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"CURRENT CHALLENGES IN CONSERVATION OF BIODIVERSITY" [In4CB - 2017]

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KN1

KEYNOTE ADDRESS URBANISATION, COGNITION AND PERSONALITY IN ANIMALS: A REVIEW OF SOME RECENT EVIDENCE

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Abstract

Urbanisation is well known to have two contrasting effects on (non-human, vertebrate) animal numbers. On the one hand, it decreases species diversity. But on the other, it may increase biomass. In other words, most species do poorly in the urban environment, many becoming effectively extinct even though they flourished in the rural environments that the towns replaced, and continue to flourish in the rural environments neighbouring those towns. But a few species do very well. What characterises the species that do well around human settlements? Obviously, there are some direct ecological effects: particular food types may become available or unavailable as a result of urbanisation, predators may be removed or become prevalent, nest sites may become scarce or abundant. I am concerned, however, with two other factors, which may operate between species but also within them; and in so far as they vary within species, may constitute the raw material for evolution, leading to inherited differences between urban animals and their rural conspecifics. These factors are cognition (my primary concern) and personality. The urban environment is always likely to pose new challenges to a species encountering it for the first time, and furthermore, because of human innovativeness, it is constantly changing. So it seems likely that species, or individuals within species, that are able to learn quickly and change their behaviour flexibly will flourish better within human settlements. It is clear that animals differ in the rate at which they learn any particular task or solve any particular problem, but a crucial subject for current research is whether such individual differences are consistent across time and across different cognitive

challenges, allowing us to use a concept of "general intelligence" to describe differences in cognitive capacity between or within species. If that is possible, will more "intelligent" animals do better in the urban environment – or worse? Furthermore, in recent decades, scientists have taken note of something that has always been obvious to those who live or work with animals: individual animals, like individual people, differ in their behaviour, in ways that are relatively stable across time and situations. In a word, they have personalities. And again, we can ask the question, will some personality types (which may be particularly common in particular species) adapt more easily to the urban environment than others? This paper will review some recent research on these topics.

Keywords : Urbanisation, Cognition, Personality Vertebrate

PLANERY TALK

PT1

UNDERSTANDING BIODIVERSITY (CATEGORIES, VALUES, THREATS, CONSERVATION AND MANAGEMENT)

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Abstract

Convention on Biological Diversity defines biodiversity as the variety and variability of living organisms in the habitats in which they live. It embraces genetic, species and ecosystem diversity, in addition to other categories such as agro, endemic and introduced biodiversity. Biodiversity is so much adorned due its precious values viz. food, medicinal, clothing, shelter, forestry, ornamental, spiritual and recreational values.

Earth holds around 5-100 million species of which 1.15 lakh species have been identified in India (which is a megadiverse country), with the dominance of insects. Both natural and man – made causes exert great pressure on world's biodiversity, which is getting degraded fastly. Global warming, climate change, sea level rise and ocean acidification and their impacts on terrestrial and aquatic biota are now being addressed world-wide, due to severity.

There is an imperative need to conserve our biodiversity for posterity and sustainability, through *in situ* and *ex situ* methods. Traditional knowledge and cultural practices of tribal and local communities will help a great deal in the conservation programmes. This in turn will promote the provisioning, regulating, cultural and supporting services of different ecosystems, with their biodiversity.

WB, UNDP, GEF, IUCN, UNEP (CBD) and other international agencies have different programmes to conserve and manage the earth's biodiversity. India, which is a signatory to the UN Convention on Biological Diversity, has established the National Biodiversity Authority for conserving our country's biodiversity, its sustainable use and sharing the benefits equitably.

We, the humans, should remember that we cannot exist in isolation and our survival depends only on the biodiversity link. Hence, it is our prime duty to save our earth with its adorable biodiversity, for our own as well as our descendant's long- standing benefits.

Keywords: Categories, Values, Threats, Conservation, Management

PT2

MICROBIO(TA)DIVERSITY - AN UNDERREPRESENTED CONSERVATION CHALLENGE

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Abstract

Biodiversity in the realm of conservation focuses mainly on the macro-fauna and -flora. The intercalating role of microbiota (bacteria, archaea, and microscopic eukaryotes), most of which (~80% – 99%) are uncultivable in the laboratory and so hard to study, is often overlooked. Thanks to the improvements is DNA sequencing technologies and molecular phylogeny, it is now possible that most of the microbiota can be surveyed, by directly isolating the DNA and sequence molecular markers. Evidence is mounting that microbiota in symbiosis with any given environment drives crucial ecological functions, and that dysbiosis (or dysbacteriosis) results in impairment or malfunction in an ecosystem - ecosystems that include gut, skin, oral cavity, vagina, etc. of large animals. Evidence suggest that immune cells of gut associated lymphoid tissue interact with trillions of microorganisms and that this interaction shapes intestinal immune response. A number of life style diseases such as inflammatory bowel disease, obesity, bacterial vaginosis, and chronic fatigue are associated with dysbiosis of human microbiome. Disbiosis has often been studied and reported in the arena human health, and economic interests. Nevertheless, it is important to consider its implications on biodiversity and conservation, overall – be it wild life or domestic life. For instance the gut microbiota of several insects have been studied in detail, if not extensively. Insects, depending on their mode of life and environment have a wide range of dependency to microorganisms. Social insects such as ants and bees harbour distinctive microbial communities that are specialized for vital functions such as modulation of immune system, and protection against pathogens and parasites. A more relevant example in relation to loss of biodiversity is the association between microbiota and coral reefs. It is recognized that the coral mucus-associated microbiota plays a key role for coral

holobiont in dealing with environmental stressors and disturbances. Furthermore, antibiotic induced eradication of mucus-associated microbiota was shown to induce bleaching of corals[10], which suggest that microbiota conservation is important in conservation of coral reef. When it comes to loss of biodiversity, and conservation, often the role of microbes are over looked. The symbiosis of microbiota and macro-organisms resulted from a long co-evolution history that has shaped both the host and the microbiota. A new perspective is required when conceiving strategies for biodiversity conservation, which includes conservation of microscopic life. This is a potential challenge and a multidisciplinary approach is required to address the problem.

Keywords: Microbial diversity, Conservation, Challenges, Pathogens, Parasites

PT3

WHY? AND NEED FOR DIGITAL MUSEUM IN THE ZOOLOGY/LIFE SCIENCE DEPARTMENTS AND ITS ROLE IN THE BIODIVERSITY CONSERVATION

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Abstract

In the Zoology/Life science Practical curriculum the students are asked to observe the salient features in the killed/preserved animals. The dead specimens preserved with chemicals have faded colours and colour patterns, shriveled skins, twisted or flattened bodies, abnormal portion of limbs and other distortions. The formaldehyde used to preserve the museum specimens are found to be harmful to health.

The Zoology teachers teach importance of Biodiversity/ Wildlife and conservation in the class rooms and same teachers encourage killing or procuring of animals for Museums ignoring the Biodiversity Conservation concept. As Zoology teachers and Biodiversity Conservationists are we doing justification? The killing of animals has a significant environmental impact. This involves threats to endangered and other species. Although habitat degradation , pollution, and climate changes are the primary causes, the animals killed for museums also resulted in the population decline of number of animal species. The ethical issues are concerned with respect for life, mortality/death and dying animals.

In India we have comprehensive sets of animal protection laws in the world. We are glad to know that our nation recognizes animals in our constitution. The Constitution of India, Section 51A (g) requires from its citizens as a fundamental duty: "it shall be the duty of every citizen of India to protect and improve natural environment including forests, lakes, rivers and wildlife, and to have compassion for all living creatures'

The Prevention of Cruelty to Animals Act, 1960 states in Section 17(2)d & (f): "that experiments on animals are avoided wherever it is possible to do so; as for example in medical schools, hospitals, colleges and the like, if other teaching devices such as books, models, films and the like may equally suffice'. The Wildlife (Protection) Act, 1972 is an legal Act gives protection to wild animals by including them under different Schedules of the Law.

The Wildlife (Protection) Act,1972 CHAPTER V Trade or Commerce in Wild Animals

Animal Articles and Trophies 39. Wild Animal, etc. to be Government property. 42. Certificate of ownership. - The Chief Wildlife Warden may, for the purposes of Sec. 40, [Declaration] issue a certificate of ownership in such form, as may be prescribed, to any person who, in his opinion, Is in lawful possession of any wild animal or any animal article, trophy, or uncured trophy, and may, where possible, mark, in the prescribed manner, such animal article, trophy or uncured trophy for the purposes of Identification.

The University Grants Commission letter No F14-4/2006 (CPP-II) asked to surrender immediately to the Environment and Forest department in case university/college has procured any animal protected under the Wildlife Protection Act. Further it is also mentioned that n o fresh purchase of preserved animal specimens be made.

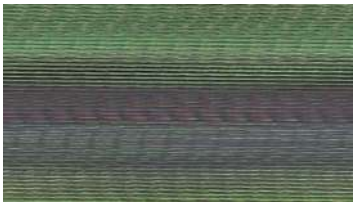
The existing Animal Protection Laws forced to stop collection , killing, preservation or procuring animals from the suppliers.

Digital Museum is a Technology driven teaching/training methodology to safeguard the animals maintained in the museums. The new Digital Technology can enhance the traditional museum mission. The Digital Museum plays a significant role in the conservation of animals and Biodiversity. The creation of Digital Museum avoids trapping, capturing and killing of different species of animals.

Common Moorhen
Gallinula chloropus
(Linnaeus, 1758)

Phylum	**Chordata**
Class	**Aves**
Order	**Gruiformes**
Family	***Rallidae***
Genus	***Gallinula***
Species	***chloropus***

Length: 30-35 cm
Wing Span: 50-55 cm
Weight:
Male 250-400 g
Female 190-340 g



You Must Do Today's Job With Today's Tools
If You Do Today's Job With Yesterday's Tools
Tomorrow You Will Be Out Of Business.
SAVE WILDLIFE/BIODIVERSITY

Keywords: Digital Museum, Biodiversity, Conservation

PT4

COGNITIVE DIFFERENCES BETWEEN AN INVASIVE SPECIES AND THE RESIDENT IT DISPLACES: THE CASE OF THE EASTERN GREY AND EURASIAN RED SQUIRRELS

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Abstract

The Eastern Grey Squirrel (*Sciurus carolinensis*) has been classified as one of the world's one hundred most damaging invasive species. Since its introduction into Great Britain and Ireland in the late 19th century, it has entirely displaced the native Eurasian Red Squirrel (*S. vulgaris*) except on a few islands and in a few specialised habitats. In two series of field experiments, we have studied cognitive capacity in grey squirrels, and then carried out the same tests with red squirrels. The first series (Macdonald, 1997) investigated spatial memory. Squirrels were trained to recover nuts buried by the experimenter at fixed positions relative to a removable landmark, whose presence also served as a signal for the presence of nuts. Grey squirrels were able to recover nuts to within an accuracy of 5cm 20 days later, and showed some retention for up to 62 days (the longest interval tested). Red squirrels showed less long-lasting and less accurate memory. The second series (Chow and co-authors, 2016 and in preparation) investigated problem solving in an extractive foraging situation. Squirrels were given the opportunity to obtain food by solving two puzzle boxes, one simple task and one more complex. All squirrels solved the simple task on their first attempt, though grey squirrels tend to be faster at extracting food. In the more difficult task, some squirrels of both species failed to solve the problem, but a higher proportion of grey squirrels were successful. However the most skilful red squirrels were faster at extracting food than the most skilful grey squirrels. It is possible that greater cognitive capacity plays some part in introduced grey squirrels' success in displacing native species; they may also show high cognitive uniformity because of the genetic funnelling at introduction.

Keywords : Invasive Species, Eastern Grey, Eurasian Red Squirrels

PT5

ANALYSES AND HARNESSING OF MARINE BIODIVERSITY FOR BIOREMEDIATION OF CONTAMINATED COASTAL SEDIMENT

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Abstract

The Coastal sediment is highly contaminated with metal distribution due to ship transportation, industries, agricultural, and urban sources, and contaminated sediments can exert toxic effects on the benthic community and causing ecological risk to environment and affected human health. This study besides striving to create the much needed marine biotechnology that is of global acclaim, we aim to harness the natural remediating potential of marine pollutants and enhance the activity of marine microcosm, through biotechnological approaches for water treatment processes in order to achieve higher level of efficiency and cost effectiveness and also investigated the effectiveness of slow release biostimulant ball (BSB) on the heavy metal distribution and enhance the marine biodiversity. Application of slow release BSB containing 1kg of uncontaminated dredged sediment mixed with 0.5M sulfate, 1M nitrate, 0.5M acetate and polysulfone (PS) coated BSB were prepared for this study. Different types of ball size varied from 1 to 5cm, ball distance from 1 to 10cmwere used to analyse thephysico - chemical parameters, heavy metal distribution in 15 days and 1 month time interval were performed. Pyrosequencing technique is used to determine the sediment microbial diversity and composition of benthic bacterial communities. The result showed that different BSB size and distance with variation of time interval were effectively reduced the physicochemical parameters such as CODMn, TS, VS, Sulphate,and the heavy metal fractionation also changedby the variations of bioavailability and prospective mobility in the heavy metals. Exchangeable form of heavy metal fractionation was changed in all analysed sample and stabilised form of oxide, organic and residual also increased. Sequential extracted Heavy metal (SEM)/acid volatile sulphide (AVS) concentration result also effectively changed

with different BSB application. Slow release BSB which enhance the activity of biodiversity such as *desulfobacteraceae, desulfovibrio and desulfobactersp* nearly 11.5% observed from sediment sample, which are metabolising the organic matter under anaerobic condition and it converted sulphate to sulphide. These sulphide bound to heavy metals and produced metal stabilised form. This result reveal that BSB has effective nutrient for benthic communities of SRB to enhance the activity and reduce heavy metal pollution in coastal sediment.

Keywords: Marine Biodiversity, Bioremediation, Coastal sediment, Contamination

PT6

CHALLENGES FACING INDIA'S BIODIVERSITY CONSERVATION

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Abstract

India is one among the 34 biodiversity hotspots in the world with highly endangered and unique eco-regions. Nature preservation and biodiversity conservation have been given importance in state and national-levels, but the scientific knowledge base on India's fragile biological diversity and the smart ways of adding values to it are unfortunately still weak. Over 90% of India's vultures have vanished in recent years and scientists blame the anti-inflammatory livestock drug (diclofenac) for their demise. The disappearance of vultures in the human-dominated landscape clearly shows that by the time wildlife biologists realize the exact causes of species disappearance, it's already too late to save the dwindling rare species.

India's human population has reached over 1.3 billion. India's economy is also exploding likewise with over 8% growth rate in recent years, which is the fastest in the region following the neighboring China. Triggered by population explosion, India aggressively pushes ahead with industrial development that tend to naturally compromise biodiversity conservation. Thousands of industrial clusters often produce, disperse and dump enormous amounts of untreated toxic waste that often end up in rivers, lakes, and forests contamination air, water and land. Although India has numerous environmental legal provisions, regulations and policies at least in papers, enforcing them on the ground continues to be problematic due to weak law enforcement, lack of manpower, reduced funding, lack of political will and corrupt practices.

The rapid developmental activities are also displacing even the common wild animals such as the golden jackal, Indian fox and nilgai. In a recent report to the Convention on Biological Diversity, India stated that the wildlife conservation agenda is facing serious challenges as many species of wild animals are often found outside protected areas near villages, towns and cities. The report added that over one million hectares of forestland has been diverted to pave way for 23,000 developmental projects since the enactment of the Forest Conservation Act of 1980. The degradation of grasslands due to development has enormously affected various grassland-dependent wildlife species. Besides, human-wildlife conflicts are also on the increase in recent years due to habitat loss inflicted by aggressive development. Radical measures are needed to save biodiversity from further destruction.

Keywords: Biodiversity, Conservation, Population, Degradation

PT7

REINTRODUCTION OF RED-BILLED OXPECKER: MACROECOLOGICAL NICHE MODELS PREDICT SUITABLE HABITATS FOR THE CONSERVATION OF AN AVIAN MUTUALIST

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Abstract

Distribution of mutualists is affected by changes in host-parasite densities and environmental conditions over time. The range contraction of red-billed oxpecker (*Buphagus erythrorhynchus*) in South Africa is a result of the widespread use of acaracides, toxic to both ticks and oxpeckers. We aimed at predicting suitable habitats, country-wide, for the threatened red-billed oxpecker using niche models to assist the ongoing reintroduction efforts and to identify new reintroduction sites for population recovery. We used biotic factors, climate, vegetation, topography, water and proximity to protected areas in our predictions and evaluated the predictive performance of all models using test data by applying generalized linear models, generalized additive models, boosted regression trees and ensemble models. Abiotic–biotic models described the current range of red-billed oxpecker in South Africa and outperformed the climate-only, veg-only, biotic-only, and climate-biotic models. The distribution of red-billed oxpeckers was influenced by moderate to high tree cover, woodlands, and starling density (a proxy for cavity-nesting birds) with regard to nest-site characteristics. Consumable resources (host and tick density), bioclimate, surface water body density, and proximity to protected areas were other influential predictors. Niche models reliably predicted suitable habitat in 40-61% of the reintroduction sites where breeding is currently successful. Our study highlights the need to involve biotic interactions within co-dependent species and its interactions with climate as key limiting factors when modelling the distribution of obligatory mutualists. Niche models serve as promising decision support tools for guiding reintroduction programs at macroscales. Active reintroductions, the use of oxpecker-compatible agrochemicals and installation of adequate nest boxes by farmers can facilitate population recovery of the species, in transformed landscapes. Prior to embarking on a reintroduction program, the effect of anthropogenic threats on habitat distributions must be investigated as the habitat in the historical range may no longer be viable for current bird populations.

Keywords: *Buphagus* sp., agrochemicals, interactions, oxpecker

PT8

REMOTE SENSING OF FOREST FIRE IN MUDUMALAI TIGER RESERVE AND SATHYAMANGALAM TIGER RESERVE: A COMPARATIVE STUDY ON TREE DIVERSITY AND REGENERATION

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Abstract

A forest fire is one of the important factors, which brings changes in forest structure, composition, and function. In India, most of the forest fires are anthropogenic in origin, which occurs predominantly in the Western Ghats, Himalayas, and Northeast. In the Northeastern of states of India, a forest fire is mainly due to the practice slash-and-burn cultivation for their livelihood for many decades. But in the Western Ghats and in the Himalayas people ignite forest fire to facilitate the collection of dead wood, non-timber forest products, antler collection, and so on. Although the number of reported fire is increasing every year, the research on forest fire is very limited in India. This study addresses two important questions viz., (i) what is the present trend in the occurrence of fires in the Mudumalai Tiger Reserve (MTR) and in the Sathyamangalam Tiger Reserve (STR)? (ii) How does the fire affect the tree diversity and regeneration pattern? The occurrence of fire was mapped with the help of Landsat satellite data in both tiger reserves. The fire frequency and trend of fire were also studied. The study at the MTR and STR was confined to the period of 1999 to 2013. The study revealed that the fire occurs regularly between January and May every year in both reserves, in which occurrence of the number of fire is many in February and March than other months. The annual rate of area burned was 9.78% in MTR and 1.18% in STR. Fire frequency mapping revealed that in the MTR the fire frequency was six times with a fire return interval of 9.28 years and in the STR it was ten times with a fire return interval of 4.7 years.

The impact of forest fire on tree diversity and regeneration based on the primary field plot study revealed that the floristic diversity decreased with increasing fire frequency in both reserves. The stand density and basal area were also showed decreasing trend with increasing in fire frequencies. The regeneration of tree species was higher in the lesser fire frequency classes and was lesser in the higher fire frequency classes. Although the top ten tree species of both reserves were dissimilar, *Anogeissus latifolia* was the dominant tree species in both reserves. *Terminalia crenulata* was the third dominant species in MTR but was absent in the top ten categories of STR. The seedlings of *Anogeissus latifolia* and *Phyllanthus emblica* attained the top position in MTR and STR respectively.

This study evidently exhibited a trend both in the occurrence of fire and in the effect of forest fire on tree diversity and regeneration in both the reserves.

Keywords: Forest fire, remote sensing, Mudumalai Tiger Reserve, Sathyamangalam Tiger Reserve, tree diversity, regeneration.

PT9

CURRENT STATUS OF FAUNA FROM SESHACHALAM BIOSPHERE RESERVE, EASTERN GHATS, ANDHRA PRADESH, INDIA

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Abstract

Seshachalam became the first biosphere reserve in the entire State and 16th in the country in 2010. It covers an area of 4,755.99 sq.km in Chittoor and Kadapa districts. The elevation ranges from 150 to 1130 m, with both dry (red sanders bearing) and moist deciduous forests. It has two protected areas namely Sri Venkateswara Wildlife Sanctuary and Sri Venkateswara National Park. It has the richest floristic diversity and faunal hotspot. Few studies on Seshachalam have been done and assessed to perform biodiversity gap analysis. This article is a review of biodiversity from Seshachalam biosphere reserve to give adequate and recent information pertaining to fauna of this area conducted during the year 2011 to 2015. Species identification in the review article was made by using various field guides and other available literature. Mostly photographic documents were done.

Mammals: 25 species of mammals belonging to 17 families were recorded. During camera traps as well as direct sighting of species were recorded. The leopard (*Panthera pardus)* and Wild dog (*Cuon alpines)* is quite common. Other predators and ungulates were also captured in the study area. The nocturnal Slender Loris (*Loris tardigradus)* could be common but seldom seen. Indian Giant Squirrel (*Ratufa indica)* and Ruddy mongoose (*Herpestes smithii)* are other interesting species seen in the study area. **Birds:** The study recorded 215 species of birds, which belong to 45 families. **Herpetofauna:** 12 species of Amphibians belonging to four families and seven genera were recorded. So far 46 species of Reptiles belonging to 36 genera, distributed in 12 families were recorded (33 species of snakes (72%) and 13 species of lizards (28%). Among which 6 venomous snakes were recorded and new records like (*Calliophis melanurus*) and (*Uropeltis ellioti*), new locality records (*Ahaetulla pulverulenta*) and (*Lycodon flavicollis*), rediscovery record (*Coluber bholanathi*) and first record in India (*Chrysopelea taprobanica).* Five families of lizards have been

recorded, the highest representation is from the family Gekkonidae (5 spp) followed by Agamidae (3 spp.), Scincidae (2 spp.), Varanidae (1 spp.) and Chamaeleonidae (1 sp.). **Butterfly:** 96 species of butterflies were recorded under five families. The family Nymphalidae and Lycaenidae were found dominant with 32 species and 22 species, respectively, followed by Pieridae (19 species), Hesperiidae (14 species) and Papilionidae (9 species).

This study indicates that, the area rich and must contain many more species. We recommend further studies in the Eastern Ghats at the earliest possibility. Also everyone should realise that the protection of habitat is an important aspect in the conservation of faunal species.

Keywords: Status, Mammals, Herpetofauna, Butterfly, Birds, Seshachalam

PT10

CONSERVATION OF WATERBIRDS AND ASSOCIATED THREATS IN INDIAN WETLAND HABITATS

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Abstract

India has a wide variety of wetlands like marshes, swamps, open water bodies, mangroves and tidal flats and salt marshes etc. with a coastline of over 7500km. The coastal lines support large area of coastal wetlands of over 40230 km^2 which consists of near shore Gulfwater, inlets, creeks, tidal deltas, bays, lagoons, coastal lakes, backwater, estuaries, coral reefs, shoals, tidal flats, mudflats, beaches, sand ridges, coastal dunes, mangroves, marsh, algae/sea grass beds, strand features, salt affected lands, reclaimed lands and delta plains. Among the avifaunal community, the second biggest group is wetland birds after passeriformes. India has wide diversity of wetland microhabitats of both inland (mainly freshwater) and coastal (saline water) areas and hence there is a wide variations and diversity of wetland birds. Till recently, 124 Protected Areas were declared exclusively for birds and in which majority (300 winter visitors) of them for migratory birds. Several studies explored the causes for the change and decline of waterbirds in different wetlands of India and mostly based on short term studies. The causes includes: man-made, man induced and natural which include cattle grazing, over-fishing, bird hunting, tourism, recreation and natural disasters (cyclone and tsunami), pollution, anthropogenic pressures, disturbances, changes in the land use patterns and disturbing the natural actions. These impacts induce habitat degradation and fragmentation which affect the diversity of waterbirds and hence some of the important bird habitats and areas become unpopular to birds. The associated threats are eventually, one or more aspects of HIPPO dilemma which include Habitat loss, Introduced species, Pollution, Population growth, and Over exploitation. Our data collection in some of the waterbird areas over the years indicated that the population decline. The long term data indicated the factors associated with them. We assess the factors associated with the changes in waterbird population and also review from other studies for the conservation of waterbirds in the wetland habitats.

Keywords: Coastal, Inland, Wetland, Waterbird, Population

PT11

DEVELOPING STRATEGIES TO MITIGATE THE HUMAN ELEPHANT CONFLICT AND HELP CONSERVE THE CRITICALLY ENDANGERED SUMATRAN ELEPHANT IN ACEH, SUMATRA, INDONESIA

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Abstract

Conservation issue: Indonesia's forests are disappearing at an alarming rate and several endangered species are facing extinction, even those living in protected areas of Sumatra. The Leuser Ecosystem in Sumatra, Indonesia forms a significant part of the UNESCO World Heritage site 'Tropical Rainforest Heritage of Sumatra' and is a stronghold for the critically endangered Sumatran elephant (*Elephas maximus sumatranus*) and other endangered wildlife (e.g. orangutans, rhinoceros and tigers). Leuser is essential for the survival and regional scale migration of the Sumatran elephant, but much of their habitat falls outside protected areas and in the most threatened lowland forests, creating Human Elephant Conflict (HEC). This makes it critical that effective mitigation strategies are developed that take into account elephant behavior and the use of technology such as early warning systems to prevent conflict with the local communities. Despite the escalating HEC in the region, the knowledge that is essential to develop effective and efficient mitigation strategies is lacking.

Goals: Our goal is to advance management strategies aimed at promoting successful human-elephant coexistence and to support development of wildlife reserves and forest corridors that are specially designed to fulfill the requirements and needs of humans and elephants. These goals are achieved by implementing an early warning system using GPS collars deployed on three wild Sumatran elephants from separate herds so that the local communities can be informed about imminent elephant arrival and take measures necessary to protect their crops and lives. At the same time, we will

help establish areas that are used by elephants in order to secure protection of those areas.

Methodology: To achieve these goals, we have fit GPS collars (Africa Wildlife Tracking) on two wild elephants (the third is in process) and track their movement patterns (recording 6 locations per day each) and using this information to inform villagers when elephants are approaching their village. In addition to the GPS data, an on-site field team that consists of people from the local communities are tracking and monitoring elephant movement. When the GPS data indicates elephant movement near or towards villages, the field team will first respond by going to the site to assess the situation and inform the local conservation agency (*Balai Konservasi Sumber Daya Alam* - BKSDA) who will then deploy a Conservation Response Unit (CRU) that consists of trained elephants and their keepers to stop or drive wild elephants back into the forest. The field team, made up of local people with knowledge of the area, will also assist the CRU in driving wild elephants back into the forest. The data from the GPS collars will also be analyzed to determine seasonal and annual home range sizes, travel routes, and the average travel speed of individuals. The kernel method (using the Animal Movement Extension in ArcView) will be used to get a realistic interpretation of ranging behavior and core range area. Habitat use will be identified by determining the amount of time spent in different areas. This information will be used to identify the key areas for wildlife sanctuaries and forest corridors to facilitate gene flow between possibly isolated populations. Identification of such areas will support HEC mitigation and park management planning.

Conservation impact: The essential information needed to mitigate HEC will consitute the main deliverable of this project: test and implement the use of an early warning system for the local communities so that they can be prepared to deter elephants from entering their villages that will ultimately support peaceful human-elephant coexistence.

Keywords: Human, Elephant, Conflict, Conservation, Diversity

PT12

EVALUATION OF TWO OBSERVATIONAL METHODS TO ASSESS THE NUMBER OF BURROWS OCCUPIED BY NESTING PUFFINS (*FRATERCULA ARCTICA*)

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Abstract

Accurate monitoring of population numbers is essential for conservation. Large numbers, dense flora, camouflage or inaccessible landscapes make counting individuals difficult or near impossible. This study compared two population count methods for puffins nesting in on steep cliffs. To estimate numbers in a colony, Apparently Occupied Burrows (AOB) are counted by the observation of adult birds returning with fish in their beaks and disappearing into the burrows (Joint Nature Conservation Committee, 2015). This study compared continuous counts via binoculars with the count obtained via a time-laps camera (one photo every 10 seconds) to help future estimates to be more accurate and provide a scientific method for the national census. The study was carried out on Lundy Island (51N, 04W) in the Bristol Channel, UK. Total counts of puffins present in the observation area were done at the beginning of each session, and then again every 30 minutes, both via binoculars and from still photos. The total camera bird count ranged from two to 39, for the live observation from zero to 45. The count of the AOBs via the photos ranged from five to 19, for the live count from one to 15. The camera count of the AOBs was always higher than the count via binoculars, by an average factor of 1.75. The difference between the two observers was smaller than the difference between the camera count and the observers. The differences in bird numbers between all three counts were significant. The observers' bird counts did not show a trend to over- or underestimate total numbers. Both observational techniques were affected by weather conditions and visibility. Counting occupied nest sites by camera is more accurate than by live observation via binoculars. For overall numbers of birds the trend was inconclusive.

Keywords: Population monitoring; cliff-nesting birds; methodology; puffins

PT13

IMPACT OF PESTICIDE CONTAMINATION ON BIRDS - AN INDIAN SCENARIO

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Abstract

Birds are among the major victims of environmental contaminants as they occupy a wide range of trophic levels in different food chains. Among the innumerable chemicals present in the environment, pesticides have been posing the most serious problems to all life forms, including birds. Rachel Carson was the first to draw public attention to the sensitive nature of birds to the deleterious effects of pesticides such dichlorodiphenyltrichloroethane through her book *Silent Spring*. The ill effects of pesticides on wildlife, particularly birds, have been a concern for a long time. Between 2010 and February 2014, 777 individuals comprising 90 species of birds were received dead at SACON from 9 states in India for investigations. Several species of birds have suffered population decline in India in recent years. The Spot-Billed Pelican *Pelecanus phillippensis*, whose population plummeted from 2000 to 330 within a span of 30 years in Karnataka, the Sarus Crane *Grus antigone*, whose breeding population declined from 27 pairs in 1973 to six pairs in 1990 and two pairs in 2016 in Keoladeo National Park, Bharatpur, Rajasthan, the Himalayan Grey-Headed Fish Eagle *Ichthyophaga nana*, which was not successful in breeding at Corbett National Park, in Uttarkhand, and the *Gyps* vultures, whose populations across South Asia declined catastrophically, are a few examples. We have recorded mortality of birds such as the Spot-Billed Pelican *Pelecanus philippensis*, Painted Stork *Mycteria leucocephala*, Eurasian Spoonbill *Platalea leucorodia*, Little Egret *Egretta garzetta*, Black-Headed Ibis *Threskiornis melanocephalus*, Black-Crowned Night-heron *Nycticorax nycticorax* due to Phosphamidon poisoning at Anna Zoological Park, Chennai, Red-Crested Pochard *Netta rufina* and Common Moorhen *Gallinula chloropus* in Sitarganj Forest Range, Uttarkhand due to chlorpyrifos poisoning and Demoiselle Crane *Anthropoides virgo* in Amreli and Surendranagar districts of Gujarat due to phorate and rodenticide poisoning. In the

case of Great Cormorant *Phalacrocorax carbo* and Great White Pelican *Pelecanus onocrotalus* in Kaziranga National Park, Assam and Cattle egret *Bubulcus ibis* in Amreli District, of Gujarat, circumstantial evidences were pointing towards pesticide poisoning. These records give credence to the concerns of ornithologists in the country. Death of birds due to pesticide poisoning has been a perpetual concern across the agricultural landscapes in India. Unfortunately, not only birds, even human beings continue to be victims to the legendary DDT to the present day poisons. A national level study by SACON to document impact of pesticide contamination on birds across India has been an enduring exercise.

Keywords: Pesticide, Contamination, Birds, *Phalacrocorax carbo*

PT14

AN OVERVIEW OF BIOLOGICAL DIVERSITY ACT-2002.

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Abstract

The Convention on Biological Diversity (CBD), an international legally binding treaty with three main goals: (1) conservation of biological diversity (2) sustainable use of its components; and (3) fair and equitable sharing of benefits arising from genetic resource, was enacted during Earth Summit at Rio de Janeiro in 1992. Based on this convention, India has enacted Biological Diversity Act, 2002 followed by Biological Diversity Rules-2004 to implement the Act. The salient features of Act are: (i) To regulate access to biological resources of the country with the purpose of securing equitable share in benefits arising out of use of biological resources and associated knowledge relating to biological resources (ii) To conserve and sustainably use biological diversity (iii) To respect and protect knowledge of local communities relating to biodiversity (iv) To secure sharing of benefits with local people as conservers of biological resources and holders of knowledge and information relating to the use of biological resources (v) Conservation and development of areas of importance from the stand-point of biological diversity by declaring them as biological diversity heritage sites (vi) Protection and rehabilitation of threatened species and (vii) Involvement of institutions of State Governments in the broad scheme of implementation of the Biological Diversity Act through constitution of committees.

National Biodiversity Authority (NBA) was established in 2003 at the national level with headquarters at Chennai, following the enactment, for regulating activities as provided in the Biodiversity Act, for issuing guidelines and advising the Central and State Governments. Subsequently, the State Biodiversity Boards (SBB) have also been established by many State Governments as provided in section 22 of the Act to advise them subject to any guidelines issued by the Central Government on matters relating to the conservation of biodiversity and their sustainable use. The Act under section 41 has also made provision for constitution of Biodiversity Management

Committees (BMC) by every local body for the implementation of the act. A decentralized regulation has been made through BMCs, SBBs and NBA each with well defined function within their respective jurisdiction. Accordingly, it is operated at local, state and national levels as a 3 tier system. NBA and SBB provide guidance and technical support to BMC for preparing People's Biodiversity Register (PBR). The BD Act provides legal mechanism for establishing sovereign rights over the Indian biodiversity and its conservation, protection against misappropriation, regulation of access and sustainable use of biodiversity. The act covers foreigners, non-resident Indians, body corporate, association or organization that is either not incorporated in India or incorporated in India with non-Indian participation in its share capital or management. These individuals or entities require the approval of the National Biodiversity Authority when they use biological resources and associated knowledge occurring in India for commercial or research purposes or for the purposes of biosurvey or bio-utilisation.

Biological Diversity Rules were formulated during 2004 for operationalising the Biological Diversity Act, 2002. The act also covers the intellectual property right related to traditional knowledge. Traditional knowledge (TK) is a collectively owned property and is integral to the cultural or spiritual identity of the social group in which it operates and is preserved. Traditional knowledge is now at the centre of the discussions on intellectual property rights and has assumed immense significance. India does not have any specific legislation for protecting traditional knowledge. The concept of benefit sharing, which is an integral part of protecting traditional knowledge, has been covered in Biological Diversity Act 2002 and Plant Variety Protection and Farmers Rights Act, 2001.

PT15

AN OVERVIEW OF REINTRODUCTION-BASED RECOVERY OF TIGER IN INDIA: COMBATING LOCAL EXTINCTIONS AND ENSURING POPULATION PERSISTENCE

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Abstract

Tiger (*Panthera tigris*) is an iconic species of wildlife conservation due to flagship and charismatic value, and for the key ecological function as top-order predator. Habitat loss and poaching continue to present significant threat to the species populations across the range countries, and consequently, there have been local extinctions in several parts of India and in other parts of the world where tiger occur. It has been established that this important is driven to less 6% of the historical range and the population size also around 1% of the historical populations. Loss of such carnivores cause cascade effects and affect the quality of life including for human. As a case in point, the species went functionally extinct from Panna Tiger Reserve (PTR), central India, in 2009 and in response; a species recovery program was implemented. Six tigers were translocated from other central Indian tiger reserves, as founder individuals. The reintroduced tiger population has bred successfullyin the past six years and the population now stands at>40 animals.During the first phase of the project, home range size, mate selection strategies and movement patterns of radio-collared tigers werealso studied. It was found that male tigers in Panna have the largest home range when compared to other Indian reserves, and that the release site had no influence on home range or mate selection, but they tend to avoid mating with genetically close conspecifics. At the current rate of growth, in terms of demographic and genetic structure, the population will survive for long-term and any effects of demographic and genetic depressions will act only after 60 years, from the perspective of business as usual model. However, the population management with suitable emigration and immigration options will negate such effects also. Given that the population has now recovered significantly and dispersal events are also taking place, there is a need to consider the conservation focus at landscape scale, looking into sinks and securing functional connectivity.

Keywords: Population Extinction, Reintroduction, Monitoring, Mate selection, Landscape approach

WILDLIFE - INVERTEBRATES

WI1

DIVERSITY OF BUTTERFLIES IN DHARMAPURI DISTRICT, TAMIL NADU, INDIA

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Abstract

Butterflies are known for their colour, beauty, wondrous shape and variability. Among invetebrates, butterflies are suitable for ecological studies, as taxonomy, geographic distribution and status of many species are relatively well known. In the present study, was carried out in Melagiri hills of Eastern Ghats, Hosur forest Division. This tract of forest is a block of 950 km^2 and lies between and 12^o 7' and 12^o 44' N latitudes and 77^o 30' and 78^o 27' E longitudes, Melagiri hills are a part of the Hosur plateau which run irregularly as a chain from north-east to south-west. The results showed that, 56 species of butterflies belongs to eight families, were collected during the study period i.e. December 2014 to March 2015. The families Pieridae, Nymphalidae were represented by the highest number of species. The most abundant species with reference in the mixed deciduous forest were *Leptosia nina*, *Ceprora nerissa* and *Neptis hylas*. *Leptosia nina*, *Ixas marianne*, *Neptis hylas* and *Danias chrysippus* were the most abundant species in the riverine forests. In the scrub jungle *Leptosia nina*, *Neptis hylas* and *Erogolis ariadne*, *Terias hecabe*, *Neptis hylas* and *Erogolis ariadne* were the most dominant species. *Precis iphita*. *Danais melissa, Danais chrysippus*, *Danais plexippus* and *Euploea core* were the most abundant species in the shola forests. In conclusion the present study brought out the richness and diversity of butterfly fauna at the study area.

Keywords: Butterflies, Density, Diversity, Dharmapuri, Tamil Nadu.

WI2

DIVERSITY OF EARTHWORM SPECIES FROM VARIOUS HABITATS OF ERODE DISTRICT, TAMIL NADU

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Abstract

The burrowing action and comparative abundance of the earthworms in different localities viz., river bank, forest region and cultivated soil were studied from January 2009 to December 2009 in Erode district, Tamil Nadu. A total mean number of 23.2 earthworm specimens, with three replicates, were collected representing four families, 7 genera and 12 species. The Megascolecidae comprised 50.4, Eudrilidae 25.4, Lumbricidae 17.1 and Moniligastridae 0.05% of the total number recorded. Four species of Megascolecidae and Eudrilidae were the most abundant and active at all sites during the month of July and November, whereas their activity was the lowest in April and May. The relative abundance was at peak in October but declined down to minimum in March. These findings exhibited great fluctuations in earthworm population over the months. The assurance for more research on their role is in need to improve the soil for agriculture in the study area. This paper intends to communicate the importance of earthworm biodiversity conservation. Development of conservation management, to prevent earthworm diversity decline should be done wisely and involving all stakeholders.

Keywords: Abundance, Diversity, Earthworms, Habitats

WI3

DIVERSITY OF COMMERCIAL CLAMS IN UTTARA KANNADA ESTUARIES, KARNATAKA, INDIA

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Abstract

Estuaries are ranked among the most productive ecosystems of the earth due to a variety of factors, the most prominent being mixing up of freshwater from the rivers with the marine tides creating varying degrees of salinity in different parts of the estuary. When these natural tidal rhythms are affected due to natural causes or anthropogenic activities, estuarine organisms, especially sedentary ones, get affected. The sedentary organisms such as bivalves make ideal cases for assessment of especially anthropogenic environmental impacts on estuaries. The rivers of Uttara Kannada district, Karnataka particularly Sharavathi and Kali have been dammed for power production, which collapsed the clam fishery. Hence, a survey was conducted in dammed river estuaries Sharavathi and Kali to know the impact of hydroelectric dams on the clams and compared with the studies from undammed river estuaries Aghanashini and Gangavali. The study reveals that the execution of hydroelectric projects in the Sharavathi and Kali rivers of Uttara Kannada district in Karnataka is seen as the major causes for the elimination of most clam bivalves from the Sharavathi estuary and habitat shifts and shrinkage for the bivalves in the Kali estuary, due to decreased salinity on account of continuous discharge of freshwater after power generation, a situation not favouring the bivalves. River valley projects are drastic interventions by humans with far reaching implications affecting even the estuarine regions, primarily due to fall in salinity creating adverse conditions. The bivalve situation in two more estuaries, of the rivers Aghanashini and Gangavali in Uttara Kannada, undammed and more natural, is compared with that of the dam affected ones to understand the situation better.

Keywords: Bivalve, Dam, Hydroelectric project, Kali, Sharavathi, Salinity.

WI4

FORAGING BEHAVIOUR OF GIANT HONEY BEE (*APIS DORSATA*), IN AND AROUND THE NEHRU MEMORIAL COLLEGE CAMPUS, PUTHANAMPATTI, TRICHY DISTRICT, TAMIL NADU, INDIA.

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Abstract

Information on the foraging behavior of *A. dorsata* is important in bee management for honey production and the conservation of the species. These types of study may be implemented for long term conservation strategy. Thus, the present study was under taken to know the foraging aspects of rock bee in and around the campus of Nehru Memorial College, Puthanampatti, Trichy District, Tamilnadu, India. Different species of plant flowers were collected and they were brought to the laboratory. The pollen grains were collected from individual flowers and the model slides were prepared in the locally available flowers of different plant species of herb, shrub, creepers and trees. Apart from this the flowering plant survey was also conducted within one km^2 area of study area. The flowering plant species were identified up to species level. The foraging behavior of rock bee was recorded in morning (06.00 to 09.00 am) and evening (04.00 to 06.00 pm) hours in and around Nehru Memorial College campus. The total number of bees going out from the comb for foraging and the total bees coming from outside to the comb for storing nectar or pollen grains were recorded.

Maximum rock bees were went out for foraging between 09.00 and 12.00 hrs (76.94 ± 20.59) while minimum number of bees were attending foraging during 15.00 to 18.00 hrs (45.33±16.35). On the other hand, more number of bees were came back to the comb between 09.00 and 1200 hrs (98.61±20.26). Comparatively, during 12.00 to 15.00 hrs low number of bees (47.73±20.95) were returned to the comb after foraging. The study revealed that foraging period of rock bees was found to be more during late morning hours and lower at post

meridiem hours. In the present study a total number of 22 plant species were identified as honey bee' foraging plants. Among these, it was observed that the rock bees were attended the *Tecoma stanus* flowers followed by *Pongamia pinnata* flowers for foraging with highest level of 64.55% and 29.83%, respectively. *Emblica* sp. *Duranata* and *Tagetes erecta* were least preferred foraging flowers by the rock bees. The honey bees showed various flower-foraging behaviors such as opportunistic, territorial, traplining buzzing and others for utilizing forage efficiently. These behavior patterns benefit the plants largely in out crossing. Since the rock bee mostly preferred flowers of *Tecoma stanus* and *Pongamia pinnata* for foraging. It is suggested these plant species might be planted more in and around the campus to improve the honey production and to increase the honey bee population.

Keywords: Giant Honey bees, Foraging behavior

WI5

GARDEN: AS REFUGE FOR BIODIVERSITY CONSERVATION OF SPIDERS

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Abstract

Spiders are polyphagous predators of insect pests belonging to order Araneae. They are cosmopolitan in distribution. Despite their wide distribution, detailed data are not available on their distribution in different habitats. The garden is considered to be a place of aesthetic value. We studied the diversity and density of various spider species found in a garden habitat (spread over 0.3 acre) at A.V.C. College, Mayiladuthurai, Tamil Nadu during 2007–2010. Density and diversity were assessed in four seasons *viz.,* post-monsoon, summer, pre-monsoon, monsoon in a year selecting five major plants species found in the garden viz. *Hibiscus rosa-sinensis, Ixora* sp., *Tabernaemontana coronaria, Cycas* sp. and *Codiaeum* sp. In addition, a quadrat of $1m^2$ laid at ground level was also surveyed to record the spider species. The populations were estimated by direct count method. The density of spiders was calculated as number/plant and number/m^2. The diversity of spiders across different seasons was analyzed by widely used indices. Bray-Curtis similarity measures (1-B) were calculated to assess similarities in spider species assemblages between climatic seasons. We identified twenty four species of spiders belonging to nine families with Aranedae being the most dominant one. The spider species densities and diversity varied among plant species studied. All the spider species except *L. decorata* were recorded in all the seasons of all the three years of the study in the garden. Multiple comparisons (Tukey's test) recorded that the post-monsoon season had significantly higher densities ($p<0.05$) for the species *O. javanus, O. shweta, L. decorata* and *T. pugilis,* while *T. dimidiata* was significantly higher during the monsoon season of the present study period. The monsoon season of 2008-2009 had a highest Shannon-Wiener Diversity index (H'=2.6406), while the summer of 2007-2008 had the highest Margalef Richness index (R= 3.6775). A highest Bray–Curtis

Similarity co-efficient of spider species composition in between the monsoon and post-monsoon seasons (0.9005), while the lowest similarity was between the pre-monsoon and post-monsoon seasons (0.8404). The assemblages of diversified species of spiders in different climatic seasons of the garden field indicated that the garden act as an important refuge for spider biodiversity conservation.

Keywords: Climatic season, Density, Diversity, Garden, Predator

WI6

INSECT DIVERSITY IN PADDY CROP ECOSYSTEMS OF THARANGAMBADI TALUK, NAGAPATTINAM DISTRICT, TAMILNADU.

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Abstract

Rice is grown mostly in the warm and humid environment under diverse cultural conditions and over a wide geographical range. A tropical rice field offers a biologically diverse and dynamic environment for microbial, floral and invertebrate population to flourish shortly after fields are flooded and continuing well after canopy closure. Arthropods diversity in rice ecosystems has received lot of attention during the past one decade. Study on the insect diversity was conducted in paddy field during the navarai and samba seasons. The data obtained by trapping and net sweeping from September 2015 to September 2016 showed the diversity of phytophagus and Entomophagus, their diversity richness and evenness. In this study insects from 11 different orders were recorded. The insect orders recorded were Orthoptera, Lepidoptera, Hemiptera, Homoptera, Coleoptera, Thysanoptera, Odonata, Hymenoptera, Diptera, Neuroptera, and Dermaptera. Totally 45 species of phytophagous, entomophagous and 70 species neutral insects were collected. Order Lepidoptera contained maximum number of phytophagous insects. Order coleoptera beetle *Ophionea indica* and *Dytiscus* sp. was the most abundant phytophagous insect in paddy crop. The study was deal with the documentation of the major and important arthropod insects, quantification of various ecological indices viz., species richness, diversity and eveness indices in both are the IPM and NIPM fields of irrigated rice field during the study period samba season and Navarai seasons.

Keywords: Rice, Tharangambadi , Diversity, Shannon's index, Simpson index, Phytophagus.

WI7

CHANGES IN THE POPULATION OF MOLLUSCAN SPECIES IN VEERANAM LAKE, TAMIL NADU, SOUTHERN INDIA

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Abstract

Lake Veeranam is one of the major freshwater bodies in Tamil Nadu, Southern India which provide water source for agricultural and domestic purposes. On the other hand, the lake has ecological significances by supporting wide varieties of biodiversity. Among the aquatic organisms molluscan forms provide primary role in aquatic ecosystems and perform considerable amount of ecosystem services. Hence, the aquatic habitats support enormous number of molluscan diversity. We assessed the changes in freshwater molluscan population at Veeranam Lake from six selected sampling stations at Kaliyamalai and Koolapadi which were collected from January 2014 to March 2015. We recorded 12 species of freshwater molluscs belonging to 7 families of class Gastropoda and Bivalvia. The overall abundance of various species of Molluscs were: *Villorita carbiculoides* (1344 specimens), *Parreysia khadakvasiwensis* (122 specimens), *Lamellidens marginalis* (822 specimens), *Corbicula striatella* (593 specimens), *Polymesoda bengalensis* (210 specimens), *Indoplanorbis exustus* (250 specimens), *Bellamya bengalensis* (11913 specimens), *Pila globosa* (2130 specimens), *Stenothyra blanfordina* (593 specimens), and *Thira tuberculota* (62 specimens), *Lymnaea biacuminada* (42 specimens) and *Cryptozoha semirugata* (39 specimens). The overall molluscan abundance of Kaliyamalai and Koolapadi were 9432 and 8724 respectively. The overall molluscan abundance was highest during February and lowest in January. Among the three seasons, the molluscan abundance was highest during winter. Among the species, abundance of *Bellamya bengalensis* was highest and *Cryptozoha semirugata* was lowest. The abundance of molluscan species varied both spatially and seasonally. The water quality changes viz., reduction in the availability of water and wise variations in amount of oxygen and salinity seems to cause the changes in the population dynamics of molluscan forms. Furthermore, this study indicated that the lake Veeranam is one of the important areas for molluscan diversity and abundance.

Key words: Mollusca, Population, Veeranam lake, Season, Diversity, Water Quality

WI8

ECOLOGY OF MICRO AND MACRO INVERTEBRATE SPECIES FOUND IN PERIYAKULAM LAKE, THIRUCHIRAPPALLI, TAMIL NADU, INDIA

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Abstract

Abundance and distribution of micro and macro faunal diversities are essential for the survival of many water bird species. The study was carried out in an unprotected lake, Periyakulam located in Thiruchirappalli district, Tamil Nadu, India. Water sample were collected from the lake, 50 liter of each water sample from each station was filtered, the sediment of the samples was collected in a bottle and the collected samples were preserved in 5 % neutralized formalin for further analysis. Quantitative and qualitative analyses of phytoplankton and zooplankton were made following the method of Sukhanova (1978) and for the macro invertebrate study the mud samples were collected by using core sampler from the bottom of the lake. Totally 13 species of phytoplanktons, 9 species zooplanktons and 11 species of oligochaete species (Polychaete) were recorded during January, 2011 to December, 2012. The density, diversity and species richness varied significantly between the years and among the season ($P<0.001$). It was found that the seasons and rain fall pattern influenced the various parameters of micro and macro invertebrate species in the Periyakulam lake.

Keywords: Wetland, Lakes, Micro and Macro fauna, Conservation.

WI9

PLANKTON DIVERSITY OF THREE DIFFERENT PONDS AT KUMBAKONAM, TAMILNADU, INDIA

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Abstract

Plankton abundance and distribution are of ecological importance, as they are very sensitive to change. Therefore plankton make ideal indicators of aquatic ecosystem. The present study was an attempt to examine the abundance of occurrence and diversity of phyto and zooplankton species inhabiting in selected ponds at Kumbakonam, Thanjauvur district, Tamilnadu. From the selected 3 stations of ponds (Mathi Pond, Seiyi Pond and Piddari Pond) around 2 kilometers difference, water samples were collected. Quantitative analysis of phyto and zooplankton as well as qualitative nature of pond water were carried out. In all the three ponds phyotoplankton community was dominantly occupied by Cyanophyceae, Chlorophyseae. Similarly zooplankton community of the ponds is comprised of Cladocera, Copepoda and Rotifera. Copepoda showed dominance both in number and diversity, followed by Cladocerans and Rotifers. The diversity is the plankton community among pponds could be correlated with water quality, thus indicating different types of pollution across the sites. The results were discussed with the focus of relating plankton diversity with environmental changes.

Keywords: Plankton, Aquatic ecosystem, Plankton diversity, Water quality

WI10

WEB DENSITY AND WEB-SITE ATTRIBUTES OF FUNNEL-WEB SPIDER, HIPPASA GREENALLIAE (BLACKWALL 1867) IN VARIOUS HABITATS OF MANNAMPANDAL, SOUTHERN INDIA

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Abstract

Spiders represent one of the most abundant predatory arthropods in terrestrial ecosystem. Their effectiveness at controlling pest populations, both alone and as part of natural enemy complex has well demonstrated in many countries. The web morphometry and web-site attributes of Funnel-web Spider was assessed using standard method between November 2016 and January 2017 in three different habitats—Garden, Grassland and Unmanaged Ground. Among the three habitats, grassland had the highest density of spiders (1.69 ± 0.28 individual/m^2) and webs (1.69 ± 0.28 web/m^2), while the unmanaged ground had the lowest density. However, the density of spider and web did not varied statistically among the habitats ($p<0.05$). Between the microhabitats, the web with vegetated surrounding had significantly higher density (spiders: 1.90±0.17 individual/m^2 and webs: 1.86±0.18 webs/m^2) than those in barren surrounding ($p<0.05$). The web morphometry viz., web length, hub diameter, and hub depth and web height to ground showed that unmanaged ground had the highest web length (24.0±2.0 cm), hub diameter (1.6± 0.13 cm), hub depth (7.7±1.29 cm) and web height to ground (25.6±12.3 cm). Among the web site attributes, web height to ground varied significantly among the habitats ($p<0.05$). The effect of vegetation parameters and web characters on density of web and spider was assessed using multiple regressions analysis and the results indicates that web density increased with vegetation cover and micro habitats (with vegetated surrounding) but decreased with hub depth. A similarly trend was also observed for spider density, which clearly indicated the importance of vegetations in site selection for the construction of webs by funnel-web spider. Further, the selection and utilization of microhabitats could also be influenced by the structural features of plant species that provide architectural supports to spider webs.

Keywords: Spider, Funnel Web, Web density, Micro habitats, Web site selection

WI11

THE CONSERVATION AND RE-POPULATION OF THE *APIS MELLIFERA* (EUROPEAN HONEY BEE) IN THE UK

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Abstract

There are serious concerns that *Apis mellifera* populations are in rapid decline (Biesmeijer, 2006; National Research Council, 2006; Oldroyd, 2007; Stokstad 2007; Gallai et al., 2009) with severe colony losses in many regions of Europe (Rosenkranz and Wallner, 2008). Figures from Potts et al. (2010) estimate that 84% of all cultivated European crops depend on pollinators (Williams, 1994) whilst Klein et al. (2007) states that 70% of all worldwide crops consumed are dependent on pollinators, with *Apis mellifera* deemed the most important and easiest to manage of all crop pollinators (McGregor, 1976; Delaplane and Mayer, 2000). There is therefore not only concern for a dying species but also for the serious ramifications and economic and world agricultural threat that will occur if action is not taken. This intervention has been planned to attempt to curb the decline of and stimulate *Apis mellifera* numbers to grow by using psychological theories to encourage and implement more sustainable behaviours among a primary school population and their parents. The target group of children will: (i) attend a lecture on the importance of *Apis mellifera*, factors driving declining populations, how to increase populations etc.; (ii) witness a demonstration on bee-keeping; (iii) have the opportunity to build their own basic beehives; (iii) be provided with wildflower seeds to encourage *Apis mellifera* into their gardens. The outcome will be evaluated in terms of Social Identity Theory (Tajfel & Turner, 1979) and the Theory of Planned Behaviour (Ajzen, 1991).

Keywords: Honeybee, *Apis mellifera*, Population, Awareness, Behaviour

WI12

DIVERSITY OF BENTHIC FORMS IN THE PICHAVARAM MANGROVE FOREST, TAMIL NADU, INDIA

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Abstract

Benthic organisms are the most significant ones and have to play a vital role for the migratory shorebirds during their migration. A study was conducted to assess the diversity of benthic organisms in the mangrove forest which is situated at Pichavaram (Lat. 11° 29′ N: Long. 79°46′ E) in the south-east coast of Cuddalore District, Tamil Nadu, India. The mud samples were collected fortnightly at $1m^2$ quadrates and in each quadrate six core samples were collected at a depth of 5cm with a $20cm^2$ core sampler, the samples were brought to the lab for further study. Totally 36 species of benthic forms were recorded from the Pichavaram Mangrove forest during August 2015 to April 2016. Out of 36 species *Cerethedia cingulata* (144.5±78.19 No./m^2) showed high density when compared to the other species recorded in the mangrove forest. The study indicates that the pichavaram mangrove forest is one of the significant habitats for the rich diversity of benthic forms including polychaetes, snail, prawns, etc.

Keywords: Wetland-mangrove forests-mudflats-benthic organisms- polychaetes-conservation.

WI13

ABUNDANCE AND DIVERSITY OF BUTTERFLIES IN A.V.C. COLLEGE CAMPUS, TAMIL NADU

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Abstract

Taxonomically, butterflies are one of the most studied groups, among class insecta and are an important group in ecosystems as pollinators. They are also one of the good indicators of environment, as they are sensitive to disturbance including climate change. This study documents the abundance and diversity of butterflies in A.V.C. College Campus, Mayailaduthurai, Tamil Nadu. Between December 2016 and January 2017, employing random sampling method, the study observed butterfly from 08:00h to 11:00h, which is a peak time of butterfly activity. Butterflies were identified following standard literatures either by direct observation or using their photograph. The study identified 43 species of butterflies belonging to five families viz., Nymphalidae (14 species), Pieridae (10 species), Lycaenidae (7 species), Papilionidae (7 species), and Hesperiidae (5 species). Among these 43 species, *Zizeeria karsandra* showed the highest abundance, contributing over 30% total sightings. The abundance (464 ± 33 individuals/day), diversity (2.27 ± 0.03) and richness (23 species) of butterflies recorded the maximum between first and second week of December 2016. This could be due the availability of suitable habitats with conducive environmental conditions. Although, butterflies abundance increased positively with temperature and humidity, but not statistically. Butterfly feeding on nectar was observed on 20 different host plant species, with *Gomphrena serrata* (Globe amaranths) receiving the highest visits and also appeared as the separate group in cluster analysis. Herbaceous plants received the highest butterfly visit (92%) followed by grass (6%) and most of visits were to yellow colored (51%) flowers followed by white colored flowers (23 %). More than two thirds of total visits were either to open (65%) or tubular

flowers (35%). The higher visits to herbaceous plants with yellow and open flower could be a function of their higher fragrant along with higher quantity nectars compared the set of plants, which are with white colored and tubular flowers. Further detailed studies on photochemical components of flowers and quantity of nectar in the flowers would shed better understanding on butterfly feeding and also plant pollination ecology.

Keywords: Abundance, Butterfly, Diversity, Environmental condition, Host plants.

WI14

SARGASSUM MATS: A BOON OR BANE

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Abstract

Marine algae are a heterogeneous group of plants with a long fossil history. Marine macroalgae (Seaweeds) are found in the littoral habitats. Among them, *Sargassum* species generally grow on the rocky surfaces of the intertidal regions and their thalli float due to the presence of air vesicles on the lateral branches. Recently, frequent occurrence of *Sargassum* mats was observed from Chatam to NorthBay, Andaman and Nicobar Islands, India and the exact reason for this is unknown. Across the Caribbean, mysterious invasion of *Sargassum* had disruptive impacts on both fisheries and tourism for the past four years. But this phenomenon which was first seen as a bane because of its adverse impacts has conversely fueled a boon for enterprising persons who have found innovative ways to exploit the explosion of this weed for as biofertilizers, making compressed wood etc. Since 2011, the small South Pacific atoll nation of Tuvalu has been affected by *Sargassum* blooms, the most recent being a large growth of *Sargassum* in the main atoll of Funafuti, a total of 19 species of macroalgae were found here, the dominant one being *Sargassum polycystum* C. Agardh. A correlation was noticed between the density of human population on the shore and the algal biomass. Higher amount of *Sargassum* biomass made it a good candidate for use as a fertilizer additive for agricultural practices in Tuvalu. Additionally, such *Sargassum* biomass could be converted into biogas using the process of anaerobic digestion in simple household digesters, to meet the renewable energy need. The *Sargassum* mats host a diverse community of animals and plants, which in turn support larger migratory species, including tunas, marlin, sharks, and turtles. The Sargasso Sea ecosystem service provides with commercial fish stocks, wildlife viewing, recreational fishing etc. The Sargasso Sea ecosystem also has ecological functions that are essential to support human life (e.g. oxygen production and carbon capture and storage). The "whole-genome shotgun sequencing" of microbial populations collected from the Sargasso Sea near Bermuda shows that these data are estimated to have been derived from at least 1800 genomic species based on sequence relatedness, including 148 previously unknown bacterial phylotypes. Therefore, Sargassum mats are a boon rather than a bane.

Keywords: Sargassum mats, Marine algae, Sea weeds

WI15

OCCURRENCE OF MARINE MOLLUSCANS IN CHINNANGUDI COASTAL REGION, NAGAPATTINAM DISTRICT, TAMIL NADU, SOUTHERN INDIA

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Abstract

Molluscs are one of the most significant groups contributing to the biodiversity in marine water environment. It draw a rapt attention because if their occurrence in huge number as well as in different habitat. The current study aimed to assess the occurrence of molluscan species using the shells during October 2015 - January 2016 at Chinnagudi coastal region, Nagapattinam district. The sampling was done by randomly at the she shore. A total of 28 species of molluscs were recorded. Among them 16 species are belonging to gastropods and 12 species are belonging to bivalves. The 16 species of gastropods belong to 14 families. Among the various gastropods *Babylonia spirata spirata* the highest occurrence of 633 individuals followed by *Bullia vitatta* with 624 individuals and *Ficus gracilis* with 528 individuals, whereas *Turbinella pyrum and Natica lineate* showed the lowest occurrence with 3 and 8 individuals respectively. The 12 species of bivalves belong to 8 families are recorded in the study area during the study period. Among the various bivalves *cardiam asiaticum* with 1349 individuals followed by *Cucullea cuculatta* with 1325 and *chalyms singaporina* with 1185 individuals whereas *pholas orientalis* and *Scapharca inequivalvis* showed lowest occurrence with 5 and 9 individuals respectively. The cell of the species abundance was minimum in pre monsoon and maximum in post monsoon. Other factors like pH, TDS, Electrical condunctivity correlated at 0.01 levels, its also influence in moluscan shell diversity. The present study concludes that the species of Bivalves and Gastropods are distributed equally in the study area during the study period.

Keywords: Baivalves, Chinnagudi, Diversity, Gastropods

CHORDATES

WC1

STATUS, DISTRIBUTION AND DIVERSITY OF BIRDS IN AGRICULTURAL LANDSCAPES OF PEDDAGATTU AND SHERPALLY AREA: A PROPOSED URANIUM MINING SITES IN NALGONDA DISTRICT OF TELANGANA STATE, INDIA

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Abstract

Birds constitute an important component in the agro-ecosystems, and gaining more and more attention. The role of birds in agriculture is well known as agricultural landscapes provide a concentrated and highly predictable source of food to many birds. In this context, the present study made an attempt to record avifaunal diversity in agricultural landscapes of the proposed uranium mining sites of Nalgonda. Peddagattu is a proposed site for uranium mining is located close to Nagarjuna sagar reservoir at an elevation of around 719 fts from sea level and Sherpally located in Devarakonda mandal of Nalgonda district, Telangana state. A field survey was conducted during the period December 2010 to March 2014 to obtain the checklist, diversity and richness of birds in five different agricultural habitats viz., Paddy, Cotton, Castor, Red gram and Fruit garden. The BIODIVERSITY-PRO version 2.0 software was used for the statistical analysis. A total of 128 species of birds belonging to 59 families and 19 orders were recorded in the study area. Of which six bird species are listed as Near Threatened (Black-headed Ibis *Threskiornis melanocephalus,* Painted stork *Mycteria leucocephala*, Oriental darter *Anhinga melanogaster*, Pallid harrier *Circus macrourus*, River tern *Sterna aurantia* and Alexandrine parakeet *Psittacula eupatria*) and one species as Vulnerable (Woolly-necked stork *Ciconia episcopus*) in (IUCN, 2016) category. The species diversity and species richness were showed high

in Paddy (n=111) 2.07 *H'* (199 species, 33.80 ± 4.97) followed by Cotton (n=69) 1.86 *H'* (73 species, 18.64 ± 3.34), Castor (n=57) 1.83 *H'* (11.39 ± 1.92), Fruit garden (n=31**)** 1.80 *H'* (67 species, 7.72 ± 1.64) and Red gram (n=36) 1.79 *H'* (6.18 ± 1.09). Out of total 128 birds, 32 species found to be common, 27 are abundant, 32 are occasionally seen and 9 are rare in occurrence. Whereas, 64 species are resident, 53 species are breeding, 9 species are local migrant and 27 species are winter migrants to the study area. Results of the present study indicate that the study area is an ideal habitat for terrestrial bird composition. Red-vented Bulbul, Common Babbler, Common Myna, Black Drongo, Small Green Bee-Eater were widespread and common occurring abundantly in all habitats. Black Drongo was observed as the most dominant bird during the study period. The present study indicates that the agricultural landscapes were attracting more number of bird diversity due availability variety of sources such as food, feeding sites, roosting, nesting sites and are important for the occurrence and abundance of Insectivorous birds. Insectivorous birds need to be encouraged in the agro-ecosystem by use of appropriate management practices. Eco-friendly management methods are essential for conservation of avian species in agricultural ecosystem. Further studies are needed for a longer period to determine the species specific relations to develop conservation measures for agricultural birds.

Keywords: Peddagattu, Uranium mining, Species diversity, Species richness, Conservation

WC2

THIRUPPUDAIMARATHUR CONSERVATION RESERVE: BALANCING THE NEEDS FOR BIRDS AND BATS

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Abstract

Thiruppudaimarathur Biosphere Reserve is first and only Conservation Reserve in Tamil Nadu. Abundance of birds and bats, and nesting status of select bird species were studied between May 2008 and August 2008 following standard ecological methods. Study revealed occurrence of 69 species of birds comprising 40 families. Among families Ardeidae had the highest number of species (7) followed by Rallidae (4). Among the species, Cattle Egret had the highest abundance followed by Little Egret and Painted Stork. Totally 578 nests comprising five species of birds, namely Little Cormorant, Cattle Egret, Little Egret, Intermediate Egret and Painted were observed. Among species, Cattle Egret had the highest nest numbers followed by Painted Stork and Intermediate Egret. Nesting trees used by the breeding birds revealed variation. Most of the bird species selected any one of five tree species, namely *Azadirachta indica*, *Prosopis juliflora, Tamarindus indica*, and *Thespesia populnea* and *Polyalthia longifolia* for their nesting. Totally, 1129 Indian Flying Fox (*Pteropus giganteus*) was observed on three species of trees, viz., *Madhuca longifolia, Polyalthia longifolia and Terminalia arjuna*. The major factors for selecting these trees were tree height and canopy volume, which ultimately provided protection from predation. Villagers of Thiruppudaimarathur are tolerant of nesting birds, and consider their arrival in large number as 'Angels of God' and harbinger of good harvest. Similarly, a prolonged stay of birds in the village is considered as an indication of probable double crop. However, in addition to soliciting local people's whole-hearted support, conservation measures including regular monitoring of birds along with their threat factors are very essential to protect the birds and bats of this reserve.

Keywords: Avifauna, Bats, Breeding ecology, Conservation reserve, Nest-site selection.

WC3

EDUCATION AND MYTHOLOGY INFLUENCE THE PERCEPTION OF PEOPLE TOWARD THE CONSERVATION OF SNAKES IN TAMIL NADU

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Abstract

The people's attitude and perception on snakes are influenced by sociodemographic factors like education, society and personal experience. Human settlements especially in rural areas are sometimes accounted to human-snake conflicts. The high ambivalence of Indian people causes deterioration of snake species which can lead to ecological imbalance. This ambivalence is mostly due to the lack of education and mythological beliefs. This study shows how education, mythology and previous interactions influence the perception of people on the conservation of snakes. The study was carried out using questionnaire method, comprising topics on the ambivalent factors between January and February 2017. Totally 150 random respondents (50 each from village, semi-urban and urban) were interviewed and data was collected. The results of the study raveled that the negative perception of snakes decreased with increase in education level. Older people and women expressed more negativity and were inclined in mythology towards snakes which were minimal in urban areas when compared to rural areas. 37% of women and 27% of men were negative in the idea of conservation of snakes. Younger men were found to be bold and they opted for handling and killing snakes which were more prevalent in rural areas. In case of snakebite, the ratio of people panicking to staying calm and performing first aid was 37.6 % to 62.4%. The present study clearly indicates that education plays a key role in influencing the perceptions of people on snakes. Belief in mythology and ignorance is the main cause of wanton killing of snakes which left unchecked can lead to extirpation of snakes. Therefore, intensive educational efforts on behavior, morphology, ecology of snakes and snakebite preventions can increase the efficiency measures of snakes' conservation and prevent human causalities.

Keywords: Socio-demographic factors, Questionnaire method, Snakes, Conservation, Human- snake conflict

WC4

CAVE NESTING PREFERENCE OF YELLOW-THROATED BULBUL (*PYCNONOTUS XANTHOLAEMUS*) IN GINGEE HILLS, EASTERN GHATS, SOUTHERN INDIA

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Abstract

Gingee is one of the Panchayath towns in Villupuram district of Tamil Nadu. It's located in 12˚14'N, 79˚23' E. It has an average elevation range is 100-500 m. The study was carried out in Gingee range forest covering 7043.74 he, which was divided having five Reserve Forests (RF) namely, Muttakadu R.F (1298.77 hec), Siruvadi R.F (1441.05 hec), Padipallam RF (1457.27 hec), Pakkam Malai (East) R.F (2237.90 hec) and Karai R.F (608.75 hec). In this range forests habitats are mixed dry deciduous scrub and thorn scrub and carried from February 2015 to January 2017 in Gingee hills. Yellow-throated Bulbul (*Pycnonotus xantholaemus*) nesting from May to August and they nest in the caves with a height of above 3-5 meters in Gingee hills. Previous research emphasized that they were ground nest, or close to ground in thick vegetation where these bulbuls were nesting. But this research showed that Yellow-throated Bulbul (*Pycnonotus xantholaemus*) was using caves for nest construction and they using same location for nesting. Further, we discuss the cave nesting preference of Yellow-throated Bulbul in Gingee hills.

Keywords: Yellow-throated Bulbul, Cave nesting preference, Gingee hills, Mixed dry deciduous scrub, Thorn scrub

WC5

DIVERSITY OF WATER BIRDS AND THEIR ACTIVITY BUDGET IN POND ECOSYSTEM

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Abstract

Wetlands are defined as transitional lands between terrestrial and aquatic eco-systems where the water table is usually at or near the surface or the land is covered by shallow water. Wetlands provide home for a huge diversity of wildlife such as birds, mammals, fish, frogs, insects and plants. Thus wetlands help in maintaining biodiversity of flora and fauna. Water birds are an important component of most of wetland environment, as these occupy several trophic levels in the food web of wetland nutrient cycles.

The study was carried out from January 2016 to March 2016 with the objectives of to determine the status and distribution, to study the activity pattern of selected bird species and to identify the conservation problems. Observations were carried out every day and birds were identified with the help of field guide using binocular. Bird sighting was estimated using total count method. All the visible individuals were counted by direct encounter method. Food and feeding and other behaviours was investigated using Focal animal observational method of Altman.

Fifteen species of water birds were recorded which are visited the pond ecosystem in all the three months and it shows that the pond is mostly preferred ecosystem by the water birds. Of the birds sighted, pond heron is the bird sighted many times (n=94) followed by little grebe (n=47), pied kingfisher (n=22) and common kingfisher (n=19). Common coots pariah kit, brahminy kite and small green bee-eater are the least sighted birds. Though pariah kite, brahminy kite and small green bee-eaters are not the water birds but they use the pond for their food catch. The diversity index of the water birds seen during the study period shows there is a significant variance within the species. Likewise the Diversity (D) and lower and upper confidential limits also shows there is a variance within the species.

This study area is one of the major feeding grounds of many water birds and other resident species. The presence of birds indicates that the level of water is most significant factor for the survival of aerial foragers. The water birds foraged and fed most actively before noon. After overnight fasting they try to maximize foraging and feeding during early morning. While the emphasis on endangered birds and high-value habitats is understandable, and also justified on account of their conservation significance, census of the common birds has generally been ignored. A standardization of census techniques using common birds would yield useful information in understanding biases inherent in sampling bird populations in the Indian context, and it could also be possible to experiment with a number of different techniques.

Keywords: Wetlands, Water birds, Status and distribution, Activity pattern, Diversity.

WC6

ROOST ABUNDANCE AND ROOST SITE CHARACTERISTICS OF INDIAN FLYING FOX (*PTEROPUS GIGANTEUS*) IN MANANTHAVADI, WAYANAD, KERALA

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Abstract

Among the mammalian fauna, bats with flying ability play significant role in pollination, seed dispersal and nutrients cycling. Globally, there are 1200 species of bats belonging to 201 genera and 18 families, of which India is fortunate to have 117 species belonging to 39 genera and 8 families. Indian Flying Fox *Pteropus giganteus,* belonging to family Pteropodidae, is a widely distributed bat species across Indian subcontinents. Like any other mammals, bats too require shelter that provides adequate protection and allows them to rest and satisfy their social need including reproduction. Habitat destruction, degradation and alteration have negative impacts on bats, as these anthropogenic pressures reduce the availability of suitable roosting sites, which ultimately reduce their population size and survival. In this paper, we report some preliminary information on the abundance and roost site characteristics Indian Flying Fox. The study was carried out in Mananthavadi town located in Wayanad district of Kerala between September 2016 and January 2017. Population size was assessed using total count method and roost site characters viz., roost tree species, and their total height, dbh, pole height, canopy length, and roost site distance to human settlement and water body were evaluated using standard methods. In total, 1383 bats were observed roosting on six tree species belonging to four families. Among the six tree species, *Albizia sama* and *Albizia lebbek* had the highest number of bats, while *Eucalyptus tereticornis* had the lowest. Number of bats roosting increased positively with canopy length and it explained 41% of the variation, while other factors viz., total height and gbh did not show significant relationship. Fruit bats are largely dependent on existing shelters including tree hollows and tree branches, which are coinciding with the present observation. Although there has been considerable discussion in the literatures on habitat loss, little attention should be paid towards anthropogenic pressures, which severely alters the roosting sites of bats in this region. Hence, continuous monitoring of population size and roost site attributes is warranted to indentify the suitable roosting sites for bats.

Key words: Abundance, Bats, Roost sites, Indian Flying Fox, Habitat destruction

WC7

NEST-SITE SELECTION OF HOUSE SPARROW *PASSER DOMESTICUS* IN AN URBAN HABITAT IN SILCHAR, ASSAM, INDIA

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Abstract

We studied the nest site characteristic features of House Sparrow *Passer domesticus*in an around Silchartown, Assam, India. Active nests of House Sparrow were located during the peak breeding season during the month of February and March, 2011.We found that House Sparrow constructed majority of nest in commercial buildings. The shutters were the predominant substrates for nest construction. The electric wire was the perch frequently observed near the nest. The height of the nest was highest in residential building and lowest in Assam pattern houses and house adjacent to paddy fields. In commercial building House Sparrow preferred shutter for nest construction and in residential building preferred roof made up of tin sheets. The distance to human house showed significant variation among the habitats. The nest height, perch distance and distance to electric post had significant influence on the selection of substrates for nest constructions. In commercial buildings, most of the nests were in <3m height and in residential building most of the nest were recorded >5m height. The maximum number of nests observed in house adjacent to paddy fields and Assam pattern house were <3m and 3-5m, respectively. The perch distance and distance to human house had significant influence on the nest height categories of House Sparrow.

Keywords: House Sparrow, Nest-site features, Urban, Commercial building, Silchar, Assam.

WC8

FORAGING TECHNIQUES USED BY GOLDEN LANGUR *(TRACHYPITHECUS GEEI)* IN A FRAGMENTED HABITAT OF WESTERN ASSAM

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Abstract

Golden Langurs *Trachypithecus geei* are selective feeders and feed on variety of food plants throughout its life time. Handling and procuring of the food items by Golden Langurs have been observed in field, while they are feeding on different food items in Kakoijana Reserve forests, Assam. It has been observed that depending upon the food item the langurs used different techniques for eating them. Out of 6833 observations, it was recognized that they used six different techniques for handling the food item. The techniques include Pluck and hold with left hand (PLR) collecting and holding the item in left hand and then eat from hands, Pluck and hold with right hand (PHR) collecting and holding the item in right hand and then eat from hands, Pluck and feeding with right hand (PFR) collecting and feeding the item with right hand , Pluck and feeding with left hand (PFL) collecting and feeding the item with left hand, Both hand (BH) feeding collecting and holding the item in both hands and then eat from hands**,** Bending and Towing methods, when foods are collected directly from the food plant either towing the plant towards them or bending itself towards the food plant. For a leafy food item Golden Langurs pluck the leaf and eats by hand and sometimes they pluck a handful of leaves and put directly to mouth. In cases of small fruits like *Syzygium cumni*, they collect the fruits either with right or left hand one by one with fingers and put them into mouth.

Keywords: Golden Langur, Fragmented habitat, Feeding techniques, Hand use

WC9

DIURNAL ACTIVITY PATTERN OF GOLDEN LANGUR IN TWO DIFFERENT FRAGMENTED HABITATS OF WESTERN ASSAM, INDIA

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Abstract

Activity patterns and time budgets are two important aspects of animal behavior that researchers use to investigate ecological influences on individual behavior. We collected data on activity patterns and time budgets in three groups of Golden langurs (*Trachypithecus geei)* from May 2013 to April in three different fragmented and isolated habitats of Western Assam, India via scan sampling method with 10-min intervals. The diurnal activity pattern of Golden Langurs showed morning and afternoon feeding peaks, with a midday resting peak. Time spent on foraging was highest during evening hours in all seasons which did not vary significantly among seasons but varied across the day. Foraging and resting accounted for 29.60 ± 26.8 % and 43.8 ± 26.3 % respectively. The percent time spent on locomotion, vigilance, grooming and social were 8.66±9.44%, 2.35±4.68%, 5.96±10.34 and 0.24±1.03% respectively. Forging and resting were the most frequently observed behaviour of Golden Langur. Among the different behaviours, parental care constituted 5.32 ±12.00% in the overall observation. The percent time spent on different activities in different habitats and seasons showed that the percent time spent on foraging was highest during wet season in Semi evergreen (47.58±23.81%), wet season in Moist deciduous forest (MDF) (40.44 ± 26.45%) and dry season in monotonous (30.24 ± 38.2%). Their time budgets showed significant variation throughout the day. Correlations between time budgets and activity with food availability clearly indicated that Golden Langurs might adopt to cope with the habitat when area and preferred foods were scarce in the prevailing habitat.

Keywords: Activity patterns. Golden langur, habitat, time budgets

WC10

EVALUATION OF PREY SELECTION OF BARN OWL IN VARIOUS PARTS OF TAMIL NADU, SOUTHERN INDIA

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Abstract

Barn owl is nocturnal raptor which is one of the major biological control agents against rodents pests in agricultural ecosystems. The major rodent species were the lesser bandicoot rat *Bandicota bengalensis*, the soft-furred field rat *Millardia meltada*, the Indian field mouse *Mus booduga*, the Indian gerbil *Tatera indica*, the house rat *Rattus rattus*, and the field mouse *Mus booduga* from different districts. The Barn Owl found to consume these rodent pests and also the grey musk shrew *Suncus murinus* to a greater extent. We evaluated the prey selection of Barn Owl in different districts of Tamil Nadu where the agricultural operations were intense. *Suncus murinus* was the dominant prey species in all districts except Nagapattinam. In Kanchipuram and Thirvannamalai districts, the percentage of *Suncus murinus* was more than 60%. In Thanjavaur and Thiruvarur districts, the percentage of *Suncus murinus* was almost similar to *Bandicota bengalensis* and *Millardia meltada* respectively. The rodent pest species composition was highest in the districts of Nagapattinam (55.4%), followed by Trichy (49.8%), Thruvarur (42.6%), Thanjavur (41.9%), Kanchipuram (24.5%), Thiruvannamalai (24.2%) and Vilupuram (23.3%). Apart from these species, frog was recorded in Kanchipuram districts, birds were seen in all the districts except Kanchipuram and Vilupuram. Bat was recorded in all the districts except Nagapattinam and Vilupuram. Insects were reported in Thanjavur and Thiruvannamalai. The Vilupuram district had highest percentage of unidentified prey species (32.6%) which indicated that there is a possibility for identifying new prey species. Among these rodent pests, the diversity measures indicated that the rodent species diversity in the diet of Barn Owl showed variations. The overall prey species diversity was highest in Nagapattinam (H'=0.5813), followed by Thiruvarur (H'=0.5367), Trichy (H'=0.5231), Thiruvannamalai (H'=0.4211), Thanjavur (H'=0.4102) and Kanchipuram (H'=0.3654). The diversity was lowest in Vilupuram (H'=0.1406). This result indicated that the Barn Owl was

extreme specialist in Vilupuram when compared to other districts. The Barn Owl consistently selected uniform number of prey species in Nagapattinam and Thiruvarur and Thanjavur districts. Although the Barn Owl act as major biological control agent, the changing agricultural practices can cause potential threat to the population of Barn Owl.

Keywords: *Bandicota bengalensis*, *Millardia meltada*, *Mus booduga*, *Tatera indica*, *Rattus rattus*, *Mus booduga Suncus murinus*, Barn Owl, Prey Selection, Agricultural fields

WC11

A STUDY ON THE TAXONOMIC CLASSIFICATION OF AVIFAUNAL DENSITY IN THE GREAT VEDARANYAM SWAMP, POINT CALIMERE WILDLIFE SANCTUARY, SOUTHERN INDIA

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Abstract

We investigated the Taxonomic Classification of Avifaunal Density in the Great Vedaranyam Swamp, Point Calimere Wildlife Sanctuary, Southern India between 2004 and 2006. Classification was used to group the birds by using different orders and families. These aspects would revealed by successive levels such as species, genus, family, order, class indicating the degree of relationship among species and higher level taxonomy. Water bird communities experience seasonal and annual fluctuations in abundance and species composition, on a local as well as on a regional scale. Hence, we assess the population density of waterbird monthly and seasonal variation. The water birds included in different orders were Ciconiiformes, Anseriformes, Pelecaniformes and Charadriiformes and in various families viz., Phoenicopteridae, Threskiornithidae, Ardeidae, Ciconiidae, Anatidae, Pelecanidae and Charadriidae . The taxonomic orders showed significant difference among the years of study and the monthly variations was also significant. The seasonal variations in the population of different orders showed significant difference among the years of study.

Keywords: Taxonomic Classification, Ciconiiformes, Anseriformes, Phoenicopteridae, Threskiornithidae.

WC12

CONSERVATION STATUS OF BIRDS IN EASTERN GHATS OF TAMIL NADU: SIGNIFICANCE OF KEY HABITATS

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Abstract

A study to assess conservation status of birds in Eastern Ghats of Tamil Nadu was carried out in nine administrative districts covering an area of 53, 652 km2. Point Count method was used to analyse the diversity and distribution of birds. The result yielded 271 species from 181 transects, among which 16 were Rare Endemic and Threatened (RET). Geographical range constriction of the South Indian birds was defined as 'rarity' in this study. Malabar parakeets, White-naped Tit and Nilgiri Flycatchers known to be Western Ghats RET endemics were recorded in this landscape, showing their range extension. 35 species of Raptors were recorded, including two Critically Endangered Vulture species and nine Owl species. Yellow-throated Bulbul was recorded from Scrub forests, whereas Nilgiri wood pigeon, Grey-fronted green pigeon, Grey-headed bulbul, Great Hornbill, Crimson-backed sunbird, Rufous babbler, Oriental Dwarf Kingfisher, Grey-headed fish eagle, Lesser Fish Eagle and Spot-billed Eagle Owl were recorded in denser forests like montane and riparian habitats. Given the species richness and boasting large number of RET species, the study evinced two conservation hotspots within the landscape, i.e. Erode and Kolli hills. Habitats that complemented dense forest were the associated open forest and riparian vegetation. Mosaic of habitats in the Eastern Ghats was found to be the major factor attributing to the species richness and density, thereby highlighting the conservation value of the landscape is highlighted. Locales above 1000 m elevation and forests thriving in proximity to Western Ghats have been accorded high conservation value within the Eastern Ghats complex.

Keywords: Eastern Ghats, Conservation status, Habitat, Point count, Endangered and endemic.

WC13

DIVERSITY, DISTRIBUTION AND CONSERVATION STATUS OF HERPETOFAUNA OF THE SHERPALLI- A PROPOSED SITE FOR URANIUM MINING PROJECT AT NALGONDA DISTRICT, TELANGANA STATE, INDIA

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Abstract

In many ecosystems of India the reptiles and amphibians exist with great diversity of habitats and microhabitats such as deserts, grasslands, forests, oceans, hills, agro-ecosystems and even in our houses. Amphibians are widely considered to be useful as indicator species in India. During the present investigation, a total of 58 species, 46 genera and 18 families of herpetofauna were recorded, of which, 45 species were of reptiles, belonging to 33 genera and 14 families. Amphibians observed included 13 species belonging to 12 genera and 5 families. Of the total amphibian species recorded, 13 species (85%) were common, and 2 species (15%) were rare in occurrence. As per the Wildlife Protection Act, 1972, out of 13 species of amphibians 10 species are listed under the least concerned category and remaining species Guntur's toad (*Duttaphrynus hololis*) is listed under Rare category and Skittering frog (*Euphlyctis cyanophlyctis*) in Schedule IV category. Among reptiles, 26 species (58%) were common, 13 species (29%) were uncommon and 6 species (13%) were rare in occurrence in the study area. The status of reptiles under IWPA showed that 2 Species, Indian Rock Python (*Python molurus*) and Red sand boa (*Eryx johnii*) were listed under endangered category. Indian Black turtle

(*Melanochelys trijuga*) was listed under Near Threatened category. Six species were under rare in nature and all other species were least concerned This report indicated that the area is rich and must contain many more species of amphibians and reptiles that would fill gaps in understanding these species diversity and distribution patterns. Awareness programmes are needed in order to make people aware with herpetofaunal communities and their essential role for a balanced ecosystem.

Keywords: *Duttaphrynus hololis, Euphlyctis cyanophlyctis, Python molurus,* Diversity, Distribution

WC14

DIET OF INDIAN EAGLE OWL *BUBO BENGALENSIS* (FRANKLIN, 1831) IN TIRUCHIRAPPALLI DISTRICT, TAMIL NADU

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Abstract

Indian Eagle Owl is one of the world's largest species of Owl. The Indian Eagle owl's diet was studied between March 2016 and January 2017. The Indian Eagle Owl builds terrestrial nests on hill slopes, earth cuttings, rocky outcrops and under bushes, where the surrounding areas, which are its hunting grounds, consisted of agriculture, scrub, grassland, water body, hills and rural habitats. The analysis of 850 regurgitated pellets yielded 1410 prey items. The mean percentage of prey composition of Indian Eagle Owl was to the tune of 24.8 % for *Millardia meltada*, 15.1 % for *Bandicota bengalensis*, 14.2 % for unidentified rodent species, 5.2 % for *Mus booduga*, 0.9 % for *Tatera indica* and *Rattus rattus*. The diet constitute 61.7 % of rodent prey and remaining 38.2 % for Insects, Birds, Bats and Reptiles. Of the 38.2% of prey, the owl ingested insects, *Suncus murinus*, Birds, Bats and other species to the tune of 24.4%, 4.2%, 2.4%, 0.7% and 6.2%, respectively. The observed mean prey items/pellet was 1.65 for the study period. Indian Eagle Owl consumed more than one prey/day. The results of the present study indicated that the Indian Eagle owl are potential hunters of both rodent and insect pests of agricultural importance.

Keywords: Indian Eagle Owl, Pellet analysis, *Bandicota bengalensis*

WC15

POPULATION STUDY OF GREY JUNGLEFOWL (*GALLUS SONNERATTI*) IN THE KETTI VALLEY OF NILGIRI HILLS, WESTERN GHATS OF SOUTH INDIA

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Abstract

The overall population of Grey Junglefowl in the study area was obtained a total of 449 individuals throughout the study period. The sex ratio in the study area was 2.25:1 [Male=304 (67.7%) and female=135 (30.07%)]. The Encounter Rate was 1.70/km walked (n=449; 1.70±2.41). The overall population of Male individuals (Cock) in the study area was 304 and the Encounter Rate was 1.15/km walked (n=304; 1.15±5.57). The overall population of Female individuals (Hen) in the study area was 135 and the Encounter Rate was 0.51/km walked (n=135; 0.51±2.78). The population of Chick in the study area was 10 individuals only and the Encounter Rate was 0.04/km walked (n=10; 0.04±0.37).The Grey Junglefowl population was high (2/km walked; 2±9.59) in the summer season when compared to other seasons (winter 1.37/km walked; 1.37±6.49 and Rainy 2.21/km walked; 2.21±10.53).

In the winter season, there were observed 132 individuals Grey Junglefowl were recorded and the Encounter Rate was 1.37/km walked during the study period (n=132; 1.37±6.49). In the winter season, the male population was 98 (1.02/km walked; 1.02±4.88), the female population 31 (0.32/km walked; 0.32±1.66) and the chick population was observed 3 (0.03/km walked; 0.03±0.3). During the summer season, a total of 192 individuals of Grey Junglefowl were recorded and the Encounter Rate was 1.37/km walked during the study period (n=192; 1.37±6.49). In summer season, the male population was 123 (1.28/Km; 1.28±6.03), the female population 64 (0.67/km walked; 0.67±3.4) and the chick population was observed 5 (0.05/km walked; 0.05±0.51). A total of 106 individuals of Grey Junglefowl were recorded and the Encounter Rate was 2.21/km walked during the rainy season (2.21±10.53).

Key words: Grey jungle fowl, Population, Ketti Valley, Nilgiris

WC16

AVIAN DIVERSITY AND ITS ABUNDANCE IN THE KETHI VALLEY AREAS, THE NILGIRIS, WESTERN GHATS

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Abstract

A total of 41 bird species were had in all the transects during the study period. Of these, the maximum number of sighting [n=2964 and Mean=19.76±14.71] were obtained for House sparrow (*Passer domestics*) and the lowest number of sightings [n=3; Mean=0.02±0.18] were had for the Greater coucal (*Centrops sinensis*). A total of 150 samplings observations were observed throughout the study period. In which, a total of 10332 individuals for different kind of avian species were obtained. A total of 41species it consisting of 12 orders and 28 families, were recorded. Out of 41 species, the highest Encounter Rate (ER) was for House Sparrow (*Passer domesticus*) (ER= 19.76 / Km walked) and the lowest ER was for Greater coucal (*Centropus sinensis*) (ER= 0.02 / Km walked) obtained. The Shannon index of alpha diversity of avifaunal group in the Study Area was -1.8425.

Keywords: Avian diversity Nilgiris ketti, Western ghats

WC17

ABUNDANCE AND DISTRIBUTION OF INDIAN PEAFOWL *PAVO CRISTATUS* IN THE MEGHAMALAI FORESTS, TAMIL NADU, WESTERN GHATS OF SOUTHERN INDIA

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Abstract

To find out the Indian Peafowls abundance its distribution in the Meghmalai forest was carried out during the period of 2012 to 2013. The distribution of Indian Peafowl was obtained in all the habitats in the study area with the wide range of altitude (330-950m). The sightings of Indian Peafowls were recorded in all the eighteen transects as well as four different seasons in Meghamalai forests. This study area consisting of five different habitats namely southern dry deciduous scrub forest (SDSF), southern dry mixed deciduous forest(SDMDF), southern moist mixed deciduous forest (SMMDF), southern sub-tropical hill forest (SSTHF) and miscellaneous and plantation forests (MISC+PL). The Indian Peafowl densities in the study area, ranged widely from 9.06/km^2 (95% CI=6.56-15.17). The highest density was recorded in the Summer season 10.13/km^2 (95% CI=14.98-43.38) and the lowest density was obtained in the Post-monsoon season 9.06/km^2.

Keywords: Indian Peafowl, Population, Meghamalai, Western Ghats

WC18

NEST-SITE SELECTION AND NEST – MORPHOMETRY OF THE BAYA WEAVER (*PLOCEUS PHILIPPINUS*)IN TAMIL NADU, SOUTH INDIA

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Abstract

The Baya Weaver *Ploceus philippinus*, for its complex, retort-shaped, dangling nest, woven with strips of grass, palm and coconut leaves, is familiar throughout the Indian sub-continent. The nest-site selection of the Baya Weaver was studied in and around 13 km surroundings of Reddiyarpatti in Tiruchirapalli District, Tamil Nadu, India between August 2016 and January 2017. Various nest characteristic features between occupied nests (n=13) and unoccupied nest trees (n=16) were measured and it indicated that occupied nests had higher length, width and circumferences than that of unoccupied nests. Study sites had more number of complete nests (80%) than that of incomplete nests (20%). Different kinds of nest knots like alphabetical, numerical and standards were also observed in the nests. The nest characteristics assessed in the present study are in accordance with the available published literature in India. Additionally, nest site selection of Baya Weaver was studied and most of the nests woven were observed either in the trees nearer to well with water and well surrounded by vegetations. Among 17 species of plants,*Cocousnucifera* and *Borassus flabellifer* had the highest number of nest than other plant species. Total number of nests had positive correlation with well length, width and depth. However, this could not be proved statistically due to fewer sample size. Availability of potential habitats such as coconut trees, food plants and water sources were closer to the nesting trees which may be the deciding factors of nest site selection of Baya Weaver. Hence, more observation on the nests and nest sites' attributes are required to identify the principle factors that influence on the nest sites of Baya Weaver.

Keywords: Baya Weaver, Nest, Nest-site, Well length, Knots

WC19

PELLET ANALYSIS OF SELECTED INSECTIVOROUS BIRDS LIKE BLACK DRONGO (*DICRURUS MACROCERCUS*) AND INDIAN ROLLER (*CORACIAS BENGHALENSIS*)

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Abstract

The food habits of Black Drongo and Indian Roller were determined through the analysis of their regurgitated pellets. The pellets were collected on their nesting and roosting sites from three different habits viz., Agricultural lands, river banks and social forests. The morphometry of pellets of Black Drongo had a mean length of 1.84 cm width of 0.76 cm and weight of 0.24 gm. The overall mean prey number in the pellet was 15.91 ± 6.17. Of them coeleopteran beetles (22.94%) were predominant prey remains followed by other insect order. The morphometry of pellets of Indian roller pellets showed 2.63 cm in length, 1.18cm in width and o.36gm in weight. The coleopterans were the most abundant insects which constituted 23.6% the mean number of prey pellet was 18.63±7.31. The beneficial role of these birds as biological control agents against pests of agro-ecosystem as such, the beneficial effects of the thriving position of these birds in the vicinity of agro-ecosystems convey to a fine focus and should be encouraged as an ideal measure of pest control.

Keywords: Black Drongo, Indian Roller, Morphometry, Pellet, Coeleoptera

WC20

WETLAND BIRDS DIVERSITY IN PIRANCHERRY TANK AND ASSOCIATED AGRICULTURAL WETLANDS, TIRUNELVELI, TAMIL NADU

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Abstract

Wetlands are one among the most important and productive ecosystems of the world, occupying about 6% of the earth's surface and were described as "kidney of the landscape" as they function as the downstream receivers of water and waste from both natural and human resources. Birds as best indicators of wetland function or as measures of success in wetland management, restoration and creation. In this study wetland birds diversity study in Pirancherry tank and associated agricultural wetlands, Tirunelveli, Tamil Nadu were conducted during November to April 2015. The study reveals the occurrence of 41 species of birds belonging to 15 families and 9 orders Among the 9 order Ciconniiformes dominated the list with 10 species followed by Charadriiformes with 8 species. Pelicaniformes with 5 species, Anseriformes and Passeriformes with 4 species, Gruciiformes, Suliformes, and Coraciiformes with 3 species, Podicipediformes with 1 species, Out of 41 species, 19 were resident, 2 were migratory and 20 were resident migrant. This study clearly represents that the Pirancherry tank and associated agricultural wetlands, too support a great diversity of migratory and residential birds and these sites will be protected for the birds.

Keywords: Bird diversity, Wetland, Pirancherry tank, Migratory bird and conservation.

WC21

ROOSTING BEHAVIOUR OF PEAFOWLS (*PAVO CRISTATUS*) IN TIRUVANNAMALAI, TAMIL NADU, SOUTHERN INDIA

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Abstract

The Indian Peafowl (*Pavo cristatus*) has been expanding its range widely in recent days and particularly establishing its population in human habitations and urban areas in various parts of Tamil Nadu, Southern India. We investigate the roosting behavior of Peafowls in Tiruvannamalai, the area where there are many holy ashramams, temples, buildings with woodlands. It was observed that peafowls used eight different tree species and the roof of the buildings and building towers for roosting. The Peafowls used tress species namely *Madhuca indica, Ficus religiosa,Terminalia catappa, Polyalthia longifolia, Couroupite guianesis, Asadiracta indica, Mangifera indica* and *Cocos nucifera*. The number of individuals roosting in a roosting tree ranged from 1 to 5 individuals of Peafowls. Among the roosting trees 60% of the trees had up to three individuals and the remaining 40% trees had more than three individuals per tree. To investigate the significance of the roosting trees, the adjacent non roosting trees were also selected for characteristics measurements. The tree and habitat characteristics viz., tree height, diameter at breast height (dbh), circumference, number of primary branches, pacing distance of canopy spread, height of the first primary branch and habitat variables such as distance to human habitation, water bodies, groves, and garden around the trees between roosting and non-roosting were compared. The roosting trees were bigger than non-roosting trees and had a tree height of 95.0 ±12.7 ft, diameter at breast height of 61.5±36.29 cm, circumference of 215.0± 68.5 cm and the number of primary branches of 4.9 ± 3.2, and the canopy spread of 13.4 ± 9.3 cm. Among these variables, the tree height, and height of primary branch, diameter at breast height, and circumference were significantly higher in the roosting trees. It has been reported in several areas that the expanding Peafowl population causing numerous conflict with human in various agricultural ecosystems. The results of this study can be devised as management measures to prevent the conflict of Peafowls in agricultural ecosystems.

Keywords: Peafowl, Roosting, Behaviour, Non-roosting tree, Tree characteristics

WC22

DIVERSITY OF MIGRATORY SHOREBIRDS UNDER THE INFLUENCE OF THE SALTPANS IN KODIKKARAI, TAMIL NADU, INDIA- A CASE STUDY

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Abstract

Saltpans are one of the significant foraging grounds for the migratory shorebirds during migration. The study was carried out during 2012-2015 at Kodikkarai saltpans. The selected saltpans were categorized into hypersaline saltpans and seasonal saltpans on the basis of the concentration of salinity in the water. The salinity was measured in both the saltpans. Birds were counted by total count method by using 7 × 50 binocular and 20 x 60 spotting scope from vantage points of the saltpans. The bird density, diversity and richness were relatively higher in the seasonal saltpans than the hypersaline saltpans. Totally 21 species of migratory shorebirds were recorded and among which the Little Stint showed the higher density than the other species recorded. Among the three years, the year 2014-15 showed higher bird density than the remaining years. The present study highlights that the density of bird are influenced by the nature of the water quality and pond type.

Keywords: Saltpans, Seasonal saltpans and Hypersaline saltpans, Migratory shorebirds, Salinity, Conservation.

WC23

CHECKLIST OF AVIFAUNAL DIVERSITY IN THE WATER BODIES OF KOTTUCHERY MEDU, KARAIKAL DISTRICT, PUDUCHERRY UNION TERRETORY, SOUTHERN INDIA

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Abstract

The present study was carried out to measure avifaunal diversity at Kottucherry medu village, Karaikal district, from December 2012 to March 2013. Totally, 1,314 individual birds belonging to 8 orders and 11 families were recorded during the study period. The recorded individuals are Among the 10 orders Ciconiiformes (6) were high in number followed by Charadiiformes (5), Coraciiformes(3), Passeriformes (3), Columbiformes (2), Falconiformes(2). The order Galliformes, Gruiformes and Pelecaniiformes represent with one individual. Among the 11 families Ardeidae (Indian Pond Heron, Large Egret, Cattle Egret, Purple Heron), Alcedinidae (White -breasted Kingfisher, Lesser Paid Kingfisher, Small Blue Kingfisher) were recorded. The family Columbidae (Blue Rock Pigeon, Spotted Dove), Accipitridae (Brahminy Kite, Black Kite), Charadiidae (Red walted Lapwing, Little ringed Plover), Hirundinidae (Asian Openbill Storks, Wire tailed Swallow), Scolopacidae (Common Sand Piper, Jack Snipe), Sturnidae (Common Myna, Little Turn) were also recorded in the study area. The family Phalacrocoracidae (Little Cormorant), Estrildidae (White Throated Munia) and Turnicidae (Common Buttonquil) are present in the study area during the study period. In the current investigation, a total of 12 species of water birds and 3 species of water associated birds were also recorded. Among the water birds Ciconiiformes are highest in number. According to their foraging behaviour the birds are divided into four groups. The Piscivores contribute 48% followed by insectivores 35%, Granivore 9% and Carnivore 8%. In the study area most of the terrestrial and water associated birds are resident to the study area. But most of the water birds are local migrant and migrant.

Keywords: Diversity, Avifauna, Kottucherry Medu, Terrestrial, Water birds

WC24

ON ECOLOGICAL STATUS OF INDIAN BRIDAL SNAKE DRYOCALAMUS NYMPHA (DAUDIN, 1803) IN TAMIL NADU AND PUDUCHERRY

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Abstract

We update the present status and distribution of Indian Bridal Snake (*Dryocalamus nympha*) in Tamil Nadu and Union Territory of Puducherry based on a literature review and a personal observation (2012-2016) in an agricultural landscape where cropping is the dominant farming practice, which provided further details into its natural history. Colouration of breeding pair and distribution record is differing from existing descriptions in literature. Erroneous identification and publication of this species are provided here. Pioneer descriptions of its breeding biology indicate that a better sampling of this species would give more detail on its natural history.

Keywords: *D. nympha*, Distribution, Breeding, Misidentification

WC25

THE CHECK LIST OF AMPHIBIAN FAUNA IN THE CAUVERY DELTA AREAS OF TAMIL NADU, INDIA

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Abstract

The study was carried out in the Cauvery delta areas of selected village ponds of Nagapattinam, Thiruvarur and Thanjavur districts. Amphibians are considered as "Environmental sponges" because of their semi-permeable skin allows environmental toxins. In India, 342 species of amphibians are classified, in which 161 are still under the data deficient category which indicates the need of elaborative, systematic and coordinated efforts for estimating the population and delimiting the distribution of species. The faunal diversity of amphibian in Tamil Nadu includes 76 species in which 23 species of amphibians include Schedule IV reported by Tamil Nadu Forest Department on 16.1.2012. A total of 12 amphibian species were recorded from 31 village ponds during the study period. About 6 species of *Euphlyctis cyanophlyctis, Euphlyctis hexadactylus*, *Hoplobatrachus tigerinus*, *Hoplobatrachus crassus, Fejervarya limnocharis and Sphaerotheca breviceps* were belonging to the family Dicroglosidae whereas only three species of *M. ornata, M. rubra* and *R varigata* were belonging to the family Microhylidae and toads of terrestrial species *D. melanostictus* and *D. scaber* were observed from the family Bufonidae. The only one arboreal species *P. maculates* also encountered which belonging to the family Rhacophoridae. Regarding amphibian diversity, about 12 species were reported from Nagapattinam, 11 species from Thiruvarur and only 10 species from Thanjavur districts.

Keywords: Amphibia, Nagapattinam, Thiruvarur and Thanjavur Districts and village ponds

WC26

HERPETOFAUNAL DIVERSITY OF EASTERN DISTRICTS OF NAGALAND, INDIA

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Abstract

Nagaland is a portion of the Indo-Himalayan Zoogeographic region, which borders the species rich Indian and Indochinese Zoogeographical Sub-regions. A report by the Zoological Survey of India, Kolkata showed the occurrence of 700 species of vertebrates, 704 insects including 490 butterflies (Lepidopterans) and 110 other invertebrate species from the state. The present investigation was carried out using direct observation, road cursing, specimens received from FCC, market survey, households and photo-documentation. The results provided herein are no way exhaustive, but are indicative of current diversity of herpetofauna studied in the Eastern districts of Nagaland. A total of 57 species herpetofauna belonging to 16 families were recorded during 2007-2010. Totally, seven species of amphibians belonging to four families were recorded; three species of Rhacophoridae, two Bufonidae, one Hylidae (*Hyla annectens*) and one species of Ranidae (*Euphlyctis sp.*). *Euphlyctus* sp. is commonly sold in the markets of 227 Eastern Nagaland. Frogs are either hand collected or collected using fishing net. The unsold frogs in the markets are dried and kept for future consumption. The present study also assessed the occurrence of 50 reptiles (4 turtles, 14 lizards, 32 snakes) belonging to 12 families. Among 32 snake species, 10 were venomous and among the snake family, Colubridae contributed the maximum species (20 species). Most of the illiterate Naga tribes found

to be killing snakes by believing that they are venomous. However, they do consume larger snakes like Rat Snakes and Burmese python occasionally. Some villagers consider the sighting of Mountain pit Viper (*Ovophis monticola*) as bad omen and most common snake bites reported are by this species of Pit Vipers. Many species of turtles and tortoises encountered are consumed by the tribes. As the tribes known for poaching wide varieties of animals and plants, the conservation measure including creating awareness and people's participation need to be initiated for the betterment of people and wildlife.

Keywords: Herpetofauna, Diversity, Eastern District, Nagaland, Direct observation

WC27

STATUS OF RAPTORS IN BEJJUR RESERVED FORESTS, TELANGANA, EASTERN GHATS

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Abstract

Birds of Prey contributed to their specialized ecological role as meat-eaters, at the top of the food pyramid and thus held as one of the most charismatic groups of birds. Birds of prey, which is commonly known as Raptors, are found all over the world and in all habitats. Vultures, a group of raptors, scavenging on dead and decaying animal carcasses, keeping the environment clean and healthy. Since, raptors are also known to indicate the health of forest ecosystem, a documentation on the status of raptors in all the forest divisions of India is a basic requirement. This study was carried out to document the status of raptors in Beijur Reserve Forest of Telangana state in Eastern Ghats. Based on preliminary survey between November 2016 and January 2017, covering different habitats systematically, and using binoculars and spotlight raptor species encountered were recorded. Over the three months period, the study has identified 22 species of raptors belonging to five families and three orders. Out five families and three orders, Accipitridae family (12 spp.) and Accipitriformes (13 spp.) order had the highest number of species. Among the 22 species identified in the study area, two species viz., Indian Long-billed Vulture (*Gyps indicus*) and Egyptian Vulture (*Neophron percnopterus*) are the critically endangered and endangered species respectively as per IUCN Red List. Of the two endangered species, long-billed vulture has a small population (~35 individuals including immature), but the Egyptian vulture recorded only twice, with one individual on each occasion. Although the long-billed vulture population is small, has been observed to breed since 2015 and an average six chicks hatches out per year. Use of pesticide in the adjoining agricultural areas especially rodenticide could be a major threat to raptors that feeds on rodents, as raptors from the Reserve Forest also depend on food from neighboring agricultural areas. Similarly, lack of carcass

availability owing to more efficient farm management in rural areas or more efficient carcass disposal systems and modernized slaughterhouses resulting in inadequate food supply for the raptorial birds. Anti-inflammatory drug viz., Diclofenac may also be having its own impact on the raptor population and breeding. A detailed toxicology investigation and long-term ecological surveillance is warranted for the conservation raptors in this area.

Keywords: Beijur Reserve Forest, Eastern Ghats, Egyptian Vulture, Indian Long-billed Vulture and Raptors.

WC28

WATERBIRDS OF KOOTHAIPPAR WETLANDS, TRICHY

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Abstract

Habitat and seasonal influence on the water birds of Tiruchirappalli district were studied, giving emphasis on Koothaippar wetland lake ecosystem from October 2009 – August 2011 covering four seasons, *viz*., Pre-monsoon (August and September), Monsoon (October - December) Post-monsoon (January - March) and Summer (April -July) of the respective years. Significant species - wise and overall variations in the population size of (as highest counts in a month and region) water birds belonging to different ecological groups were recorded in two regions of the lake during different months of the year 2009 – 2011. Population fluctuations (both in individual number and in the distribution of different species) were observed for all the birds recorded in two regions of the lake and these fluctuations were significantly differs due to the variations in the atmospheric and water temperature. Totally 30 species of water birds were recorded during the study period and of the 30 species, 4 species were divers, 14 species were large waders, 6 species were swimming birds, 4 species were small waders and 2 species were aerial foragers. Population of all the water birds visiting this lake was found to fluctuate with regard to months, years and regions of the lake during the study period. Region I, Which attracts more number of swimming birds, is of open, shallow water area when compared to region II, which is of deep water area. Species composition in region I is from small waders in the margins and swimming birds in the deep open water area. Region II attracts more of long legged waders when compared to region I. This may be due to the preference of prey types and preference by these birds based on the reachability of prey. Variations in the surface water and atmospheric temperature were assessed and they significantly vary with regard to different months of the year during the study period.

Keywords: Koothaippar wetland ecosystem, population fluctuation, ecological group, atmospheric and water temperature.

WC29

EFFECT OF MANAGEMENT SYSTEM ON DISEASES PREVALENCE, HEALTH CONDITION AND VETERINARY CARE AMONG ASIAN ELEPHANTS (ELEPHAS MAXIMUS) IN TAMIL NADU, INDIA

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Abstract

Asian elephants, despite having a long history of captivity, globally suffering with wide range of welfare problems. While maintenance of wild animals in captivity is fraught with numerous challenges, including the control of disease, a systematic documentation on various diseases, health condition and veterinary care are vital for effective the management of animals in captivity. This study evaluated the diseases prevalence, health condition and veterinary care among 144 Asian elephants managed under three captive systems—Hindu temple, private and forest department—in Tamil Nadu, India between 2003 and 2010. Through rapid surveys, occurrence of diseases prevalence, health condition and veterinary care were obtained by direct observations on each elephant, from register of records maintained at each facility and through inquiry with mahouts and veterinary experts concerned. Data on disease records showed that among the three systems, a higher occurrence of foot rot, stereotypies and arthritis was found among elephants managed in temple, followed by private system and least or absent in the forest department system. On the other hand, eye problems and parasitic prevalence were more among forest department elephants than those in temple and private systems. The growth curve obtained from the shoulder height records of various age class showed that the private elephants attained a lower asymptotic shoulder height (241 cm), compared to those in forest department (243 cm) and temple system (251 cm). Similarly, the growth curve obtained based on body weight records showed that asymptotic body weight was far higher among temple elephants (3890 kg) than private (3199 kg) and forest department elephants (3104 kg). The relatively higher height

and weight recorded among temple elephants as compared to those in the forest department and private systems attributed to lack of physical exercise in temple elephants. Health condition assessed by rating method based on visual observation on various body parts revealed that the proportion of elephants with poor health condition was highest in the private facility (24%) followed by temples (16%) and lowest in the forest department (6%). Data on veterinary care revealed that all elephants in the forest department system received regular veterinary care, while only 75% of elephants in temple and 25% of elephants in private systems had periodic medical checkup.

Keywords: Captive Asian Elephants, Diseases, Health Condition, Veterinary care

WC30

A MASSIVE ROOSTING OF WATERBIRDS ON A 100 YEAR OLD HERITAGE BANYAN TREE IN COIMBATORE: URBAN ECOLOGY

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Abstract

Tamil Nadu Agriculture University (TNAU) is very well known for its green cover that spread across hundreds of hectares and provides safe shelter to number of wildlife in the Coimbatore city. As this green area is surrounded by fast growing urban landscapes, this assumes significant importance in the conservation of biodiversity in urban areas. Large numbers of colonial waterbirds have been roosting on the Banyan tree (*Ficus benghalensis*), which is situated near sericulture department at TNAU. This tree is known to be one of the oldest trees in the campus and more or less has crossed >100 years. Over the last few years, the tree has been witnessing massive congregation of colonial water birds throughout the year except for few months (July to October). I observed the roosting behaviour of colonial waterbirds for the two seasons during Jan 2013- Dec 2014. Using total count method, all the birds in roosting tree were counted. Morning and evening roost counts were done on weekly basis between Novembers to April months. About eight species of colonial water birds have been identified roosting at this banyan tree *viz*., Little Egret *Egretta garzetta,* Intermediate Egret *Mesophoyx intermedia,* Great Egret *Casmerodius albus*, Indian Pond Heron *Ardeola grayii*, Cattle Egret *Bubulcus ibis,* Oriental White Ibis *Threskiornis melanocephalus,* Purple heron *Ardea purpurea and* Grey heron *Ardea cinerea*. As many as 3570 individuals of water birds were counted, in 2014 which includes the prominent species Cattle Egret (1800 individuals), Little Egret (1300 individuals) and Oriental White Ibis (60 individuals). This massive bird congregation definitely excites the nature lovers and birdwatchers and common man as well. Colonial waterbirds used this site for roosting purpose only, while breeding seems to be occurring at some other sites, because these birds were not present during breeding months (July to October). Roosting places was surrounded by the

presence of interconnected wetlands/waterbodies. Apart from the existing wetlands near paddy breeding station at TNAU, many other interconnected water bodies were identified and mapped around the roosting site which includes Narsampathi Lake, Krishnampathi Lake, Selvampathi Lake and Kumaraswamy Lake. These were the potential foraging habitat for these birds. The dropping of the birds are rich in nutrients like nitrogen, phosphorous, potassium and other micronutrients, which assumes importance from the agriculture and conservation point of view as well.

Keywords: Waterbirds, Banyan tree, Roosting, Lake, Urban Ecology, Conservation

WC31

OCCURRENCE OF INLAND FISHES OF DIGBOI REGION, ASSAM, INDIA

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Abstract

India is known for its rich indigenous fishery resources with great biodiversity. The poor inland fishers and rural community depended for their livelihood and food security on these indigenous species. India has vast inland fishery resources in the form of rivers and canals (195210 km),reservoirs (2-94 million ha), tanks and ponds (2.41 million ha), floodplain, lakes and derelict waters (0.79 million ha), offering tremendous scope for fish production. But the developments in composite fish culture in the past few decades has shifted the importance more towards producing Indian major carps and selected exotic carps. Simultaneously, the degradation of different water bodies due to various reasons viz. habitat loss, pollution and anthropogenic pressures had affected the biodiversity, the quality and quantity of fishes obtained from these water bodies. Considering the extent to which small indigenous species of freshwater fish play a role in providing nutrition to the rural poor and in maintaining biodiversity, it is important to have an assessment of inland fishery resources and promoting sustainable use of small indigenous species. There are about 3.91 lakh hectare of water area in Assam in the form of rivers, beel, derelict water bodies and ponds and tanks producing 415 thousand tonnes of fishes. Scientific fish farming in the State, in natural water bodies has been mostly traditional capture fishery only. The present study gives an idea about the presence of air-breathing fishes and non-air breathing in different water bodies of Digboi region, Assam during the month of November 2016 to January 2017. Fishes were randomly collected from 3 different rivers and ponds by cast net fishing. They were identified on the spot and were classified as air- breathing and non air-breathing species. Further they were classified upto the family level, their IUCN status, their food and mode of feeding were identified. The study revealed the occurrence of 19 species belonging to 12 families. Among the families, Cyprinidae has the highest number of species (5) followed by Channidae (4). The remaining families were represented by one species each. Among the 19 species observed, 13 species (68%) were bottom feeders, 11 species (57%) were non- amphibious. Diversity indices viz. Shannon Weiner, Simpsons index and the species richness varied across the habitats.

Keywords: Inland fisheries, indigenous, non-amphibious

WC32

A SURVEY ON AVIAN DIVERSITY IN RAJAH SERFOJI GOVERNMENT COLLEGE CAMPUS, THANJAVUR, TAMILNADU

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Abstract

Biodiversity is a complex term which incorporates ecosystem diversity, species diversity, genetic diversity and natural processes. Birds biodiversity, is an important part of the ecosystem playing various roles as scavengers, pollinators, predators of insect pest etc. They are also the bio-indicators of different kinds of environment. They are one of the best indicators of ecosystem and are sensitive indicators of pollution problems and function as early warning system. Based on the above information, the present investigation aims to study the biodiversity of birds in Rajah Serfoji Government College campus. The present study is focused not only on the biodiversity of birds. In addition, this work aims at providing the basic information of the avifauna for further studies related to campus biodiversity. The data collected from Rajah Serfoji Government College campus is based on the field observation carried out during October 2012 to February 2013. A daily survey was done by systematically walking on the mixed routes through the study area. Field characteristics and the number of birds were counted and noted on data sheets. The identification of birds was done using field guides. The data collected are used for mean index and dominance index. In the present study, the bird community structure of Rajah Serfoji Government College, Thanjavur revealed 23 species of birds belonging to 19 families were identified. Mean index was calculated, coppersmith barbet birds are present in the large number during in the month of November and December, followed by the red vented bulbul and common myna. In the month of January, the number of coppersmith barbet birds was stable, whereas common myna number increase and the red vented bulbul number decrease. In the month of February common

myna was dominated the coppersmith barbet and red vented bulbul. Dominance indices of the bird community indicated that the coppersmith barbet is dominant bird in the college campus followed by the common myna and red vented bulbul. Hence, present study concluded that the college landscape selectively logged area support proportionally high density of birds. Furthermore, studies were needed in view of climatic, habit and habitat present in college campus which is supporting the birds diversity.

Keywords: Birds diversity, mean index, dominance index, coppersmith barbet birds and red vented bulbul

PLANTS

WP1

ETHNOBOTANICAL STUDIES IN A PART OF KOLLI HILLS, NAMAKKAL DISTRICT, TAMIL NADU, SOUTHERN INDIA.

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Abstract

The apparent reversal of trend from western to herbal medicine is partly due to the fact that synthetic drugs have always shown adverse reactions and other undesirable side effects. This has led to the belief that natural products are safe because they are more harmonious with biological systems. These plant species are regarded as precious and highly valued. Considering the rate at which the vegetation is getting depleted in this part of the world, there is the need to document the precious knowledge of these plants as well as the experience of the traditional healers and herbalists. The study was aimed at list out the Ethnobotanical plants in Kolli Hills, Namakkal district, Tamilnadu. The study area mostly depended on these plants rather than allopathic treatments Information on the names of plants, used parts and cure disease were obtained from traditional medical practitioners, herbalist, and rural dwellers, using questionnaire. A totally fifty herbal plants of 33 families were found to be used locally for treating various diseases including diabetes, mental disorders, tumors, malarial fever, rheumatic fever, paralysis, skin diseases, asthma, blood vomiting, allergy, snake bite, anaemia, dog bite poison, nervous disorders, cardio tonic, kidney problem, snake venom, anti inflammation, tooth ache, blood purifier, hair growth, improve memory power, joint pain, headache, antifertility, jaundice and piles with the help of the herbalist. In this survey the following plant parts such as leaves, bark, fruits, seeds, milk and root were used for medicinal purposes. The present investigation revealed that medicinal plants still play a vital role in the primary health care of the people. The information gathered from the tribal is useful for further researchers in the field of ethnobotany and taxonomy.

Keywords: Kolli Hills, Ethnobotanical, Diabetes, Antifertility, Paralysis and asthma.

WP2

A REVIEW ON STATUS, CONSERVATION AND ACTIVE COMPOUNDS OF MEDICINAL PLANTS USED FOR CANCER TREATMENT IN THE WESTERN GHATS, SOUTHERN INDIA

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Abstract

Cancer is the second leading cause of death worldwide. Great advancements have been made in the treatment and control of cancer progression. But, a number of undesired side effects sometimes occur during chemotherapy. Natural therapies, such as the use of plant-derived products are good alternative medicine for cancer treatment and they may reduce adverse side effects. The Western Ghats is one of the major repositories of medicinal plants. This review will focus on the status and conservation of anticancer activity plants in Western Ghats and their active anticancer chemical compounds.

Totally, 100 herbal plants of 48 families were reported as anticancer plants. Among the families, Caesalpiniacea include many anticancer activity plants (8 species), followed by Fabaceae (7 species), Euphorbiaceae (6 species) and all the other remaining families included ≤5 species. With regard to anticancer activity bioactive compounds, Rutaceae possessed highest bioactive compounds (82) followed by lamiaceae family possessed 60 bioactive compounds. Among the 100 anticancer plants of the present review, *Hemidemus indicus* from Periplocaceae was reported as endangered category and *Cinnamomum verum*, *Hydnocarpus pentandra, Aegle marmelos* as vulnerable category. Conservation status of remaining all other reported anticancer plants was not reported. This association of medicinal plants and cancer needs further research and experimentation in order to develop and design anticancer drugs. However, several species are feared to be threatened, while the population size of some species is severely reduced and in certain cases the availability of the produce has become scarce. Therefore, appropriate conservation strategies have to be implemented immediately to protect the fragile habitats of many such medicinal plants. From the present review it is suggested that 3 different approaches *viz*, sustainable wild harvest, *in-situ* conservation and encourage the production in private plots to conserve and produce medicinal plants threatened in Western Ghats.

Keywords: Anticancer activity; Medicinal Plants; Conservation.

WP3

NEW SPECIES OF MELIOLALES, KODAIKANAL HILLS, TAMIL NADU, INDIA

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Abstract

Meliolales is one of the order in the fungal species. These are mostly tropical in distribution. The species in this family are biotrophic on the leaves and stems of plants. Nevertheless most of the species do not cause extensive damage to the host plant, which is one of the significant characteristics features of the species. The study was conducted at Kodaikanal Hills, Tamil Nadu, India during 2007-2009. Totally 44 species were recorded during the study, in which *Meliola euonymi* is the first time record in India. Besides *Asteridiella solani* var.*kodaikalensis* and *Meliola daviesii* var. *kodaikalensis* have been recorded as new varieties. Apart from this *Meliola cyperacearum*, *Meliola hoveniae*, *Meliola luculiae* and *Meliola thiyagesanii* were new to taxonomic world. The study revealed that the Kodikanal Hills are the vital habitat for many known and unknown fungal species.

Keywords: Taxonomy, plants, fungi, Meliolales, conservation

WP4

A REVIEW ON THE TRADITIONAL HERBAL MEDICINES FOR DIABETES MELLITUS AND THE NEED FOR CONSERVATION IN THE EASTERN GHATS, SOUTHERN INDIA

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Abstract

In India, as in many developing countries, most diabetic patients use medicinal plants as folk medicine to treat diabetes. In the indigenous Indian system of medicine good numbers of plants were mentioned for the cure of diabetes and some of them have been experimentally evaluated and active principle were isolated. Their therapeutic significance is well studied and discussed. However, their significance as an integral element of the biodiversity is being realized in the forestry sector lately, as it is brought to light that about 85% of known and recorded medicinal plant diversity of the country is captured in forests and wild habitats. Further, demand for herbal medicines has led to significant changes in traditional patterns of medicinal plant harvesting has placed some species under threat. These plant species are regarded as precious and highly valued. Considering the rate at which the vegetation is getting depleted in this part of the world, there is the need to document the precious knowledge of these plants as well as the experience of the traditional healers and herbalists. Thus the present review was carried to list out diabetic plants, their active compounds, status and conservation in the eastern ghats of southern India.

Totally, 61 herbal plants of 41 families were reported as antidiabetic plants and they were used for the successful treatment of diabetes mellitus by traditional healers and local people of Eastern Ghats, South India. Among the 41family, Euphorbiaceae has high number of plant species (6 species) with antidiabetic property. They were reported to possess 58 bioactive compounds with antidiabetic property. Beta sitositrol was found to be dominant antidiabetic compound which present in 13 plants of 11 families. Among the 61 antidiabetics plants

of the present review, *Curculigo orchioides* was reported as endangered category and *Asparugus racemosa* as threatened category. Conservation status of all other diabetic plants was not reported. However, several species are feared to be threatened, while the population size of some species is severely reduced and in certain cases the availability of the produce has become scarce. A number of papers reported that herbalists having to walk increasingly greater distances for herbs that once grew almost outside their door. As habitats for plants disappear and over harvesting for commercial uses reduces stocks of wild medicinal plant material, there is a corresponding drop in the availability of the plants used as the first and last resort for health care by many rural populations. Therefore, appropriate conservation strategies have to be implemented immediately to protect the fragile habitats of many such medicinal plants. From this review, we recommend that the *in situ* conservation may initiative to protect the medicinal plants, in which the populations are allowed to flourish, while the conventional forestry management operations are kept to minimum and regulate the harvesting process.

Keywords: Traditional, Medicine, Diabeties, Conservation

TECHNIQUES IN SCIENCE

TS1

WEB RESOURCES OF BIOINFORMATICS FOR BIODIVERSITY

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Abstract

Immense amount of informations related to genetic, species and ecology levels of biodiversity are based on many parameters such as biomass, ecosystem, genetic erosion, hotspots etc., are invented by many biodiversity scientists all over the world. All these biodiversity data must be globalized and should be interpreted effectively. Advancement in the field of bioinformatics enables the researchers to study and to correlate genetic information with native habitat, physiology and genealogical relationship of the species. Further, it will also help to enrich the analysis of molecular level data sets with significant compatibility through the Global Biodiversity Information System (GBIF). This paper focuses the available variety of biodiversity databases i.e. resources for effective management and for the conservation of biodiversity data.

Keywords: Biodiversity, Biodiversity conservation, Bioinformatics resources, Biodiversity databases, Global Biodiversity Information System.

TS2

BACTERIA DETECTION FROM THE WATER SAMPLES USING GLYCINE PASSIVATED COBALT FERRITE NANOPARTICLES ($(GLY/COFE_2O_4)$) AND ANTIBODIES COATED FLUORESCENT SILICA NANOPARTICLES

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Abstract

The detection of small numbers of bacteria in environmental or clinical samples requires an amplification step involving the growth of bacteria in culture to increase cell number. This procedure considerably prolongs the detection time, especially for slowly growing bacteria. Here we report a sensitive, rapid, and simple method for detection of bacteria. In this work, we reports synthesis and applications of Glycine-modified Cobalt Ferrite nanoparticles ($Gly/CoFe_2O_4$) that can act as a collection tool to separate and detection of bacteria from water samples. The synthesized nanoparticles were confirmed by using SEM, FTIR, XRD, Raman and EDX spectra. The bacteria collection efficiency of these nanoparticles was determined using different bacteria present in the clinical mastitis samples. The results indicated that the maximum 92% ±1 of E.Coli, 82.15% ± 1.01 S. aureus, 70.86% ±1.78 of S. agalactiae were collected with 20 min. For the E.Coli detection, we development sandwich assay using anti- E.Coli antibodies coated fluorescent silica nanoparticles and the concentration of E.Coli was quantified based on anti-E.Coli conjugated rhodamine 6G/silica particles. The calibration curve of the E.Coli showed the linear range to be between 1x10□□ and 1x10□□ CFU/ml (R^2 = 0.9944). The minimum detectable concentration was 1×10^2 CFU/ mL. The developed method offered the best **way to determine** E.Coli with a total analysis time of less than 30 min. .

Keywords: Cobalt ferrite nanoparticle; Magnetic capture; Glycine; bacteria

TS3

DETAIL STUDY ON *ELAEOCARPUS GANITRUS* (RUDRAKSHA) FOR ITS MEDICINAL IMPORTANCE - A REVIEW

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Abstract

Elaeocarpus ganitrus commonly known as Rudraksha in India belongs to the *Elaeocarpaceae* family and grows in the Himalayan region. *Elaeocarpus ganitrus* has an important position in Hindu religion and in Ayurveda, the ancient Indian system of medicine. *Elaeocarpus ganitrus* commonly known as Rudraksha in Sanskrit and Rudraki in Hindi is grown in Himalayan region in India for its medicinal properties and attractive fruit stones. The seed of Rudraksha has been given an individual place and it is attributed with numinous and heavenly properties. Rudraksha beads have been traditionally used in India and other Asian countries As stated by Ayurveda system of medicine, wearing Rudraksha beads relieves strain, anxiety, lack of concentration, insomnia, depression, hypertension, palpitation, infertility, rheumatism, and asthma. Present investigation as a review has been attempting to make the collections of the details like botanical, ethnomedicinal, pharmacological information and therapeutic potential of *Elaeocarpus ganitrus* on the basis of recent scientific research.

Keywords: *Elaeocarpus ganitrus* , Medicinal properties, Medicinal uses.

TS4

SYNTHESIS AND STUDY OF THE INHIBITION ACTIVITY OF IODINE NANOPARTICLES AGAINST ENVIRONMENTAL BACTERIA

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Abstract

Povidone iodine solution is generally used as disinfectant. The solution mainly contained poly vinyl pyrrolidone (PVP) and iodine. The PVP- iodine complex has iodine: iodide ratio of 2:1, but it is not routinely maintained in some commercial preparations and hence the stability of these products are compromised. In this work, we developed iodine nanoparticles without use of any stabilizer and their bactericidal effect were tested against Gram positive and Gram negative bacteria. For synthesis, we developed a new co-precipitation process using PVP, calcium lactate, disodium hydrogen phosphate and iodine solution as precursor, and the reaction was catalysed by using sodium hydroxide. The synthesized nanoparticles were characterized based on Scanning electron microscope (SEM), energy dispersive x-ray spectroscopy (EDX), Raman Spectroscopy, Fourier transform infrared spectroscopy (FTIR) and X-ray powder diffraction (XRD) pattern. The SEM based particles size analysis indicated that, the synthesised nanoparticles are around 40 ± 5.0 nm. The EDX based elemental compound analysis indicated that the particles contained iodine. FTIR based analysis also indicated that the iodine finger print regions were present on the surface. The XRD and Raman spectra result showed that the particles are highly amorphous. To study the antibacterial efficacy of particles, we tested the minimal inhibition concentration (MIC) and biofilm degradation ability against Gram positive and Gram negative bacteria. The results indicated that, the nanoparticles destroy 90% of bio film formation and 10 mg of nanoparticles inhibits 95% of bacteria. The membrane disintegration activity of the nanoparticles were tested based on cytoplasmic degradation assay, protein assay and viability measurements. The result indicated that the synthesised nanoparticles clearly destroy the extracellular membrane of the bacteria. The delivery studies indicated that nanoparticles exhibited burst release and also undergoes first order kinetics model. In conclusion, the developed nanoparticle contains more than 50% iodine and does not require any stabilizer during preparation and possessed strong antibacterial activity for long duration.

Keywords: Iodine nanoparticles, Nanoparticles, Bacteria, Bacterial killing

TS5

A STUDY ON ZERO-COST-EFFECTIVE METHOD OF WASTEWATER MANAGEMENT AND THE RESULTANT PRODUCTION OF HIGH QUALITY SPIRULINA BIO-MASS

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Abstract

Spirulina is multi cellular, photosynthetic (autotrophic) and filamentous blue-green microalgae. Spirulina has rich protein (50-70% of dry weight), vitamins, minerals, lipids, polysaccharides and pigments. They are reported to possess various biological properties such as prevent cancers, decrease blood cholesterol levels, stimulate the immunological system, reduce the nephrotoxicity of pharmaceuticals and toxic metals and provide protection against the harmful effect of radiation and it is used as anti-tumor drugs and anti-HIV-I drugs. It is also used as food supplement to human being and used as animal feed. Thus, spirulina is widely used in commercial cultivation estimated to about 3000 metric tons/year. However the current production of spirulina is not meet out the present requirements. It is understood that there is immediate need to produce large amount of spirulina with low cost. The culture medium is an important factor in the production cost of the algal product, massive cultivation of spirulina in wastewater media could improve the prospects for industrial production. Thus the present work was made an attempt to address dual problems i.e., production of spirulina biomass economically with good nutritional characteristics using wastewater and treatment of wastewater by culturing spirulina.

The wastewater was collected from CVR Women Hostel, Nehru Memorial College, Puthanampatti. The following water quality parameters such as TSS, TDS, CO_3, Na, Mg, Fe, Ca, PO_4, S and total alkalinity were measure before culturing spirulina and after harvesting of spirulina, were tested. Three different concentrations of wastewater were prepared and used for spirulina culture. Based on the concentration, spirulina culture was divided in to 5 groups

viz., Group I (100 % wastewater), Group II (50 % wastewater), Group III (25 % wastewater), Group IV (synthetic medium with tap water) Group V (control 100% tap water). After 3 days, spirulina biomass was harvested and weighed.

Appearance of culture shifted from light green to dark green in proportion to the increase cell mass. It showed healthy growth of spirulina. The same trend was observed in all concentrations of wastewater. Results showed that high yield of spirulina biomass in all concentration especially group III (25 %) yielded 10.6 g/l which was equal to the yield of synthetic medium. The cost effect ratio for the synthetic medium showed the high expenses but it showed zero cost expenses in wastewater culture medium. With regard to wastewater treatment, the culturing of spirulina favorably altered the physical and chemical parameters of the wastewater except chlorides, total hardness and total alkalinity and thus it might be used for irrigation and toilet flushing purposes.

Keywords: *Spirulina platensis*, Zero-cost Effective, Wastewater treatment.

TS6

STUDIES ON PREPARING ORGANIC COMPOST FROM FRUIT WASTES

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Abstract

A wide range of wastes is being spread on the land which creates a major problem in various parts of India and around the world. These dumped waste creates a nuisance to the public and also it is the major source of vector-borne diseases by being home to vectors to breed. These wastes can be collected for bioenergy production. The present study was undertaken to assess the management of fruit waste. Usually, we are dumping all the waste from our house to common dust bin established by municipality authorities. These wastes are collected and are subjected to composting in small scale that is within flower pot. All these waste, both renewable and non-renewable are brought to the common place where they are buried. Instead of this, the wastes are separated that is both fruit (degradable) and other waste (non-degradable) including plastic and iron. Compost improves the soil in a number of ways and reduces waste going to landfills. When added to soil, compost increases soil water and nutrient holding capacity. It improves plant productivity and covers. Increased plant cover reduces water runoff and the potential for soil erosion and nutrient pollution. All these processes of compost production are explained elaborately.

Keywords: Fruit waste, Bio-energy, Fermentation, Compost

TS7

CONSERVATION BIOLOGY - A CRISIS DISCIPLINE: IS BIOTECHNOLOGICAL TOOL AN EFFECTIVE SOLUTION TO THE CRISIS?

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Abstract

In the rapidly changing world there are too much anthropogenic activities that the world is suffering now. Conservation biology is recent response to the wave of global environmental change that is threatening to extinguish a tremendous portion of the world's biological diversity. Conservation biologists view their main task as providing the intellectual & technological tools that will anticipate, prevent, minimize and repair ecological damage. Biotechnological tools play vital role in understanding and assessing the conservation issues without damaging the ecosystem. DNA is a molecule with an authentic and comprehensive indicator of a species. The charismatic molecule, which we all possess, revels a lot about the species. What we can get from the DNA: 1. Species identification 2.Sex identification 3.Species quant. It is basically the genetic finger print of the species, which helps conservationist to apply DNA, based information to get: 1.Animal database 2.Wildlife forensic data 3.To track the poaching activities. A panda defecates 100 times a day, so easy to collect DNA from its scat rather than taking a tissue or blood sample, for research. Assessing genetics is an important to know the factors causing the extinction rate of the population. In this paper we will briefly talk about all the above area of biotechnology and focus on non-invasive techniques to assess the threatened population.

Keywords: Conservation biology, Biotechnology, DNA, Non-invasive methods.

TS8

APPLICATION OF STANDARD MODELS TO EVALUATE GLOBAL WARMING POTENTIALS OF GREEN HOUSE GASES IN INDIA

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ABSTRACT

In India it is observed that more than 90% of Municipal Solid Waste (MSW) is disposed on land without taking any specific precautions. Methane emission from landfills amount to 6 to 020% of total methane emission from the anthropogenic sources. It is highly imperative to assess the landfill methane (CH_4) and Nitrous oxide emission from such sources. Application of models for inventorying and replicating the methane emission to the wide area is crucial and critical for determination of the management practices required to be followed to mitigate global warming. Different models *viz*., IPCC, Theoretical First Order Decay model (FOD) and USEPA regression models were available for assessment. The scope for the IPCC model used here may be extrapolated extensively to the other areas. Unlike the methane emission models, nitrous oxide emission is enumerated by seasonal integration of flux. Precise inventorying the methane emission from different sources is of immense use and interest for Environmentalists, Climatologists and most importantly for Agricultural scientists. Among the different sources of methane emission landfill alone contributes 6-20% of the other anthropogenic sources. Previous years due to lack of data and systematic handling of Municipal Solid Wastes, there exist a problem of precise measurement.

Keywords: Landfill, MSW, Methane emission, IPCC

TS9

POPULATION STATUS AND MILK QUALITY AMONG THE *GENES BOS* IN THE SELECTED VILLAGES OF THIRUVARUR DISTRICT, TAMIL NADU, SOUTH INDIA.

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Abstract

The present work is aimed to conformation of present status of indigenous cattle *Bos indicus*, among the *Genes Bos* from agriculture belt of selected five village of Sethalapathy,Kovilpathu, Koothanur, Poonthotam, Uthragangai in and around Cauvery delta region of Thiruvarur District, Southern India. In the present study population density of total above five villages were not prevalence in maintenance of cattles of *Bos indicus* and *Bos taurus indicus* . The high population density was occurrence only in the species of *Bos Taurus*. The present study resulted low population density was occurance only in the species of *Bos taurus indicus*. There was few number of population in *Bos indicus* prevalence in the study area except in Uthragangai village. The milk quality examination (Methylene blue Reduction test) was resulted long time taken in *Bos taururs indicus* and *Bos indicus*. Resulted methylene blue reduction of milk was very short time (1hour) taken in *Bos indicus*.

Keywords: Population status, *Genes Bos*, Methylene blue milk reduction test.

TS10

EFFECT OF VERMICOMPOST ON THE GROWTH OF VEGETATIVE CROPS

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Abstract

Vermicomposting is an ecofriendly method to degrade this organic waste. Earthworm species convert this waste into better end product and provide solution to the problem of organic waste degradation. Vermicomposting is the process of composting using various worms, usually red wigglers, white worms and other earthworms to create a heterogeneous mixture of decomposing vegetable or food waste, bedding materials and Vermicast. Before final disposal one can process and treat the waste so as to reduce the "wasteful wasting of waste". Some of techniques available to achieve this objective are volume reduction, recovery of resources, energy recovery. This study is done to reduce the pollution problems due to solid waste and industrial sludge by converting it into compost by using earthworms very successfully, economically and usefully. Unsafe and non-productive disposal of food waste pollutes the environment. Biodegrable food wastes have been composted and applied to soil as an amendment to improve the soil properties and fertility hence conserving the environment .The significance of vermicompost is that it is of biological origin and will be readily available to mankind in future.

Keywords: Vermicompost, Earthworms, Decomposing

TS11

SURVEY OF COMMON CULTIVABLE CROPS VARIETIES AND PROTECTION OF FOOD GRAINS AND SEEDS IN CAUVERY DELTAIC REGIONS IN TAMIL NADU, INDIA

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Abstract

Agriculture is an important sector of the Indian economy, accounting for 14% of the nationwide, about 11% of its exports, about half of the population still relies on agriculture as its principal source of income and it is a source of raw material for a large number of industries. Storage and upkeep of agricultural products are very important post harvest activities. In the present study the direct interview questioner method Thanjavur, Thiruvarur and Nagapattinam District, among the three districts revealed that the most of the peoples are cultivated the paddy followed by green gram, black gram and cotton. In Thanjavur, Thiruvarur and Nagapattinam, around 225 respondents in fifteen villages showed equal percentage of the paddy (100%) cultivated, followed by the most production of green gram (62.66%) in Nagapattinam district, In Thiruvarur district (60.88%), and 60.44 % in Thanjavur district. The black gram 25.77% in Nagapattinam district, 15.55% in Thanjavur and 15.11% Thiruvarur were observed. Among the three districts in Nagapattinam 83% of stored grains were paddy variety recorded followed by Thanjavur (70.23%) and Thiruvarur (68.88%) Districts. Which are stored for the purpose of next year for seeds, food consumption and other purpose.

Keywords: Paddy, Green gram, Black gram, Thanjavur, Thiruvarur and Nagapattinam.

TS12

GEOMETRIC MORPHOMETRICS APPROACH: AN OVERVIEW

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Abstract

Morphometrics is a study of variations in the size and shape of any form and the main goalis to describe shape of any form through quantitative method, most widely used in biology to describe size and shape of species. Traditionally, morphometrics was done by measuring linear distance *viz*., length, width, height, counts, ratio, and areas. These measurements are simple to adopt and most of the multivariate statistical approaches uses such measurements to describe patterns of shape variation within and between groups. However, the biggest problem facing the 'traditional' morphometrics is that the linear measurements are highly correlated with size, measurements taken from two different shapes could produce equal results and fails to reconstruct graphical representation of shapes. To overcome such problems, a more advanced method called 'Geometric morphometrics' was created.

Geometric morphometrics uses a set of landmark coordinates to describe shape of a specimens in a two or three dimensional points which are tightly defined by set of rules. Asthe result of the experiment fully depends on the quality of landmark coordinates, a lot of effort needs to be put to choose the correct/specific landmarks that would have high morphological, ecological, and evolutionary significance and relevance for the experimenting questions. Further, replications of such selected landmarks is curtail in every specimens taken for an experiment. The extracted set of coordinate landmarks has a lot of variation in positon, orientation, and scale among specimens,and those non-shape variations can be removed by a popular method called Generalized Procrustes Analysis (GPA). After performing GPA to all the sample specimens, shape differences can be extracted by calculating differences in the coordinates of corresponding landmarks. This data set is then used for multivariate analysis to compare shape variations. Principal component analysis, canonical variates analysis and factor analysis are some common multivariate statistical options that can be used for the analysis of thecoordinate basedlandmark data sets of two or three dimensions.

Keywords: Morphometric, Length, Width, Height, Count

TS13

STUDIES ON THE EFFICIENCY OF EARTHWORM, *EUDRILUS EUGENIAE* IN THE BIOCONVERSION OF VEGETABLE AND FLOWER WASTE MIXED WITH TARTRAZINE

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Abstract

The efficiency of earthworm, *Eudrilus eugeniae* was studied in the bioconversion of wastes mixed with the commonly used food colouring agent tartrazine into micro and macro nutrients. The work was carried out for 35 days in the laboratory by maintaining control and wastes mixed with tartrazine separately. The bioconversion of the wastes into micro and macro nutrients is considered as an indicator of the potential nature of the earthworm. The nutrients analysis indicated that the nitrogen, phosphorous and potassium levels were increased in the flower and vegetable wastes except nitrogen level in the tartrazine treated vegetable waste. In contrast, the ferrous level was decreased in all the treatments. However the analyses of ferrous in the tartrazine treated vegetable waste revealed increased level. Similarly, manganese and zinc were also increased in all the treatments significant. Besides, the other nutrient i.e., copper showed decreasing level in the vegetable waste treated with tartrazine whereas in the rest of the treatments, it showed increasing level. Similar to nutrients, physical characters such as electrical conductivity and pH were also increased. The observed results showed the potential nature of the earthworm in the bioconversion of vegetable and flower waste for 35 days.

Keywords: *Eudrilus eugeniae,* Tartrazine, Bioconversion, Flower waste, Vegetable waste.

TS14

ULTRASTRUCTURAL REPORT ON THE SKIN ASSOCIATED LYMPHOID TISSUES (SALT) IN *CHANNA PUNCTATUS* (BLOCH)

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Abstract

The present report focused on the skin associated lymphoid tissues (SALT) in skin of *Channa punctatus*. *C. punctatus* were collected from the local fish ponds, acclimatized to laboratory conditions. The fishes were sacrificed, skin tissues were dissected and fixed in neutral buffered formalin for light microscopic studies and fixed in glutaraldehyde for transmission electron microscopic studies. Routine histological procedures were adopted for preparing tissue sections. The lymphoid cells and non- lymphoid cells were observed in the skin of *C.punctatus*. The results were discussed in detail in relation to mucus associated lymphoid tissues (MALT) and their role in the defense mechanism of fish against pathogens.

Keywords: *Channa punctatus*, SALT, MALT, Pathogens, Lymphoid cells

TS15

IDENTIFICATION OF SEX USING THE PELVIC GIRDLE BONE OF LESSER BANDICOOT RAT (*BANDICOTA BENGALENSIS*) FROM CAUVERY DELTAIC REGION OF INDIA

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Abstract

Rodents are a dominant group of mammals and there are more than 2700 species of rodents worldwide; in fact, 42% of all the mammals species on Earth are rodents. In India, so far, totally128 rodent species were identified and in which 18 rodent species damage crops. Barn Owl is the major predator for agricultural rodent pests. The content in the regurgitated pellet of Barn Owl particularly the osteological remains are used to assess the prey selection. Morphology of mandibles and skull of different species of field and commensal rodents were species specific which is used as a tool for identification, when these portions were recovered from the pellets. But the sex difference cannot be identified. At times the pellets were found to be disintegrated due to various reasons. In such situations, an alternative is needed to identify the prey species. The pelvic girdle of the rodents can be often recovered from the disintegrated pellets. The pelvic girdle of the rodents is also species specific and in addition there are sexual differences between male and female. Hence, we investigated the differences in the pelvic bones of adult male and female species of Lesser Bandicoot Rat *Bandicota bengalensis*. The dead Bandicoot rats of different age groups were collected from the farmers which were killed using traditional traps during rodent pest control programme in agricultural fields. Among the sexes, minute but obvious difference was recorded in the pelvic bone which has ileum, acetabulum, ishium, and pubis. These parts of the pelvic girdle are identical in both sexes except pubis region. The pubis of the pelvic girdle of the female bandicoot has distinctive with pubic symphysis. The pubis is a region with gentle slope in adult male whereas the slope suddenly gives deep straight finishing as pubic symphysis in female bandicoot. Hence, the pubis region of

the bandicoot was distinctive which can be used as a key to identify the species and sex of the species in adult individuals. Bandicoot is the common prey item of the Barn Owl in agricultural ecosystems of Tamil Nadu, particularly in Cauvery deltaic region. Further, this key would be used to identify the sex of Bandicoot and therefore within prey selection of Barn Owl the sexwise prey selection can be identified for Barn Owl. Assessing the sexwise prey selection of Barn Owl would be useful for developing management strategies for Bandicoot control in the field.

Keywords: Rodent, *Bandicota bengalensis,* Pellet, Barn Owl, Pelvic girdle, Sex

TS16

NUTRITION AND YIELD EVALUATION OF OYSTER MUSHROOM (*PLEUROTOUS OSTREATUS*) IN DIFFERENT SUBSTRATES

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Abstract

Edible mushroom *Pleurotous ostreatus* was cultivated on different natural wastes viz. Bamboo leaves (substrate -I), coconut husk (substrate-II), and mixture of Bamboo leaves + coconut husk (substrate-III) to determine the suitability of these waste on yield and nutritional content. Coconut husk showed significantly highest yield (No/kg) among the substrate up to third harvest. The difference in the biochemical content it has been reported that not only the content of fruit body but also the nature of content depends on used substrate. When compare to second harvest and maximum protein, carbohydrate and lipid were observed in the first harvest. Among the three substrate coconut husk are very much suitable for mushroom cultivation *(Pleurotous ostreat*us) and also showed high nutrients then other substrate during the study period. Bamboo leaves had long incubation time and differ significantly than the other substrate composition it was not suitable for mushroom cultivation. Mushroom can be considered as an alternative source of protein and this can solve problems of people all over the world who often suffer from protein deficiency and also gives self employment for women's.

Keywords: *Pleurotous ostreatus*, Yield, Nutritional analysis, Coconut husk, Bamboo leaves.

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TS17

FLUCTUATION IN THE POPULATION OF FUNGIIN THE VERMICOMPOST MADE FROM FLY ASH WITH PRESSMUD AND COW DUNG BY *EISENIA FETIDA*

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Abstract

The culture media for the earthworms were prepared from the following substances-Lignite Fly Ash (FA) collected from NLC (India), Neyveli and Bedding material (BM) in the following ratio in five different combinations such as: T1 (20%FA+80%BM),T2(30%FA+70%BM), T3 (40%FA+60%BM),T4 (50%FA+50%BM) and T5 (60%FA+40%BM).100% BM was used as control. Preclitellate earthworms *Eisenia fetida* were inoculated at the rate of 15g /kg after the pre decomposition of waste materials. Populations of fungi were enumerated on 30th day, 60th day and 90th day in the vermicomposts. Fungal population was more in 60th day vermicompost in T1 among the treatments and it was less than the population found in control. The highest population in T1 among the treatments may due to higher preference due to palatability and acceptability of earthworms.

Keywords : Bedding material, Lignite Fly Ash, *Eisenia fetida,* Vermicompost.

TS18

DETERMINATION OF CHEMICAL PROPERTIES OF MICROBIAL (*PSEUDOMONAS SP.*) DEGRADED COIR PITH IN RELATION TO PARTICLE SIZE

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Abstract

The elastic cellular cork like pithy material forming the non-fibrous tissue of the husk is generally referred to as the coir pith, which accounts for 50-60% of the total weight of the husk. The extraction of one kilogram of coir fiber generates two kilograms of coir pith. In the present investigation aimed to be analyze the chemical properties of microbial degraded coir pith. The standard methods were employed to analyze the chemical properties of microbial degraded coir pith in relation to particle size. The chemical parameters such as pH, Electrical conductivity, Total organic carbon, Lignin, Cellulose, Chloride, Nitrate, Nitrite, Sodium, Sulphate, Calcium and Magnesium. From the results, the medium size degraded particles i.e 500 to 850 µm showed good chemical properties which will be suitable for potting medium. The results clearly showed that, the medium size particles have been agreed for suitable potting medium even though it will be used for soilless medium. Hence the present study prove a substantial solution to fill the gap in the constructive utilization or recycling of coir pith as a potential soilless medium for any kind of culture operations in indoor culture, green house farming, terrace gardening or field culture and wild plant cultivation in their native location.

Keywords: Particle size, Coir pith, Chemical properties, Wild plant cultivation, Degradation

TS19

AN ECO-BIOTECHNOLOGICAL APPROACH FOR RECYCLING OF DIFFERENT SOLID ORGANIC WASTES INTO USEFUL PRODUCTS – A COMPARATIVE STUDY.

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Abstract

Vermicomposting has recently emerged as a simple but efficient biotechnological tool for recycling wide ranges of organic wastes to produce better end products with the help of some specific groups of earthworms. Here we evaluated the efficiency of *Eudrilius eugeniae* at converting four organic wastes (vegetable waste, municipal wastes, sago wastes and dairy wastes) into vermicompost. These chosen substrates were mixed with cow dung and soil in the ratio of 3:1:1 (w/w) to initiate the waste conversion process into a useful product. Physical and biochemical activity, occurring during the 45 days of vermicomposting period were analyzed. During this process pH, organic carbon, and C:N ratio were found to be decreased, whereas, the total nitrogen, available phosphorus and exchangeable potassium content were increased with vercomposting period. 15 days precomposting of three different substrates (wastes + cow dung) and subsequent vermicomposting upto 45 days, clearly indicate the potential of earthworm biotechnology in reduction of biomass of the waste, addition of the nutrient pool (nutrient enrichment) and more availability of animal protein in the form of earthworm number and biomass. An experimental study is also conducted in which the effects of different types of vermicompost on plant growth, in terms of plant heights and stem diameter are examined in a experiment with maize plant. Towards the end, the positive outcomes substantiated that vermicomposting biotechnology is a powerful tool for the decomposition of different types of organic wastes into value-added material.

Keywords: Eco-Biotechnology, Eudrilius eugeniae, Sago wastes, Dairy wastes, Municipal wastes, Vegetable waste, Cow dung.

TS20

AN ANALYTICAL STUDY ON EFFECT OF SIZE ON PER CAPITA HOUSEHOLD SOLID WASTE GENERATION IN MANNAMPANDAL PANCHAYAT, MAYILADUTHURAI TALUK, NAGAPATTINAM DISTRICT, TAMIL NADU

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Abstract

Solid wastes are the materials which arise from various human and animal activities and discarded as useless or unwanted. The rate of generation of household solid waste in the developing countries is increasing with an increase of population, technological development, and the changes in the life styles of the people which is posing a great environmental and public health problem to both flora and fauna of locality. As family size and income are the most significant factors affecting the quantity of solid waste from household consumption, a study on the relationship among these is vital in the decision making on waste management strategies. Therefore, a study was conducted in Mannampandal Panchayat, Mayiladuthurai Taluk to find out the correlation among residential solid waste generation, family size and income. This study covered 500 houses with different socioeconomic levels such as income level and family size. There were three components of solid waste; vegetable wastes, plastic wastes and paper wastes which were evaluated in this study. Among the three wastes, the paper wastes showed huge amounts 130.50kg/day followed by vegetables and plastics 123.28kg/day, 17.20kg/day respectively. The results showed that, residential waste generation such as vegetables, paper and plastic showed significant positive correlation with family size. The study concluded that, wastes like plastics will be more effective to the household animals and human being.

Keywords: Solid wastes, Household wastes, Family size, vegetable wastes, plastic wastes

TS21

ADVANCES MADE BY INTEGRATED CONSERVATION GENOMICS APPROACH FROM SEX MARKER DEVELOPMENT

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Abstract

Conservation genetics has got its role to know the current genetic structuring for long-term survival fitness of a species. There are series of conservation units, which include species, evolutionarily significant units (ESUs), management units (MUs), action units (AUs), and family nets (FNs) which helps wildlife managers to protect biodiversity. Integrated genomic approach to develop the sex markers with relevance to conservation is logical mainly because of its genomic complexity and primitive nature. The sequence related amplified polymorphism (SRAP) or sequence characterized amplified region (SCAR) of amplified fragment length polymorphisms (AFLP) or random amplified polymorphic DNA (RAPD) should be considered as an important part of a complementary approach for the development of sex-specific DNA markers because of their easy to use techniques where hundreds of genomic loci could be deciphered in a relatively short time and, more importantly, in an unbiased manner. The sequence related amplified polymorphism (SRAP) is a PCR based technique which could be used to detect the genetic variation in open reading frame (ORF) of a genome. The random amplified polymorphic DNA (RAPD) technique is based on the polymerase chain reaction (PCR) and has been one of the most commonly used techniques to develop molecular sex markers. Amplified fragment length polymorphism (AFLP) is a powerful technique used for studying poorly deciphered genomes. Differential gene expression pattern in ovary and testis could be used as a diagnostic marker for gender identification.

Whole genome sequencing is the pioneering multi-purpose approach which acts as a reference database for all other integrated genomic approaches utilised in this project for sex marker discovery and understanding its genome complexity. This approach will

make our country proud for serving the aquafarmers of India as well as world and the scientific community with first reference whole genome for prawn aquaculture applications. Restriction-site associated DNA sequencing (RADseq) is one of the most recent and prominent approaches for sex marker development for the species where no reference whole genomic data is available. Neutral or adaptive conservation should be conserved for species survival fitness. Large parts of the ganome are invariable even among species but some intact regions are hypervariable as in the case of Major histocompatibility complex (MHC) genes. Sex-determination mechanisms can differ between even closely related species and arise frequently and independently which is connected to a very peculiar genomic process, namely the formation of sex chromosomes. The sex determination or differentiation mechanisms of the crustaceans have been least understood, poorly studied and seems to be quite complex. Interestingly, the sex differentiation mechanisms in other arthropods including insects are also debatable. Previous study shows that both XY and ZW sex chromosomes are present in certain crustacean decapod species indicating their primitiveness in evolution. Genome walking is an important complementary approach for the above techniques to reveal upstream or downstream flanking region of sex-biased fragment to find out putative sex-specific markers owing to the fact that the single-nucleotide polymorphisms (SNPs) resided in the less conserved genomic sites as identified in restriction sites by a previous study. Higher density of sampling is essential for the genomes of endangered species and with more genome wide screening of markers than what has typically been the case in traditional conservation genetic studies where typically 10–20 loci of microsatellite markers have been considered to a good number of sampled loci. Therefore, despite the difficulties in generating, analyzing and managing genomic data, it is imperative for the future of conservation science that researchers embrace these new technologies and modify to purpose.

Keywords: Next generation sequencing, conservation genomics, habitat fragmentation, adaptive fitness, Neutral markers, genetic drift, inbreeding

POLLUTION/THREATS

POT1

INFLUENCE OF AGRO-CHEMICALS ON THE POLLUTION STATUS OF CHOSEN POINTS IN RIVER GIRI, HIMACHAL PRADESH, INDIA

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Abstract

Environment gets degraded more rapidly in spite of various remedial measures undertaken. The man activities, abundant usage of inorganic fertilizers and pesticides have still worsened the problem. This is turn affects the water bodies very severely making it unfit for drinking, domestic and even agricultural purposes. In this background, the present work was initiated to analyse the level of deterioration of water in a defined stretch of River Giri, Himachal Pradesh, India. Himachal Pradesh, a hilly state of India known for apple and other stone fruits, and green vegetables. Various kinds of pesticides are being used by the orchardists and farmers to save their crop from the attack of insect and pests. The area of investigation is located in the southern east district of Himachal Pradesh. The district in outer Himalayan range commonly called as Shivaliks between 77°01′12″ and 77°49′40″ East longitude and 33°22′30″ and 31°01′12″ North longitude. The physical and chemical qualities of water were analysed and the extent of pollution was found out and presented in detail. In order to assess the impact of pesticides on the water quality that influence the fresh water bodies in river Giri, water quality assessment was undertaken during the critical period of July, September and November. The samples were taken from three different sites i.e. Katal, Karganoo and Maryag) of study areas for water quality parameter assessment. The results showed that, among the physico-chemical factors the nitrate content showed greater variation from the natural level i.e 1mg/l in all the three sites. The study indicates that the river is rich in nutrients and simultaneously polluted as well. Therefore proper treatment and management is being required to check and rectify the entry of drains into river Giri. Moreover, the determined pollution definitely affects the biological organism in a way of direct and indirect.

Keywords: Himachal Pradesh, Pollution, Physical factors, Chemical factors, Pesticides

POT2

AN OVERVIEW OF ENVIRONMENT IMPACT ASSESSMENT OF MINING INDUSTRIES IN INDIA

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Abstract

India, a mineral rich country, with an appropriate geological setup and favourable geological ambiance is similar in many ways to that of other mineral resource rich countries across the world. The mineral reserves of the country is yet to be fully explored, assessed and exploited. During the last few decades, India has been a major mineral producer in Asia and beyond globally. There have been advancements in tools and techniques to deal with environmental pollution in mining industries. However, several major environment challenges from mining industry which remain a matter of concern to environment and society are i) Acid Mine Drainage (AMD), ii) surface and ground water pollution, and iii) loss of biodiversity and forests. We present here the extracts of the analysis made for selected case studies on various types of mining industries in India. The analysis reveals a gross failure of the Environment Impact Assessment (EIA) practices carried out in India. Of late, Social Impact Assessment (SIA) has been incorporated into EIA and made an integral part of the environmental assessment process, which is still to be seen thoroughly for implementation. We made a review of the EIAs undertaken for some of the mining industries in India. The results reveal that Environmental Clearance (EC) was granted to 2609 mining projects, of which 631 were coal mining projects. Most of the mining projects in India are seen suffering from various environmental issues ranging from Bauxite mining in Maharashtra to limestone mining in Meghalaya. The issues are wide such as fertile land degradation, loss of agriculture, water quality deterioration and scarcity, loss of forest and biodiversity, landscape deterioration, spreading of spoils creating wasteland, noise pollution. Moreover, in almost all the cases, the lack of implementation of EC conditions and environmental management plans were quite apparent. In this regard, the Mines & Minerals (Development & Regulation Act) (MMDR Act 2016), which governs the mineral sector, assumes significance. This (recently amended) act allows Foreign Direct Investment up to 100%

which could also include the state of the art technology in mining sector for better environmental management.

Further, India is known for its wide range of legislations to deal with environmental issues and problems. However, the findings of the present analysis are indicative of lack of institutional capabilities in implementing the legislations and guidelines enacted for safeguarding mining environments, and also a gross violation of EC conditions as prescribed by relevant agencies. It may also be due to the fact that public investment in mineral resources brings many state and non-state actors together and most of these organs and agencies have their own interests w.r.t. safeguarding of environment. Hence, EIA must not be seen only as a legislative piece or must not be used only for obtaining required permissions to initiate mining operations. It should be used as a tool to achieve sustainable development in mining sector. However, lack of implement mechanisms fully at ground level seemed to be a major hurdle in India. The present review/analysis tries to consolidate the existing lacunae in each category of mining industries in terms of implementation of guidelines for environmental management, and it calls for sustainable practices of mining in our country. Hence, the focus should be not only on the "resource management" but also on the "environmental management" with final aim of sustainable resource utilization.

Keywords: Acid Mine Drainage, Environmental Clearance, Environmental Management, Geological Ambiance, MMDR Act, Social Impact Assessment

POT3

STUDIES ON ANTIOXIDANT STATUS IN GREY MULLETS IN RESPONSE TO METAL POLLUTION AT UPPANAR ESTUARY, CUDDALORE DISTRICT, TAMILNADU

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Abstract

The present study was to determine the response of the fish *Mugil cephalus* with reference to its antioxidants during their exposure to metals like cadmium, copper, lead, zinc, iron and chromium present in the industrial effluents that are discharged into the Uppanar estuary. Fish were collected from various stations during the monsoon and summer seasons. Fish liver homogenate (N = 20 per group) was prepared for evaluating oxidative stress parameters. The results were also found to vary with seasons, the determination of oxidative stress biomarkers in *M. cephalus* along with seasonal variations may serve as a convenient approach during pollution monitoring.

Keywords: Antioxidant; Estuary; Grey mullets; Oxidative stress; Pollutants

POT4

ACUTE TOXICITY OF LEAD NITRATE ($PB(NO_3)_2$) ON FINGERLINGS OF THE FRESHWATER FISH *LABEO ROHITA*

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Abstract

The contamination of water by heavy metals due to anthropogenic activities is a worldwide problem in recent years. Lead is one such a heavy metal dangerous to all living organisms. The objective of the present study was to determine the LC_{50} value of Lead nitrate (Pb $(No_3)_2$) on fingerlings of *Labeo rohita* using static but renewable type acute toxicity test. The values were determined using probit analysis. Stock solution of Pb $(No_3)_2$ was prepared and the fingerlings (Length 7 ± 2 cm; weight 3.5 ± 2 gms) were exposed to various concentrations. The 96 hrs LC_{50} value of lead nitrate was determined as 23.7mgL^{-1}. Time and concentration dependent mortality rates were observed in the test fish. Mortality in the test fish may be due to the severe damages in the gills and respiratory distress caused by lead nitrate.

Keywords: Lead nitrate, *Labeo rohita*, Mortality, LC_{50}.

POT5

PEOPLE PERCEPTION ON TOURISM AND ECOTOURISM IN UPPER NILGIRIS, TAMIL NADU, INDIA

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Abstract

Tourism is an important contributor to enrich the economic background of many countries. Tourism is a composition of activities, services and industries that deliver a travel experience, transportation, accommodation, eating and drinking, establishments, shops, entertainment, activity facilities and other hospitality services available for individuals or groups travelling away from home. Tourism is widely considered to be one of the fastest growing industries in the world, and ecotourism is believed to be its fastest growing subsector, though the definition of the term ecotourism has not been clear to date. Ecotourism is becoming more attractive because it is believed that it makes it possible to improve income generation without harming the environment. Ooty is one of the mass tourism destination located in the district called Nilgiris, A Blue Mountains of the Western Ghats; it draws a large number of tourists every year. The study was indented to bring out the interest and preferences of tourists visiting Ooty, to examine the satisfaction of tourists with respect to visiting Ooty, to investigate the problems encountered by the tourists while visiting the hill station and to identify the factors influencing the tourists to visit again to this hill stations. The Nilgiris District is a celebrated summer resort for the tourist from all over India. Ooty's economy depends on the factors, the first one is the plantation and the next one is through tourism activities.

The study was conducted where the places of interest of tourists inside Ooty municipal limit are: 1. Botanical Garden, 2. Boat House and 3. Rose Garden. The study is basically exploratory in nature. The study attempts to analyze the tourist's responses regarding various factors of tourism in Ooty. Questionnaire was surveyed

with the tourists of Tamil Nadu, neighbouring states and few foreign visitors. About 76 questionnaires were administered for analysis. SWOT analysis was made to know the status of tourism in Ooty. The questionnaire contains 38 simple questions and it was given to the visitors to get their opinion. Opinion was asked to the respondents that whether the tourism activities in Ooty can be conducted purely by ecotourism. About 95% of the people agreed that it can be converted with ecotourism which can help the local communities. Almost all the people expressed their satisfaction that the tourism and ecotourism activities being conducted in Ooty and surroundings are appreciable. They also opined that the place is very cool, clean and beautiful. Almost all of them generally opined that to keep the Ooty and its natural beauty as such for future generation. Ooty has already faced a huge setback from the point view of carrying capacity at the Botanical Garden, Rose Garden and Boat House. It is suggested that long term monitoring on nature based tourism or ecotourism in and around Ooty should be carried out to evaluate the merits and demerits.

Keywords: Tourism, Ecotourism, Udhagamandalam, Ooty, Nilgiris, Questionnaire survey.

POT6

ASSESSMENT OF WATER QUALITY OF COLEROON RIVER, TAMIL NADU, INDIA

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Abstract

The study was conducted in Coleroon River from Upper Anaicut to Lower Anaicut Thanjavur District, Tamilnadu. It is the drainage carrier of Cauvery, branching out near Upper Anaicut. Normally, the entire floodwaters of Cauvery, surplus from Mettur dam are being diverted to Upper Anaicut and Coleroon directly and also through Grand Anaicut. Eight stations were selected for collection of water samples and it was analysed for its water quality parameters. The air temperature varied between 28°C and 38°C during the period of investigation. Air temperature has significant relationship with water temperature, dissolved oxygen, phosphate and silicate. The water temperature was found to have significant relationship with air temperature, DO and sulphate. The physiographical and temporal variations of river were reflected in air and water temperature. The conductivity was a factor related to the present study points to its significant relationship with water temperature, phosphate and silicate. During summer, the dissolved oxygen level was reduced because of the decomposition of organic matter, resulting in increased COD and BOD. Sulphate in the water is ranged from 1.1 to 29.52 mg/l. Sulphate was found to have significant correlation with DO, BOD and COD. Phosphate was found to have significant correlation with silicate, BOD and COD. Similarly, Phosphates was observed in the river were within the suitable range for supporting a productive ecosystem. Silicates show significant correlation with Air temperature, Conductivity, DO, BOD and COD. This data was computed with the value of National Sanitation Foundation Water Quality Index (NSFWQI), mostly applicable in USA and India. The results of NSFWQI of Coleroon river indicates that its water quality as 'Good'. Based upon the results, the existing conservation measures have been reviewed and additional measures are suggested.

Keywords : Water quality parameters, Water quality index, Coleroon River, Temperature.

POT7

DETOXIFYING EFFECT OF *CALOTROPIS GIGANTEA* FLOWER EXTRACT ON HEAVY METALS EXPOSED TILAPIA FISH (*OREOCHROMIS MOSSAMBICUS*)

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Abstract

Heavy metals are recognized as one of the most hazardous environmental pollution and they are toxic to many living organisms. Industrial discharges containing toxic and hazardous substances, including heavy metal contribute tremendously to the pollution of aquatic ecosystem causing cytotoxic, mutagenic and carcinogenic effects in animals. Cadmium, mercury, lead and zinc are most toxic to all aquatic organisms and cause secondary hazards to human being. They increase free radicals and oxidative stress which leads to lipid peroxidation, protein denaturation and DNA damages in fishes. Detoxification is the removal of toxic substances from the polluted aquatic medium and living beings that are exposed to heavy metals. There is an increasing scientific interest in medicinal plants as potential sources of bioactive principle including detoxification mechanisms. Thus, the present study aims to to investigate the detoxification effect of crown flowers, *Calotropis gigantea* on combined heavy metals (Potassium dichromate, Lead (II) chloride, Nickel chloride and Cadmium chloride) to tilapia fish (*O. mossambicus*).

The flower of *Calotropis gigantea* were selected as an herbal detoxificant to determine the detoxifying effect in tilapia fishes exposed to 5 ppm of combined toxic metals. Flowers were collected from local area, dried under shade, and powdered with mechanical grinder and then stored in an air tight container. The plant powder was extracted using ethylacetate solvent by Soxhlet apparatus and stored in a desiccator for further studies. To compare the efficacy of herbal detoxificant, Sylimarin (hepatoprotective homeopathic drug) was used as standard. The experimental fishes were exposed with combined heavy metals at a dose of 5 ppm for 15 days. Thereafter the heavy metals exposed fishes were treated with the plant extract by mixing with the feed (boiled egg) for 15 days. Simultaneously another set of heavy metal exposed fishes were treated with Silymarin for 15

days. At the end of the experimental period the fishes were sacrificed to assess the biochemical parameters and their results were compared with control and Silymarin.

Heavy metal exposed fishes showed that significant reduction in the protein, glucose, glycogen and cholesterol levels in liver, gills and intestine. However, the biomarkers GOT, GPT, ALP and ACP were significantly increased in the heavy metal exposed fish tissues. Treatment with ethyl acetate extract of *C. gigantea* flower in the heavy metal exposed fishes showed increased protein, glucose glycogen and cholesterol levels and biomarkers enzyme activities were reduced. The silymarin standard drug treatment also suggested same results. It indicates the toxic effect of the heavy metal was decreased after the addition of plant extract of *Calotropis gigantea.*

Keywords: Heavy metal, *Calotropis gigantea, Oreochromis mossambicus,* biochemical parameters.

POT8

EFFECT OF INSECTICIDE AND FUMIGATION ON SPIDERS: THE BIO-CONTROL AGENT IN GODOWN

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Abstract

Food grains form an important part of the Indian diet. Storage of grain plays a vital role in preventing their loss caused by insects, rodents and micro-organisms. A large number of insect pests are well known to affect the stored grains. Although, many physical and chemical measures are developed to prevent the infestation of stored products, integrated pest management, biological methods is more essential for safety of consumers and the environment as a whole. Spiders play a major role in controlling insect pest especially in agriculture crops and stored grains, with their diverse range of foraging behavior. To understand the spider community of storage godown and assess the effect of insecticide and fumigation used in godown on the spiders of storage places, we surveyed the spiders community in different godowns and compared their density before and after the application of insecticide and fumigation in the godown in Nagapattinum District, Tamil Nadu between December 2011 and March 2012. The survey was carried out in two different godowns (one with paddy and another with grocery items) employing six random plots ($1m^2$) on weekly interval. Overall, nine species of spiders—*Crossopriza lyoni, Pholcus phalongioides, Plexippus paykuli, Plexippus petersi, Lycosa tista, Cyrtophora cicatrosa, Achearanea mundula, Priitha* sp. and *Heteropoda venatoria*—belonging to seven families were recorded with varied densities in the two godowns. In paddy godown, Shannon-Wiener diversity (1.3856) and Evenness index (0.63062) were higher compared to grocery godown, while Species Richness (1.1484) and Dominance Index (0.4149) were higher in the grocery godown. Comparison of density estimated, based on selected spiders, for both before and after the applications of insecticide and fumigation revealed that the density decreased significantly after the applications ('t' test; $p<0.05$), indicating the detrimental effect these chemicals on spiders, which act as potential predators of insect pest in the godowns. Therefore, measures to be taken to minimize the usage of such chemicals and conserve the spiders in the godown so as to maintain hygienic food and environment.

Keywords: Density, Diversity, Godown, Insecticide, Spider.

POT9

BIOCHEMICAL STUDIES ON FRESH WATER FISH *LABEO ROHITA* (HAM.) EXPOSED TO SUBLETHAL CONCENTRATIONS OF SEVIN

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Abstract

Sevin is a Carbamate pesticides widely used in agriculture .In the toxic effect of sevin affect the physiological state of an animal. There by improving the various metabolic levels. The determination of LC_{50} values for 68 hrs exposure to pesticide sevin was found to be 5mg/lit. *Labeo rohito* fishes were exposed two different sublethal concentrations (1mg/lit and 3mg/lit) of sevin for 7 days. The impact of the pesticide on protein carbohydrate and lipid metabolism was studied in muscle, gill and liver of the fish. Significant change in the protein, carbohydrate and lipid content was observed in all the organs studied in fishes exposed 1mg/lit and 3mg/lit. However Biochemical content was markedly decreased in fishes exposed to 3mg/lit when compared to 2mg/lit. From this study it is clear that sevin influences the protein, carbohydrate and lipid metabolism in a dose dependent manner in different organs of *Labeo rohita* fishes.

Keywords: Biochemical studies, *Labeo rohita*, sevin, selected organs.

POT10

PESTICIDE KNOWLEDGE AND PRACTICE AMONG AGRICULTURAL WORKERS IN CAUVERY DELTAIC REGION IN TAMIL NADU, INDIA

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Abstract

Agriculture is the largest sector in South India for generating crops. Agricultural workers (farmers) use pesticides to kill insects, fungi, rodents and other organisms to protect the crop production and preservation of food materials. Cauvery deltaic region is regarded as the `Granary' of South India, unfortunately due to its vast agricultural areas where large amounts of pesticides are being used in agriculture. Next to benefits for agriculture, pesticides impose a huge threat to the environment when they are used in the wrong way. The objective of this work was to determine the level of knowledge and awareness of the farmers towards the use of pesticides in Cauvery deltaic region in Tamil Nadu between January 2016 and December 2016 using the specially designed questionnaire adapted from WHO field surveys of 'Exposure to Pesticides Standard Protocol'. All the participants were male with mean age of 50.5 yrs. While 70% of respondents perceived pesticide spraying affects a person's health, only 30% were aware that it affects the environment. Results of the present study indicate that the majority of farmers prefer Insecticide (70 %) followed by Fungicide (18%). Two thirds of the respondents (60%) were aware that pesticide enters the body through mouth, skin and inhalation. None of them attended any prior training programs related the application of pesticides. Most of the educated farmers (Higher secondary and college level) had good knowledge regarding pesticide. However, none of respondents use any protective clothes like gloves and mask during pesticide spraying. Around 75% of farmers indiscriminately disposed empty containers while 25% buried the leftover pesticides. Strong association was observed between knowledge of the farmers and their practices related to pesticides. Overall awareness of agricultural workers on pesticide was inadequate. Improper disposal of pesticides and its container can produce harm to the environment. The findings of the study emphasize the need to educate agricultural workers regarding safe and adequate use of pesticides to prevent health and environmental hazards.

Keywords: Agricultural land, Cauvery deltaic region, Pesticide Application, Environmental hazards.

POT11

BIOREMEDIATION OF SUGAR MILL EFFLUENT AND THEIR RESPONSE ON AFRICAN MARIGOLD

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Abstract

Environmental pollution is a very serious problem in worldwide. The industrializations are main causes for the environmental pollution. Sugar industry is one of the most important agro based industries in India and it plays an important role in creating rural economy of our country. It released large amount of wastewater into nearby water bodies during sugar production. The wastewater contain large amount of organic and inorganic compounds which harmful affect the water and soil ecosystems. The farmers used this effluent to agricultural field for scarcity of the water which reduced the growth and yield of the crop, soil fertility and also harmful affect the consumers. Bioremediation is a new technique for remedy of this pollution by using microbes and plants. It is a simple, cost effective and eco-friendly technology and it is accepted worldwide. In the present study, the N.P.K.R. Ramasamy co-operative sugar mill effluent treated by using hydrophytic plants (*Eichhornia* sp., *Pistia* sp., *Salvinia* sp. and *Lemna* sp.) and the impact of raw and biologically treated effluent on growth and yield of African marigold (*Tagetes erecta* L.). As a result, the hydrophytic plants reduced the pollutant from the effluent and the biologically treated sugar mill effluent increased the growth and yield of the *Tagetes erecta*. The treated effluent may be present in favourable amount of plant nutrients.

Keywords: Agriculture, Bioremediation, Environmental pollution, Hydrophytic plants and *Tagetes erecta* L.

POT12

EFFECT OF GUAR (*CYAMOPSIS TETRAGONOLOBUS*) MEAL BASED DIETS ON GROWTH PERFORMANCE AND FEED UTILIZATION IN ASIAN CATFISH, *PANGASIANODON HYPOPHTHALMUS* FINGERLINGS

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Abstract

An experiment was carried out to evaluate the potential of guar meal as a substitute for soybean meal in the diet of Asian catfish *Pangasianodon hypophthalmus*. Six experimental diets of isonitrogenous and isolipidic were formulated to contain guar meal at 0, 5, 10, 15 and 20% level by replacing soybean meal at 0, 25, 50, 75 and 100% respectively. An experimental diet containing 20% soybean meal and 0% guar meal was used as a control diet. Triplicate group of 15 fingerlings (2.74 ± 0.07 g mean initial body weight) were fed with each diet for a period of 45 days in a completely randomized design under tank condition. Analysis of proximate composition showed that the crude protein and ether extract content of guar meal were slightly higher than those of soybean meal (50.11 Vs 47.09% and 4.90 Vs 3.41% respectively), but lower total ash content (4.71 Vs 6.23%). The results of 45 days feeding experiment showed that there were no significant ($p > 0.05$) difference in various growth parameters namely, percent weight gain, average daily growth coefficient, specific growth rate and daily growth coefficient of fingerlings that fed with diets containing guar meal up to 10 % inclusion level. The feed conversion ratio (FCR) was significantly lowered ($p < 0.05$) in the fingerlings fed with diets containing more than 10% of guar meal (GM 15 and GM 20). Similarly, the survival rate was also reduced significantly ($p < 0.05$) in GM 15 (58.33%) and GM 20 (41.64%) dietary groups compared to control group (97.77%). Results of the present study concludes that guar meal can be included up to 10 % by replacing soybean meal at 50% during feed formulation for Asian catfish, *Pangasianodon hypophthalmus* fingerlings without affecting the growth performance and feed utilization

Keywords: Aqua feed, Soybean meal replacement, Guar meal, Asian catfish, *Pangasianodon hypophthalmus*, Growth performance

POT13

AVOIDANCE BEHAVIOURAL TEST ON OECD SOIL WITH *EISENIA FETIDA* EXPOSED TO SUPERPHOSPHATE

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Abstract

The Avoidance Behavioural Test (ABT) is one of the simplest and basic ecotoxicological test performed using Eisenia foetida as the test organism with OECD artificial soil as the substrate. Since now many tests have been performed using various chemicals like insecticides, pesticides, etc.. But studies relating the effect of chemical fertilizers were not yet performed. Thus this study was aimed to monitor the effect of the chemical fertilizer, Superphosphate (SP) on the earthworm, *Eisenia fetida*. Another important indirect effect especially of SP fertilization is soil acidification, with considerable negative effects on earthworms. The avoidance behaviour of earthworms regarding SP was tested in the OECD soil under temperate condition in the range of concentrations from 330.40 to 5442.5mg/ kg. The results indicate a significant reaction of earthworms to the lower concentrations of SP in OECD soil. The EC_{50} values with 95% confidence limit and LOEC and NOEC values were 1307.7[95% CL – n.d.], 348.0 and 73.3mg/kg. Extension of this study to other types of soil with other fertilizers would improve the understanding of toxicity to earthworms.

Keywords: Avoidance Behavioural Test, *Eisenia foetida,* Superphosphate, OECD Soil, Temperate condition

POT14

EFFECT OF TAPIOCA WASTE IN PHYTOREMIDATION OF CADMIUM POLLUTED WATER

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Abstract

Environmental pollution affects the quality of pedosphere, hydrosphere, atmosphere, lithosphere and biosphere. Great efforts have been made in the last two decades to reduce pollution sources and remedy the polluted soil and water resources. Cadmium which is widely used and extremely toxic in relatively low dosages, is one of the principle heavy metals responsible for causing kidney damages, renal disorder high blood pressure, bone fraction and destruction of red blood cells. Phytoremediation, being more cost-effective and fewer side effects than physical and chemical approaches, has gained increasing popularity in both academic and practical circles. Many plant species have been identified to have potential for soil and water remediation. However no study was reported on phytoremediation of tapioca waste. Thus the present study was carried out to know the phytoremediation effect of cadmium by using tapioca waste.

Cadmium removal efficiency of different tapioca waste was analysed under laboratory condition. Cadmium nitrate (0.1mg/ml) was prepared and treated with 4 different concentrations of vegetable waste at pH 8. Spectrophotometric analysis was performed to know the amount of cadmium present in water. Tapioca waste showed high percentage of absorption of cadmium even at low concentration. Thus, the waste of tapioca may be used for the removal of cadmium pollution in the water. From the result it is concluded that phytoremediation technique using tapioca waste has the potential to be remediation on cadmium polluted water.

Keywords: Phytoremediation; Heavy metal; Cadmium pollution.

POT15

CLIMATE CHANGE AND CONSERVATION OF GREEN ENVIRONMENT WITH SPECIAL REFERENCE TO GREY WATER USE FOR AGRICULTURAL PURPOSES

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Abstract

Climate change occurs due to temperature and weather patterns in the environment at regional level. Water is one of the outstanding problems in the world for irrigation and drinking purposes due to insufficient of rainfall now a day. So some alternative techniques are essential one to save water all over the world. Every day resources like water got wasted because of our life style. People use a lot of water at the kitchen, sink-cooking, washing dishes. This then went to waste. At present a method is essentially required to remove impurities present in daily use water. The impurity water should be removed without spending too much money. The method should be implemented in ordinary households. Hence, the M.Sc., Zoology students of Nehru Memorial College (Autonomous) (N11° 03.845'; E078° 41.007'), Puthanampatti, Trichy district, Tamil Nadu, India has started a project on Grey water use for irrigation purposes within the college campus. A plot which has 25x10 feet area was selected, and various plants such as white radish, merchi, tomato were planted in two areas viz grey water irrigation plot and fresh water irrigation plot. At present lush growth of saplings are recorded both the plots. However slight changes are recorded in plant growth. The mean plant growth is 15.12±1.36 cm in Grey water irrigation plot and 13.12±1.85 cm in fresh water irrigation plot of white radish. The day hour's temperature is around 32±0.85 °C in the plot area. The fresh water pH is around 8.62±0.20 and the grey water pH is around 9.58±0.12. The control plot soil pH is 7.39±0.19 and the experiment plot soil pH is 7.43±0.19. We are taking the other parameter and are in pipeline and to be analysed for thesis preparation during April 2017. Hence, this kind of project should reach all over the districts that are our aim of this project. Various purification process of grey water has been discussed detailed in this paper. The lab to land techniques is successfully implemented in Puthanampatti village.

Keywords: Climate change, Conservation, Greywater

POT16

BIOREMEDIATION ACTIVITY OF DIFFERENT BACTERIA ON POLLUTED LAKE WATER IN TRICHY DISTRICT OF THURAIYUR AREA, TAMIL NADU, SOUTHERN INDIA

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Abstract

The present study was under taken at Thuraiyur area (N11° 03.845'; E078° 41.007') of Trichy district, Tamil Nadu, India from June 2016 to December 2017. The water pollutants were analysed using in various strains of bacteria. Further, the physico chemical parameters of lake water were analysed. The lake is locally called 'Chinna aree'. Parameters such as pH, Total suspended solid (TSS), Total dissolved solids (TDS), Dissolved oxygen, carbon dioxide, slicate, BOD, Phosphate were estimated in the polluted water. The bacterial strains such as *Basillus subtilus*, *Enterobacter aerogenes, Escherichia coli, Pseudomonas putida* were used for bioremediation process. The present study revealed that these strains were successfully remediate the pollutants. After the treatment with *Basillus subtillus*, the oxygen level was increased in the polluted water when compared with other bacterial strains. The bacterial inoculation also decreases the levels of pH, carbondioxide, silicate phosphate and TDS levels. As per our observations, the bacterial inoculation triggers the bioremediation process and within the limited period they normalize the polluted water. Hence, it is concluded that the bacteria can be used as a good bioremediation activity. This methods can be applied in the other polluted areas in Trichy districts. From the above results, we can conclude that the use of bacteria give much importance in treating polluted waters. Further studies will contribute the through knowledge about the bioremediation mechanism of *Bacillus subtilus*. The different kinds of bacteria were utilized to treat the polluted lake water. The *Bacillus subtilus, Enterobactor aerogenes, Escherichia coli* and *Pseudomonas putida* are inoculated for Bioremediation process. The polluted Lake water was collected and analyzed for its physico-chemical properties. The initial values of Physico-chemical properties are tabulated. The initial value of pH (8.22), oxygen (1.5), Carbondioxide (2.5), Silicate (0.07),TSS (0.865), TDS (0.112), BOD (3.5), Phosphate (0.07) were higher in the polluted lake water. Various aspects of bioremediation process are discussed in this paper.

Keywords: Thuraiyur area, Lake Water, Bioremediation using different Bacteria**.**

POT17

ANTHROPOGENIC PRESSURES IN THE INDIAN PEAFOWL (*PAVO CRISTATUS*, LINNAEUS 1758) HABITATS AT THURAIUR AREA OF TRICHY DISTRICT, TAMIL NADU, SOUTHERN INDIA

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Abstract

Anthropogenic pressures such as livestock grazing, collection of fire wood and Non Timber Forest Produces (NTFP) exist in Thuraiyur area of Trichy District Tamilnadu during the study period 2012-2014. The Bench mark survey revealed that, 1,085 cattle and 2,230 sheep and goats entered this forest range from 12 villages. It was found that these cattle graze from 1000 – 1700 hrs. daily in the Thuraiyur study areas. 160 firewood collectors visited from the five villages intensively in the study area and collected 3,160 kgs @ 100 kgs of head load of fire wood. Out of 21 plant species, *Prosopis juliflora*, *Delonix elata*, *Azadirachta indica*, *Eucalyptus* sp. and *Acacia nilotica* were the dominant plant species preferred as firewood by the local people. At Thuraiyur study area 08 Non Timber Forest Produces (NTFP) items were collected by the local people. This leads to destruction of undercover which affect the foraging, resting and nesting grounds of Indian Peafowl. Alternate livelihood programmes may be launched or intensive awareness programmes with regard to resource utilization and management should be organized for villagers. The most serious threat to the long-term survival of the endemic Indian Peafowl comes from the activities of farmers who set deliberate poison to kill these birds against crop damage in some of the study areas. In the present investigation about 43 Indian Peafowl were killed due to deliberate poisoning for the three years between 2012 and 2014. Five Peafowls were accidentally killed at Thuraiyur and Trichy Highway metal road. Three incidents of egg pirating were recorded and five Peafowls were found dead by unknown manner. There is an urgent need for surveys to be done to determine the whereabouts of viable populations of the Indian Peafowl though the number is high. It is essential as a long-term aim that conservation education should encourage people.

Keyword: Indian Peafowl, *Pavo cristatus*, Anthropogenic pressures, Thuaiyur area.

POT18

MOLECULAR STUDIES ON THE PROTECTIVE ROLE OF EPIGALLOCATECHIN GALLATE AGAINST FLUORIDE INDUCED TOXICITY IN HIPPOCAMPUS OF RATS

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Abstract

Fluoride (Fl) exposures produce neurodegeneration and induce oxidative stress in the brain. Neuroprotective role of EGCG on Fl induced ROS mediated apoptosis in rat hippocampus has not yet been studied. Hence, the present study is focused to see whether EGCG (40mg/kg/bw) supplementation prevents Fl induced oxidative stress on rat hippocampal apoptosis. Fl (25mg/kg/bw) administrated rats showed increase Fl concentration along with decreased AChE activity in the brain. The oxidative stress markers (ROS, TBARS, NO and PC) significantly increased with decreased enzymatic (SOD, CAT, GPx, GR, GST, and G6PD) and non enzymatic antioxidant (GSH, TSH and Vit.C) in Fl intoxicated rats. Moreover, the intrinsic and extrinsic pathway mediated apoptotic markers were also significantly altered in the hippocampus of Fl intoxicated rats. Fl induced ROS increased the DNA damage and induced neurodegeneration were assessed by histological studies. Pre-administration of EGCG at 40 mg/kg bw for 28days has protected Fl induced oxidative stresses, biochemical changes, cellular apoptotic and histological alternation in the hippocampus of adult male rats. In conclusion, EGCG supplementation significantly decreased the neuronal damage and effectively scavenged the free radicals induced by Fl and protects rat hippocampus against Fl induced neuronal apoptosis.

Keywords: Fluoride, ROS, Brain, Apoptosis, Rat, Hippocampus

POT19

INFLUENCE OF TANNERY INDUSTRIAL EFFLUENT INDUCED HISTOPATHOLOGICAL ALTERATIONS IN GILL AND LIVER OF FRESHWATER FISH *CATLA CATLA* (HAMILTON)

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Abstract

Water pollution has now become an international issue. Water is scarce and its demand is likely to intensify, it mandates more attention. Pollution of water is mainly due to contamination with hazardous chemicals from agricultural runoff and wastewater from house hold and industries. The tannery industries are one of the water based industries as they use large quantity of water and chemicals in processing the leather. Of all the industrial wastes, the tannery effluent is found as most dangerous pollutant. The present investigation experimental fishes were exposed to 21 days LC_0 concentration of tannery effluent for 21 days. The control and experimental fishes were dissected out and the samples were collected at the end of 21 days. The tissues like liver and gills were collected for histological studies. The fish, *Catla catla* when exposed to sublethal concentration of tannery effluents for 21 days showed marked histopathological changes in their gill. Excessive secretion of mucous, fusion of secondary gill lamellae, reduction in length, swelling of epithelial cells of secondary lamellae and cytoplasmic vacuolization were some of the observable changes. The structural organisation of the liver appeared disturbed when fish were exposed to 21 days sublethal concentration of tannery effluents. Rupture of hepatocytes, necrosis and vacuolization were some of the observable changes in the liver. The tannery effluent consists of variety of toxic components such as heavy metals, soda, lignin, chlorine, resin acid, dioxin, and furan. These toxicants deliberately affect the aquatic organisms including fish and through food chain that toxicant affects human beings.

Keywords: *Catla catla,* gill, histology, liver, tannery effluent

POT20

PROTECTIVE EFFECT OF *PISONIA ALBA* IN ATRAZINE TOXICITY ON BIOCHEMICAL MAKERS ENZYMES IN THE LIVER TISSUE OF ALBINO WISTER RAT *RATTUS NORVEGICUS*

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Abstract

The present study was undertaken to evaluate the hepatoprotective effect of *P. alba* against the toxicity effects of herbicide atrazine on AST, ALT, ACP and ALP in the albino wister rat *Rattus norvegicus*. In the present experimental study, *Rattus norvegicus* were intoxicated to sub lethal dose of atrazine (0.25 mg of atrazine) for 28 days. The biochemical makers enzymes in the liver were evidence by increased compared to the control. During the treatment of *Pisonia alba* against atrazine intoxicated rats were restored near normal level (Group III and IV) the observed results were discussed in detail.

Keywords: Atrazine, *Rattus norvegicus*, *Pisonia alba* and Biochemical makers enzymes.

POT21

IN VIVO STUDIES ON THE ROLE OF SPIRULINA ON MERCURIC CHLORIDE INTOXICATED LIVER AND KIDNEY OF FISH *LABEO ROHITA* (HAMILTON)-A HISTOLOLOGICAL SURVEY

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Abstract

The present investigation was revealed that the studies on the histopathological effects of 7 days sub-lethal concentration (0.15 ppm) of mercuric chloride on fish revealed that these metallic salt are capable of producing severe damage and changes in its cellular histoarchitecture of the liver and kidney leading to the death of the animal. The intoxicated fish again treated with *spirulina* of required concerntration (5.0 ppm) for another 7 days to promote the regeneration of liver and kidney cellular histoarchitecture of fish.

Keywords: Mercuric chloride, *Spirulina* , Fish, Liver, Kidney.

POT22

EFFICACY OF ECO-SAFE AND ECO-FRIENDLY ORGANIC EXPOSURE ON HEAMATOLOGICAL CHARACTERISTICS AND DISEASE RESISTANCE IN *OREOCHROMIS MOSSAMBICUS* AGAINST *AEROMNAS HYDROPHILA*

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Abstract

Many freshwater ecosystems are contaminated with micro-organisms, industrial, domestic and agricultural chemicals, such as herbicides and insecticides, which are ubiquitous and can spread regionally and globally. *Aeromonas hydrophila*, as a strong Gram-negative bacterium, can infect a wide range of freshwater fish, including chichild carp *Oreochromis mosambicus*, and cause the huge economic loss. Though vaccines are the best way to control the outbreak of the disease caused by *A. hydrophila*, it doesn't have practical feasibility. Hence, using immunostimulants for disease prevention is suggested. The aim of this study was to assess the effect of comparison of cow and bull urine on the haematology and disease resistance in *O. mossambicus*. Thirty healthy tilapia were randomly divided into five equal groups. Fish of group 1-4 were treated with cow and bull urine at 0.1% (v/v) concentration as T1-Gir cow calf urine; T2-Gir bull calf urine; T3-Gir cow urine; T4-Gir Bull urine and Control-without cow urine exposure for a week. Fish were immunized with heat killed *A. hydrophila*, with i.p injection of 0.2 ml of $1x10^7$ cells/fish of post treatment. Blood samples were collected on 7th, 14th, 21st and 28th days post immunization. Different haematological parameters (haemoglobin content, total erythrocyte count, total leukocyte count, mean corpuscular haemoglobin) were evaluated. After 30 days, all the groups of fish were challenged with virulent *A. hydrophila* $1x10^7$ cells/fish. It was found that Gir cow urine conferred positive effects on the haematological parameters and relative percentage survival after *A. hydrophila* infection, when compared with bull and calf cow urine. Considering these promising results, we suggest that cow urine administration at 0.1% concentration for 7 days can effectively improve immunity of *O. mossambicus*.

Keywords: *O. mossambicus*, Gir Bull, WBC, RBC, Haemoglobin, *Aeromonas hydrophila*.

POT23

ANALYSIS OF MAGNESIUM DOPED ZINC OXIDE NANOPARTICLE TOXICITY ON FRESHWATER FISH *LABEO ROHITA* – A HISTOLOGICAL SURVEY

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Abstract

Nanotoxicology is a study of impact of manufactured nanoparticle on living organisms and environment. Nanoparticle metal oxides have been used in various fields such as consumer products, industrial application and health care technology are likely to enter the environment. The present investigation was revealed that the studies on histopathological effects of Lethal concentration 50 in various doses such as 50, 75, 100, 125 and 150mg/L of Mg doped Zno nanotoxicants may evoke changes in liver and gill and cause death of freshwater organism. A great deal of research has therefore been conducted to understand the effect of toxicants on the physiology of aquatic organism especially in fish.

Keywords: Magnesium doped Zinc oxide, *Labeo rohita*, Gill, Liver.

POT24

EFFECT OF ORGANIC SUPPLEMENT (PANCHAGAVYA) AND PESTICIDES (ROCKER) ON SEED GERMINATION IN FENUGREEK (*TRIGONELLA FOENUM-GRACUM.* L) *IN VITRO*

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Abstract

Pesticides are highly toxic substances. Their toxicity may not be absolutely specific to the target organisms but can adversely affect different processes in the non-target host plants. Panchagavya can be used to reduce the toxic effect of pesticides. *Fenugreek (Trigonella foenum-graecu*m L.) is important pulse crops grown in India to eradicate the malnutrition and hunger from developing country like India. Pesticides and panchagavya were exposed at different concentrations like 0.1%, 0.25%, 0.5% and 1% (v/v) for 96 hours. In the present study, the effect of pesticides and panchagavya on seed germination, seedling emergence, seedling vigour, stem height, stem diameter, root length, and shoot length in *T. foemu,-graecum* seeds for 96 hours was observed. All the tested pesticides reduced the growth of fenugreek where as panchagavya had stimulatory effects on growth and seed germination as compared to the control, as well as pesticide. The best concentration of panchavya was found to be 0.5% (v/v). The combined effect of treatment on germination and on seedling development was discussed.

Keywords: Panchagavya, Pesticides, seed germination, fenugreek, *T.f-graecum*.

POT25

COMPARISION OF TRACE METALS ACCUMULATION ON THE MUSSEL *PERNA VIRIDIS* IN THE COASTAL WATERS OF NAGAPATTINAM, TAMIL NADU, INDIA

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Abstract

The concentration of Fe, Mn, Zn and Cu in the Whole soft tissue of male and female *Perna viridis* and coastal water from three sampling sites (Tranquebar-1,Thirukkadaiyur-2 and Thirumullaivasal-3) along the Nagapattinam coastal waters revealed higher concentration of Fe, Mn and Zn in station -1 followed by Cu in station -3. In all the sampling sites female showed higher trace metals accumulation, except in station -1 water showed high accumulation of Fe content. Among the different trace metal accumulated by *P.viridis*, their level was within the maximum permissible limit. So the mussels are suitable for human consumption. The trace metal content may be due to a variety of natural and anthropogenic activities.

Keywords: Manganese, Zinc, Copper, Accumulation, *Perna viridis*

POT26

CHARACTERISTICS AND CHANGES IN THE WATER QUALITY OF VEERANAM LAKE, CUDDALORE DISTRICT, TAMILNADU, INDIA

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Abstract

One of the major freshwater bodies in Tamil Nadu, Southern India is Lake Veeranam which provide water source for agricultural and domestic purposes. Further, the water is distributed to different areas for drinking and cooking purposes. The lake is surrounded by agricultural fields where the farmers intensively undertake agricultural operations and use fertilizers and various other chemicals. Hence, it seems that the water quality could vary widely and can yield unsuitability of water for domestic purposes. We assess the characteristics of water quality and changes in turbidity, electrical conductivity, pH, dissolved oxygen, total dissolved solids (TDS), calcium, magnesium, iron, manganese, free ammonia, nitrite, nitrate, chloride, fluoride, sulphate, and phosphate March 2014 to March 2015. All these parameters were within the permissible limits in most of the months for using the water for domestic purposes. However, the changes in the level of calcium, magnesium, iron, manganese, free ammonia, nitrite, nitrate, chloride, fluoride, sulphate, and phosphate exceeded the permissible months during summer months i.e. from April to July. In this paper, we assess the suitability of the water for domestic uses and changes in the water quality across different months.

Keywords: Veeranam Lake, Water Quality, Agricultural Chemicals

POT27

ACUTE TOXICITY AND BEHAVIOURAL RESPONSES OF *CYPRINUS CARPIO* TO ORGANOPHOSPHORUS PESTICIDE, MONOCROTOPHOS

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Abstract

Monocrotophos is a commonly used organophosphorus pesticide in agricultural fields, which gets mixed up with the nearby freshwater systems through agricultural run-offs, thereby affecting by and large the aquatic biota and fishes in particular. In the present investigation, the acute toxicity and behavioral response of Monocrotophos to Common carp, *Cyprinus carpio* was observed. The acute toxicity bioassay was carried out in a static renewal system. It is evident that no mortality of *Cyprinus carpio* was recorded at 20.5 mg/l of Monocrotophos up to 24 hrs. of exposure. The LC_{50} values of Monocrotophos at various exposure period were found to be 21.0 mg/l for 96 hrs; 21.5 mg/l for 72 hrs; 22.0 mg/l for 60 hrs; 22.5 mg/l for 48 hrs and 23.5 mg/l for 24 hrs. The *Cyprinus carpio* showed behavioral alterations against Monocrotophos intoxication viz. uncoordinated movements, erratic swimming, convulsions, excess mucus secretion, decreased opercular movements, loss of balance, drowning and changes in body pigmentation, muscle fasciculation, moribund lethargy, refusal of feeding and respiratory distress. These symptoms became more apparent with increase in duration of exposure at all test concentrations of Monocrotophos.

Keywords: Acute toxicity, behaviour, *Cyprinus carpio*, Monocrotophos

POT28

PHYSICAL CHARACTERISTICS OF ARASALAR RIVER OF KARAIKAL REGION, PUDUCHERRY, INDIA

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Abstract

Water quality assessment is an important part of environmental monitoring. When water quality is poor, it affects not only aquatic life but the surrounding ecosystem as well. Studies on water quality assessment (Physical characters) were conducted in Arasalar River of Karaikal region, Puchucherry Union Territory, India. The study was conducted for four consecutive months of October, November, December (2015) and January (2016). Water samples were collected from six different locations of the Arasalar River of Karaikal region. Physical parameters such as Colour, Temperature, Suspended solids, TDS, Turbidity and Total hardness were analyzed. The colour was brown and the average temperature was 30±2°C for all the four months. The other parameters such as Suspended solids, TDS, Turbidity and Total hardness were seen increased to about 200 – 250% in all the four months. This may be due to the industrial effluents that are discharges in the River in Karaikal region. Further studies on chemical and biological parameters must be done to determine the pollution level of Arasalar River and the eradication measurements must be followed.

Keywords: Water Quality Assessment, Physical characters, Arasalar River, Karaikal region.

POT29

POPULATION SIZE AND SOCIAL STRUCTURE OF RHESUS MACAQUE (*MACACA MULATTA*) IN TELANGANA STATE, INDIA.

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Abstract

Human population growth and activities like deforestation, agriculture and urbanization lead to an ever-increasing encroachment on wildlife habitats. Reduction in wild animals' natural habitats forces many species to adapt to altered habitats and small isolated marginal patches. Primates, in particular, often come into direct competition with humans and are sometimes considered a serious menace and persecuted as pests. Due to their great behavioural flexibility and adaptability, Rhesus macaques (*Macaca mulatta*) are able to acclimatize to varying environmental conditions. Hence, the present study on population estimation and social structure of *M. mulatta* will certainly helps the wildlife managers to develop the management strategies to minimize the population and reduce the man-animal conflict. The study was conducted at selected locations of Telangana state during the period of 2014 - 2016. The study was initiated by interviews with the people asking whether they have come across *M. mulatta* at locations where they carry out their daily activities, and if yes, noted the location. Population surveys will be carried out throughout the study area from all the accessible trails. Total counts will be used to survey populations. The trails were walked slowly at 0.5 km/hr. Observers paced along trails stopping every 100 meters to search the area for 10 minutes by applying both visual and auditory cues simultaneously. A total of 6886 Individuals in 201 troops were observed and the range varies from 2 to 218 individuals. The number of troops observed was high in Nizamabad district (67) followed by Medak (48), Khammam (46), Adilabad (17), Warangal (16), and Karimnagar (7). However, the mean group size was predominantly high at Karimnagar (39.05 ± 4.03) followed by Warangal (23.01 ± 3.04), Khammam (45.04 ± 5.97), Medak (34.90 ± 5.93), Adilabad (19.24 ± 3.42) and the lowest was at Nizamabad (16.45 ± 1.42). The presence of Rhesus macaque in agricultural fields and

human habitations in high numbers with greater sex ratio is mainly due to the non availability of resources in natural habitats and less predatory pressure influences the species in shifting to the road sides and agricultural areas. This leads to the intensive crop damage in agricultural fields and increases man-animal conflict. Hence, proper management strategies should be developed to minimize the man-animal conflict along with restoration of natural habitats.

Keywords: *Macaca mulatta*, distribution, total count, Telangana

human habitations in high numbers with greater sex ratio is mainly due to the non availability of resources in natural habitats and less predatory pressure influences the species in shifting to the road sides and agricultural areas. This leads to the intensive crop damage in agricultural fields and increases man-animal conflict. Hence, proper management strategies should be developed to minimize the man-animal conflict along with restoration of natural habitats.

Keywords: *Macaca mulatta*, distribution, total count, Telangana

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