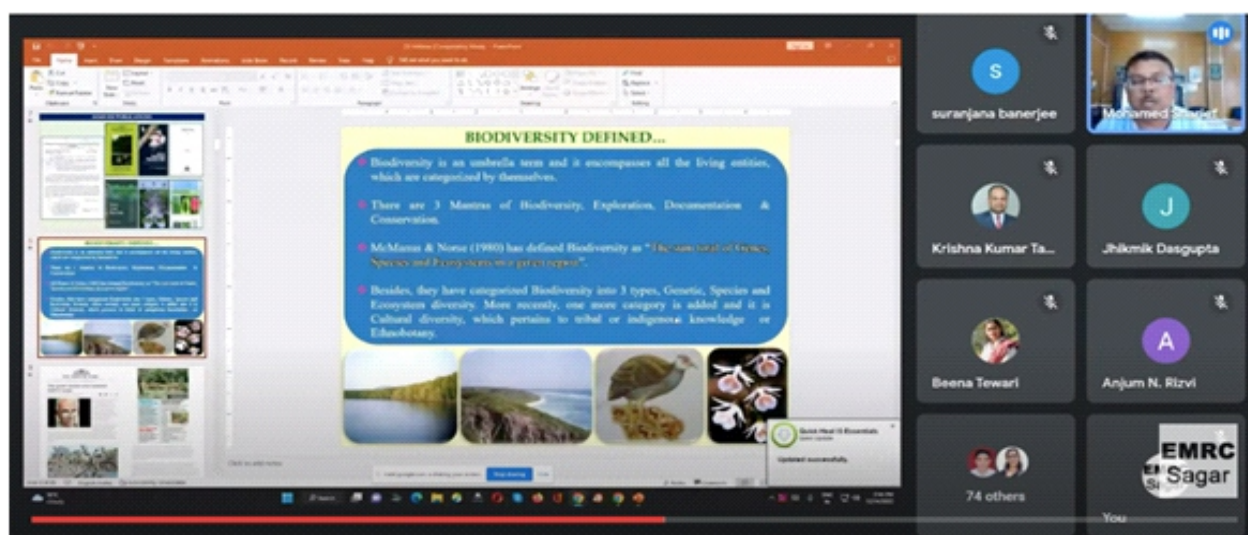
Scientist 'F' & Head of Office, Botanical Survey of India
Southern Regional Centre, Coimbatore – 641003



Title: Conservation of Biodiversity- A Botanical Survey of India Perspective

Concise Summary of the lecture: With Brief description about Botanical Survey of India he explained the term “**Biodiversity**” which encompasses all the living entities which are categorized by itself. It is nothing but “**variety of life on earth**”. Mc Manus and Norse (1980) has defined biodiversity as the “**sum total of genes, species and ecosystems in a given region**”. The biodiversity balance in any region should be at least to the minimum level, otherwise the complete ecosystems will collapse. As nature's gift the tropical countries are rich in Biodiversity compared to temperate countries. About 60 to 70% of the world's biodiversity is being accounted by tropical countries only. Such countries are referred to a **Megadiverse countries** and they include 17 countries like – **Brazil, China, Mexico, Australia, India, Peru, Ecquador, Zaire, Columbia, Indonesia, Malaysia and Medagascarr**. Biodiversity is at constant threat due to various man made activities as well as natural calamities. Anthropogenic activities like, Urbanization, Deforestation and Refrigeration is eroding biodiversity on one side, while natural calamities like forest fire, floods,

Tsunamis are destroying biodiversity on the other side. These types of destructions are to be stopped immediately; otherwise the results will be more serious than any Thermo Nuclear Reaction. More recently, a new category “**Cultural Diversity**” otherwise known as “**Ethnobotany**” or “**Traditional Knowledge**”, which relates to “**total inter-relationship of human beings and plants**” is also gaining a leading position especially in the field of “**Bioprospection**” and “**Newer Drug Development Programme**”. Nevertheless, India is one of the richest nation in terms of biodiversity as well as traditional knowledge is concerned. India gifted with two groups of Islands viz., Andaman & Nicobar (A&N) Islands and Lakshadweep Islands, Mountain Ranges like Himalayas and Western Ghats, which are affording highest plant-animal diversity. These areas are designated as the world's eighteenth Hotspots of Biodiversity. Documentation of floral and cultural diversity of these Hotspots is a major task assigned to BSI, which is under progress. A&N Islands are very significant in the realms of rich vegetation, trade and commerce, marine research, naval developments as well as Anthropological Studies. The most fascinating feature of the vegetation of A&N Islands is its richness and endemism associated with six aboriginal tribes. Further not only plants, from animal point of view also A&N Islands are unique. For Ethnobotanical studies also A&N Islands act as a great emporium with aboriginal tribes like, Great Anadamanese, Onges, Jarawas, Sentinelese, Shompens and Nicobarese. Today, Biodiversity has become a Sovereign Property of any nation under consideration. Further, sustainable use of biodiversity is also very important as it influences four important facts of life like, economical, environmental, social and cultural. Conservation of biodiversity benefits in preserving the Food Chain and genetic entities of plants and animals. It provides immediate benefits to society as Recreation and Tourism besides acting as an Insurance Coverage for future generations. India possesses two distinct groups of Islands lying either side of the peninsular region. One is '**Bay Islands**' also known '**Andaman & Nicobar Islands**' (A & N Islands) and the other is '**Arabian Sea Islands**' also known as '**Lakshadweep Islands**'. The rich vegetation of A & N Islands regards them as '**Hot Spots**' of Biodiversity amalgamated with pristine environment. The most fascinating feature of the vegetation of A & N Islands is its richness and endemism associated with last aboriginal tribes. The Andaman group consists of 325 islands, while Nicobar group consists of 24 islands. These two groups are separated by the '**Ten Degree Channel**' of 155 km width.



Slides displayed by Dr. Sharief for the audience during the presentation

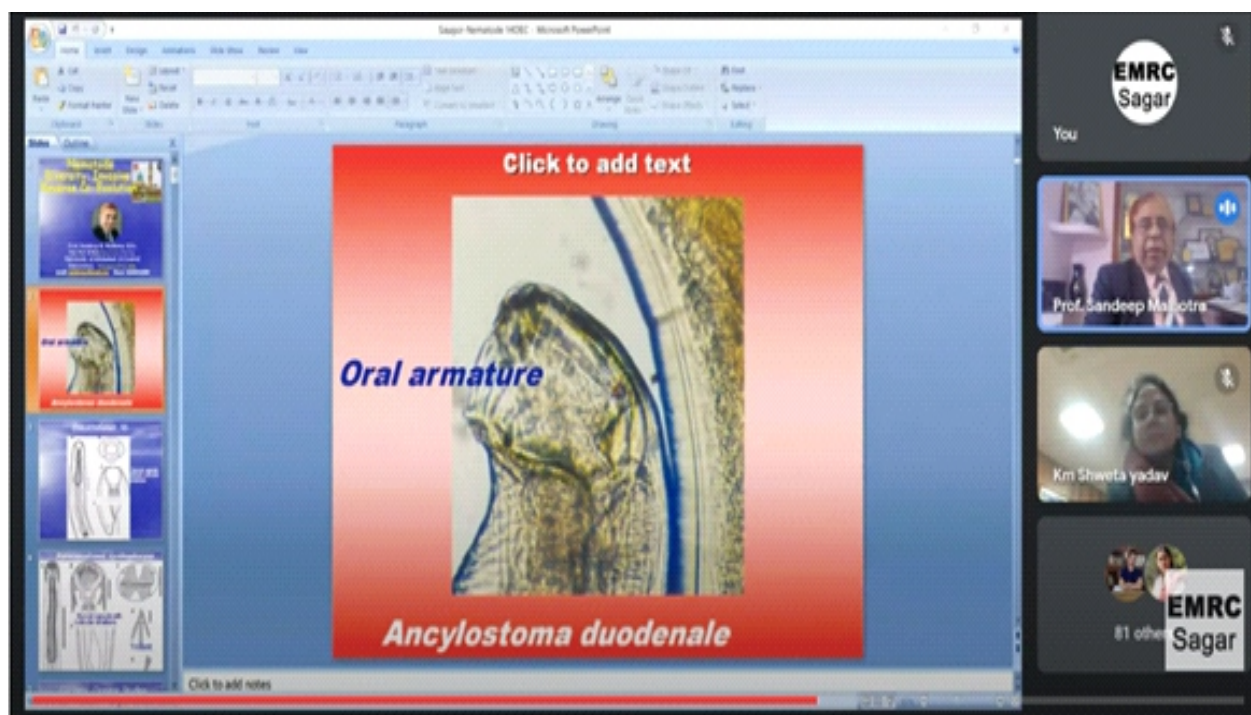
4. Prof S K Malhotra

Allahabad University,
Prayjraj (U.P.)



Title: Nematode Diversity and Invasive Reverse Co-Evolution

Concise Summary of the lecture: The anatomical characteristics of many nematodes, such as *Ancylostoma duodenale*, *Paracamallanus cyathopharyx*, and *Neolebouria* worm, were recovered. He thoroughly outlined the oral armature of the worm *Ancylostoma duodenale*. Additionally, he explained the function played by crustaceans in the conclusion of *Neolebouria*'s life cycle and detailed the anatomy of the species, especially its genital aperture. He also provides a short explanation of the development of the fish parasite, *Paracamallanus cyathopharynx*, as well as a brief overview of the evolution of fish based on the variety of nematodes. Additionally, he spoke about how mammalian worms had the same robust oral armature as fish worms. Additionally, a brief history of the transition of fish to mammals was provided, along with an explanation of how genetic erosion led to the irreversible shift from fish to mammals. On the basis of the nematode's buccal capsule, papillae, oesophagus, and intestinal caeca, which coincide with the development of fish to mammals, he described the morphological and anatomical features.



Slide that shown by Prof. Malhotra during the presentation

5. Prof. Rajendra Kumar

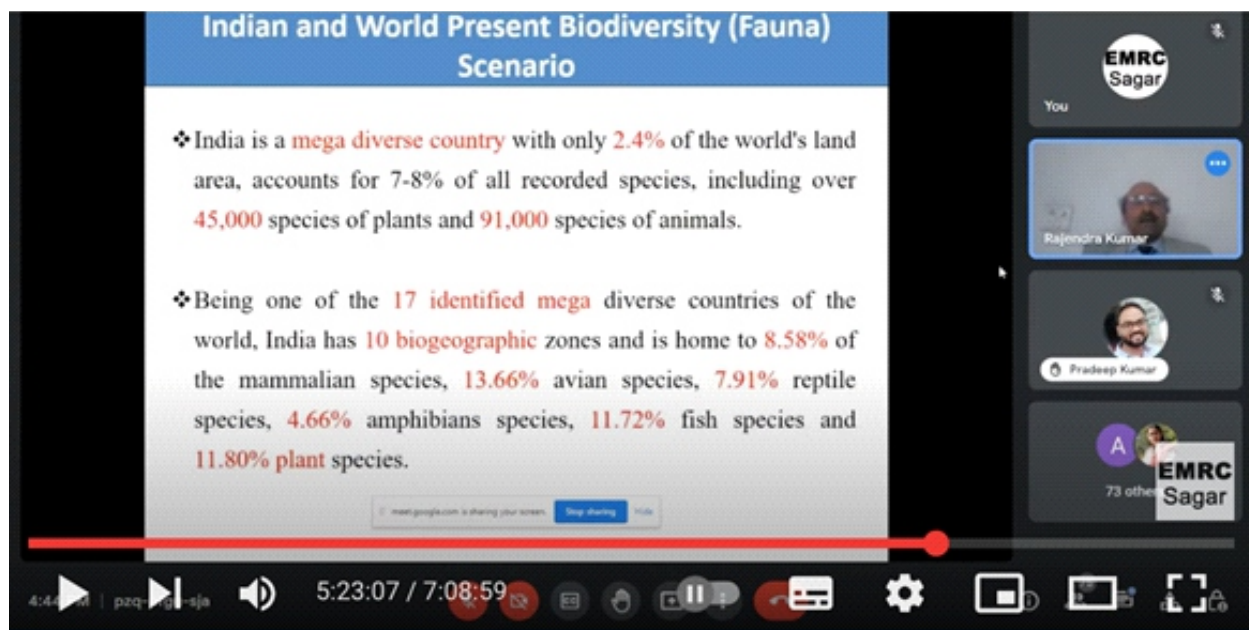
Indian Agriculture Research Institute (IARI)
New Delhi, India



Title: Unsnarling In vivo and In vitro Crop Breeding Strategies in Changing Climate Scenario for Biodiversity Conservation and Boosting Ecosystem Efficacy

Concise Summary of the lecture: During the lecture, Prof. Rajendra Kumar covered many aspects of biodiversity, climate change, agricultural productivity, and biological conservation related topics. He remarked on how things are presenting in India right now in terms of the country's animal and plant biodiversity. India occupies 2.4% of the World's landmass and is revenue to approximately 45,000 plant species and 91,000 animal species. Besides, he explained the types of biodiversity, i.e., genetic diversity, species diversity, and ecosystem diversity. Later, he shared information about the greenhouse gases (GHGs) emissions from different anthropogenic activities. He made a comparison between the levels of greenhouse gas emissions in 1990 and those in the current days. In comparison to our emissions in 1990, we have produced two times as many greenhouse gases in the present time. He discussed about the negative consequences of climate change on our environments. For example (1) due to rise in the atmospheric temperature, the sea level will increase 10-20 cm by the end of 21st century resulting in disappearance of several costal areas; (2) 40% of terrestrial ecosystem, 57% river ecosystem 65% marine ecosystem is also threatened by climate change; (3) due to climate change, plants produce leaves earlier and earlier greening vegetation occurs. Similarly, in case of animals, egg-laying and hatching timing changed; (4) climate change is responsible for biodiversity losses, and it is also responsible for changing pattern of migration in birds and fishes. Apart from the consequences of GHGs emissions, some solutions, such as biodiversity conservation, efficient transportation, sustainable use of energy sources, and population stabilisation approaches, have been suggested for reduction/stabilization of GHGs emissions in the environment. Further, Prof. Kumar shared information on how to improve agricultural crop productivity under the current changing conditions. According to him, the world population will reach 9 billion people, including 1.6 billion in India, by the year 2030. In India, due to extreme weather conditions, around 5% of agricultural production is lost every year. Therefore, to feed 1.6 billion people, we have to conserve biodiversity in order to minimise the effect of climate change on crop productivity. Some of the conventional breeding approaches for conservation of crop biodiversity, such as self-pollinated crops, cross-pollinated crops, and vegetative propagated crops were also discussed. Apart from that, unconventional biotechnological methods such as micropropagation, organogenesis, micrografting, cryopreservation, and Agrobacterium tumefaciens-mediated transformation were explained by Prof. Kumar. During the lecture he covered all the aspects of biotechnological approaches for conservation of biodiversity. Methods such *ex situ* conservation technologies, its types, advantages and disadvantages; marker technology (AFLP, ISSR, SCAR, SSR, RFLP, and RAPD); GWAS method for enhancing atmospheric nitrogen assimilation; new breeding strategies such as epigenetics, speed breeding, editing tools, and association mappings; integrated breeding

strategies for biodiversity conservation-an accelerating process to shorten cycle time; and biotechnological application for crop improvement were also briefly discussed. In this context, Prof. Rajendra Kumar informed that his lab at IARI, New Delhi, developed (A) some cross-pollinated vegetables crops, namely Azad Bhindi-2 (KS-410), Azad Krishna (Azad Bhindi-3), Azad Bhindi-4 (KS-442). (B) vegetative propagated crops namely Turmeric variety selection-4 (Vallabh Sharad). In addition, specialty genotypes such as PUSA 1108 as antioxidant of chickpea, ICC 1083 as low raffinose chickpea, JG 11 as a chickpea recourse genotype for the nitrate reductase enzyme, ICP-10654, ICP-13579, ICP-14638, ICP-14976 as waterlogging pigeon pea genotype, and tomato genotype PUSA Sheetal for organic farming for better self-life were also identified. Also he gave an overview of food products such as potato flakes energy bars, chickpea protein isolates, potato biscuits, chickpea husk based biscuits developed in his lab.



Slide that shown by Prof Kumarduring the presentation

6. Dr. M. Kamalakannan

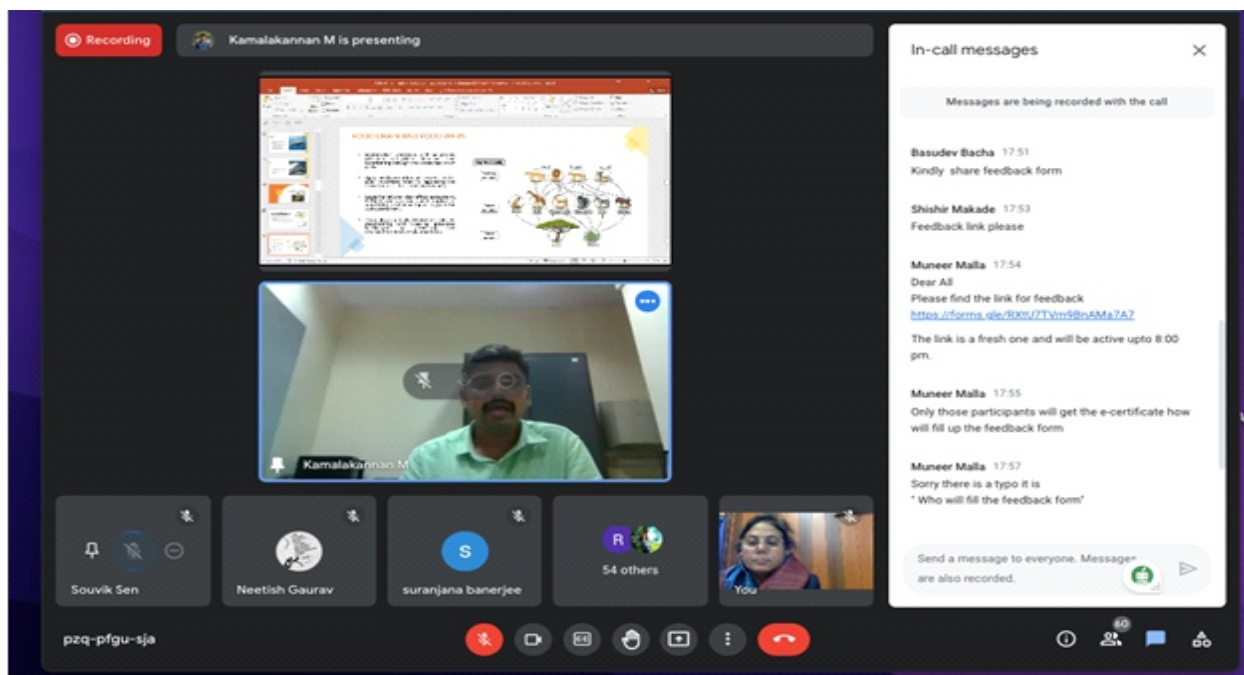
Zoological Survey of India,
Western Ghat Regional Centre,
Kozhikode-673006



Topic: *Role of mammals in ecosystem functioning*

Concise Summary of the lecture: Mammals are warm blooded vertebrates and are distinguished from other taxa by the possession of mammary glands, hair, three unique middle ear bones, and a specialized brain structure neocortex. Ecologically, mammals are found on all continents, in all oceans, and on many oceanic islands of the world. Different species of mammals have evolved to live in nearly all terrestrial and aquatic habitats on the planet. The greatest majority of mammals in the world live in terrestrial environments, only 1.6 % of mammals live in marine habitats. Mammals

show extreme morphological diversity of forms; the smallest mammals are found among the bats and shrews and can weigh as little as 2 grams; the largest mammal is the blue whale, which can weigh 160,000 kg. Global mammal's account for about 6500 species placed in 167 families of 30 orders. Over 70% of mammal species are smaller mammals belonging to the orders Rodentia, Chiroptera, and Soricomorpha. Indian mammal's account for 446 species placed in 48 families and 13 orders (7% global species). Of the 446 Indian mammal species, 413 species are terrestrial and 33 species are in marine form. 46 species of them are endemic to India; genus *Anathana*, *Latidens* and *Nilgiritragus* are monotypic and found only in India. Mammals always play a vital role for whichever ecosystem they live in. They are important for maintaining services and functions associated with sustaining a balanced ecosystem. Mammals are important contributors of food chains and food webs, playing a key role as predators and grazers. They can feed at various levels of food chains, as herbivores, insectivores, carnivores and omnivores, etc. Mammals provide the essential services to the ecosystem as ecosystem landscapers, seed dispersers, pollinators, regulators of insect-pest populations, etc. Since the presence, absence or abundance of mammals indicates the health of the ecosystem, many mammalian species are considered as 'Indicator Species' to the aspects of biodiversity. The smaller mammals also undoubtedly play pivotal roles in forest ecosystem functions by providing essential services such as insect pest control, consumers of invertebrates, pollination, seed dispersal, bioturbation of soils, and act as indicators of the general ecosystem. However, unlike charismatic mammals, the conservation importance of smaller mammals are poorly understood and therefore neglected in conservation action. The habitat destruction, overexploitation and climate change by anthropogenic activities are the major threats to mammals. Mammals always play crucial roles in all ecosystems by performing a broad range of key functions. Their decline in abundance or extinction will lead to negative effects on ecosystem processes. Thus, conserving the mammals would help in maintaining this intricate system.



A snapshot of Dr. Kamalakkannan's presentation

Deliberation and Concluding Session

Dr. Anjum Rizvi and Prof. Shweta Yadav, Coordinators for Collaborative activities between ZSI and DHSGU wrapped up the Webinar. Dr. Rizvi summarised the opening session's main insights and the lectures delivered by Dr. Subramanian, Dr. Tiwari, and Dr. Sharief. Professor Yadav encapsulated the lectures given by Prof. Malhotra, Prof. Kumar, and Dr. Kamalkanann.

The webinar made the following recommendations:

- The Webinar recognised that protecting biodiversity is "*a common concern of humanity*" and an important part of the process of development.
- There is an urgent need to protect biodiversity and the uses of genetic resources in a fair and equitable way.
- The scientific and general public should be concerned about role of biodiversity and their functioning.
- According to feedback, there is a need to provide scientific training for taxonomic identification of flora and fauna.

Programme of the Webinar

Role of Biodiversity Conservation in Ecosystem functioning

14th December 2022

Inaugural Session		
11.00-11.05 am	Opening and Introduction to Webinar	Prof Shweta Yadav Dr. Hari Singh Gour Vishwavidya laya Sagar (M.P)
11.05-11.10 am	Welcome Address	Prof Subodh Jain Dean, School of Biological Sciences Head, Dept of Zoology Dr. Hari Singh Gour Vishwavidya laya Sagar (M.P)
11.10- 11.25 am	Inaugural Address	Dr. Dhriti Banerjee Director, Zoological Survey of India Kolkata
11.25-11.40 am	Presidential Address	Prof Neelima Gupta Vice Chancellor Dr. Hari Singh Gour Vishwavidyalaya Sagar (M.P)
11.40- 11.45 am	Vote of Thanks	Dr Anjum Rizvi Scientist “E” Zoological Survey of India, Kolkata
Technical Session		
11.45-12.45 pm	Dr. K. A. Subramanian Zoological Survey of India Southern Regional Centre, Chennai	<i>Role of Aquatic Insects in Wetland Biodiversity and Conservation</i>
12.45-1.45 pm	Dr. Umesh Tiwari Botanical Survey of India, Kolkata	<i>Plant Diversity of Arunachal Pradesh and Ecosystem Services</i>
1.45-2.30 pm	Dr. Umar Sharief Botanical Survey of India Southern Regional Centre, Coimbatore	<i>Conservation of Biodiversity- A Botanical Survey of India Perspective</i>
2.30-3.15 pm	Prof S.K Malhotra Allahabad University, Prayagraj	<i>Nematode Diversity & Invasive Reverse Co-Evolution</i>
3.15-4.00 pm	Dr Rajendra Kumar IARI, New Delhi.	<i>Unsnarling In Vivo and in vitro Crop Breeding Strategies in Changing Climatic Scenario for Biodiversity Conservation and Boosting Ecosystem Efficacy</i>
4.00-4.45 pm	Dr. Kamalakannan M. Zoological Survey of India Western Ghat Regional Centre, Kerala	<i>Role of Mammals in Ecosystem Functioning</i>
Deliberations and Concluding Session		
4.45-5.00 pm	Dr Anjum Rizvi and Prof Shweta Yadav	

Brochure

Time
11:00 am to 5:00 pm

Link for Registration
https://docs.google.com/forms/d/e/1FAIpQLSejeRiqkSHpBvNmq9poJVAJXBNF49GZjYVLO-jvKPTJ8mDxDA/viewform?usp=sf_link

Last Date for Registration
12 December, 2022

Meeting Link & E-Certificates
will be provided
to the selected
candidates

Jointly Organized by
Department of Zoology
Dr. Harisingh Gour Vishwavidyalaya, Sagar (M.P.)
(A Central University)
&
Zoological Survey of India, Kolkata

Inaugural Address
Dr. Dhriti Banerjee
Director, ZSI
Ministry of Environment, Forests
& Climate Change, Govt.

Presidential Address
Prof. Neelima Gupta
Hon'ble Vice-Chancellor
Dr. Harisingh Gour Vishwavidyalaya
Sagar (M.P.)

Distinguished Speakers
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