INTERNAL ANNUAL RESEARCH SEMINAR

PROGRAMME

Monday, 23rd May, 2016

Venue: Conference Room, GIS Building, Tamil Nadu Forest Academy (TNFA), Forest Campus, R.S.Puram, Coimbatore

Seminar Chairperson: Sh. Qamar Qureshi, Scientist-G, Wildlife Institute of India, Dehradun

0930 – 0935 hrs Welcome: Dr. P. V. Karunakaran Principal Scientist, SACON

0935 – 0945 hrs Opening Remarks: Sh. Qamar Qureshi, Scientist-G, Wildlife Institute of India, Dehradun

TECHNICAL SESSION – I Part (1)

Studies on Avifauna: - Habitats

Chair : Dr. P. Balasubramanian, Senior Principal Scientist, SACON

Co-Chair : Dr. S. Babu, Scientist, SACON

0945 – 1000 hrs Nest-site Characters and breeding success of the Endangered Narcondam Hornbill on the Narcondam Island, India.
Dr. Manchi Shirish S., Senior Scientist

1000 – 1015 hrs Factors influencing the habitat use of owls in North Andaman.
Suresh marimuthu, Project Fellow

1015 – 1030 hrs Mapping key nesting sites of coastal and marine birds for identification of Ecologically Sensitive Areas (ESAs) along Indian coasts.
Dr. Rajah Jayapal, Principal Scientist

1030 – 1050 hrs Discussion and remarks by Session Chair and Co-Chair

1050 – 1115 hrs TEA

Sálim Ali Centre for Ornithology and Natural History (SACON)
(A Centre of Excellence under the Ministry of Environment, Forest & Climate Change, Govt. of India)
Anaikatty (Post), Coimbatore, Tamil Nadu - 641 108

TECHNICAL SESSION – I Part (2)

Studies on Avifauna: - Ecology and Management

Chair : Dr. S. Muralidharan, Senior Principal Scientist, SACON

Co-Chair : Dr. Mahendiran M. Scientist, SACON

1115 – 1130 hrs Patterns of bird species diversity along elevational gradients in Sutlej River Basin, Western Himalaya, Himachal Pradesh.

Shanthakumar B., PhD Scholar

1130 – 1145 hrs Co-occurrence in serpent eagles (*Spilornis*) on the Andaman Islands, India.

Shivkumari Patel, Project Fellow

1145 – 1200 hrs Assessment of management strategies of bird hazards to aircraft in select Indian Air Force airfields.

S. Srinidhi, PhD Scholar

1200 – 1215 hrs Heavy metal contamination in select species of birds in Gujarat.

V. Kirubhanandhini, Technical Assistant

1215 – 1245 hrs Discussion and remarks by Session Chair and Co-Chair

1245-1330 hrs LUNCH

TECHNICAL SESSION – II

Ecological Studies

Chair : Dr. P. A. Azeez, Senior Principal Scientist-I, SACON

Co-Chair : Dr. H. N. Kumara, Senior Scientist, SACON

1330 – 1345 hrs Documentation of the biodiversity of Sompeta wetland, Srikakulam District, Andhra Pradesh.

Dr. Mathew K. Sebastian, Principal Scientist

1345 – 1400 hrs Diversity and distribution of Odonata in Coimbatore District, Tamil Nadu.

Suhirta Muhil M., PhD Scholar

1400 – 1415 hrs Occurrence and distribution of endemic flowering plants in the Sathyamangalam Tiger Reserve, Tamil Nadu.

L. Prakash, PhD Scholar

1415 – 1430 hrs Co-occurrence in non-*Panthera* cats of Eaglenest Wildlife Sanctuary and Community Reserve, Arunachal Pradesh.

Prafull Choudhary, Project Fellow

1430 – 1445 hrs Diversity and distribution of selected faunal taxa in paddy fields.

Chaithra Shree J., PhD Scholar

1445 – 1500 hrs Vocalizations of birds in Anaikatty Hills – a preliminary analysis.

C. Divyapriya, PhD Scholar

1500 – 1530 hrs Discussion and remarks by Session Chair and Co-Chair

1530 – 1545 hrs TEA

TECHNICAL SESSION – III

Assessment Studies

Chair : Dr. Mathew K. Sebastian, Principal Scientist, SACON

Co-Chair : Dr. Manchi Shirish S. Senior Scientist, SACON

1545 – 1600 hrs Status of Mangrove habitats in Palk Bay - preliminary study.

Nishadh K.A., Project Fellow

1600 – 1615 hrs A study on teachers' awareness, attitudes and practice of environmental education in Coimbatore District, Tamil Nadu.

Chandran R., PhD Scholar

1615 – 1625 hrs Discussion and remarks by Session Chair and Co-Chair

CONCLUDING SESSION

1625 – 1640 hrs Concluding Remarks : Sh. Qamar Qureshi, Scientist-G, Chairman, IARS

1640 – 1645 hrs Vote of Thanks : Dr. Goldin Quadros, Senior Scientist, SACON

Nest-site Characters and breeding success of the EndangeredNarcondam Hornbill on the Narcondam Island, India

- Manchi Shirish S.

Narcondam Hornbill *Acerosnarcondami* is one of the most endangered and restricted range avian species, distributed only on the 6.82 sq.km. Narcondam Island. We focused on understanding the nest-site characteristics of the endemic Narcondam Hornbill, on the Narcondam Island. During January to April 2013, total 23 nests were found in seven families of trees. To understand nest-site characteristics, we measured 11 different continuous variables from 23 nests. Four components of Principal Component Analysis explained 72.75% of total variance. Component 1 described 31.2% and was correlated with the nest tree characteristics (Nest Tree GBH, Cavity Height, Nest Tree Height and Height of First Branching). The second component explained 21.05% and was correlated with the nest hole and nearest branching (GBH of Nearest Branching, Distance from Nearest Branching and Shape of Cavity).The third component explained 12.4% and was correlated again with the nest tree characteristics (GBH at cavity and Nest tree species). The fourth component explained 8.1% and was correlated with the Altitude. Rao Spacing Test determined uniformity in nest orientationrevealed that no directional dependency in nest selection ($U=251.679 > p=186.450$, $\alpha= 0.05$). Just above 60% of the nest openings were oriented either in NE, E or SE direction. Roundholes were selected over the oval cavities with significant variations in the concealment of these cavities ($\chi^2= 9.49$, $p=0.05$). The nest tree GBH reduced at higher altitudes with an increase in the canopy cover.Nest success could only be determined for 18 of 23 nests. No nest witnessed complete failure, with 15 nests (83.3%) displaying complete success (both chicks fledged) and three nests (16.7%) demonstrated partial success (only one chick fledged). Height of First Branching, Nest Tree Height, Nest Tree GBH, and Cavity Height were found critical for the nest success of study species.

Project Title	:	Status Ecology and Conservation of Narcondam Hornbill *Aceros narcondami* on Narcondam Island, India
Investigator(s)	:	Dr.Manchi Shirish S.
Researcher(s)	:	-
Funding Agency	:	Ministry of Environment, Forest & Climate Change (MoEF& CC), Govt. of India
Project Duration	:	November 2010 to December 2016

Factors influencing the habitat use of owls in North Andaman

-Suresh marimuthu

Absence of data on endemic species and increasing anthropogenic pressure in Andaman Islands urge us to identify and prioritize the habitats for their conservation. In this context, we identified ecological determinants that influence the occurrence of owls on Andaman Islands using Occupancy Framework. To achieve this, we overlaid 4 km^2 spatial grids on a base map of North Andaman Island. Fifty percent of the grids were selected for sampling and all selected grids were further subdivided into four 1 km^2grids as spatial replicates. Within each sub-grid, one owl census was conducted by employing three techniques viz., listening to spontaneous calls, call playback and spotlight searches. At each census point, site and sampling covariates were measured using standard sampling techniques to examine *apriori* hypothesis of determinants that influence the detection probability and occupancy of owls respectively. Sampling covariates such as temperature, humidity, wind speed and noise level were measured while site covariates such as terrain (elevation and slope), tree and understorey characteristicswere quantified. The detection probability of owls was 0.03 for Barn Owl and 0.78 for Oriental Scops Owls. Except for Barn Owl (0.11), the others, Andaman Scops Owl (0.89), Andaman Hawk Owl (0.94), Hume's Hawk Owl (0.96) and Oriental Scops Owl (0.98),had high naïve occupancy.

Project Title	: Owl assemblage and occupancy in Andaman archipelago, India.
Investigator(s)	: Dr. S. Babu & Dr. H. N. Kumara
Researcher(s)	: Mr. S. Suresh marimuthu & Mr. N. Rajeshkumar – Programme Fellows
Funding Agency	: Department of Science and Technology (DST-SERB) Govt. of India
Project Duration	: 19.06.2013 to 18.06.2016

Mapping key nesting sites of coastal and marine birds for identification of Ecologically Sensitive Areas (ESAs) along Indian coasts

- Rajah Jayapal

Important nesting sites of coastal and marine birds have been recognized as one of the 11 key criteria employed to identify Ecologically Sensitive Areas (ESAs) along the Indian coasts. We undertook a study to collate information on nesting sites of birds along India's seaboard, prioritize sites based on their conservation significance and map their extent with boundaries. In total, 56 species of coastal and marine birds that are known to regularly nest along the Indian coasts were shortlisted and 708 records of their nesting from both published and unpublished sources were collected. Our database also includes site names, geographical coordinates, microhabitat type, abundance of birds (if available) nesting information (if provided), number of nests (if available), and protection status of nesting sites. Based on these criteria, a prioritization algorithm was developed to identify and shortlist the nesting sites for recommendation as potential ESAs. Our database contained the highest number of nesting records for coastal heronries (259), followed by mangroves and littoral forests (137), woods on seaboard (107), seashore and sandbank (51) and coastal caves (39). Based on the multiple criteria, 90 sites were prioritized to be considered as ESAs along the Indian coasts. The highest number of shortlisted sites were from Andaman & Nicobar Islands (62) followed by Maharashtra and Tamil Nadu (five each). Of the 90 sites, 67 are Protected Areas (PAs) and 23 are located outside PAs. Using habitat-based algorithm in Google Earth Pro and 1:50,000 SoItoposheets, exact boundaries of prioritized sites are being demarcated for incorporation into master spatial database maintained at NCSCM

Project Title	:	Mapping key nesting sites of coastal and marine birds for identification of Ecologically Sensitive Areas along Indian coasts.
Investigator(s)	:	Dr. Rajah Jayapal, Dr. S. Babu, Dr. P.A. Azeez, & Dr. Goldin Quadros
Researcher(s)	:	Mr. N. Mohamed Ibrahim, Ms. V. Gayathri & Ms. Madhumita Panigrahi – Project Fellows
Funding Agency	:	National Centre for Sustainable Coastal Management (NCSCM), MoEF&CC
Project Duration	:	20.07.2015 to 31. 07.2016

Patterns of bird species diversity along elevational gradients in Sutlej River Basin, Western Himalaya, Himachal Pradesh

- Shanthakumar B.

The riverine habitat is an important resource base for avian communities. Understanding the structure of bird communities along the elevational gradient is very important for local and regional level conservation. We examined patterns of species richness, diversity and range size distribution of birds along 500 m to 3700 m elevational gradient in the Western Himalayan region of Himachal Pradesh. We used the point count method for sampling. In total 318 plots were sampled seasonally between June 2012 and May 2013. One way ANOVA was performed to test the variation of species richness and abundance of birds between seasons. Shannon-Wiener diversity index and evenness was calculated for each season. We used Monte-Carlo simulations and null model for testing geometric constraints on species ranges. A total of 203 bird species belonging to 57 families were recorded. Muscicapidae was the most representative family with 23 species followed by Accipitridae with 13 species. Majority of the species (72%) were resident, 12% were summer visitors, 7% each were winter and local migrants and 2% passage visitors. Six species fall in the threatened categories, four in Near Threatened categories (IUCN, 2015) and one species which isendemic to the region were recorded. Of the total individuals, passerines dominated, with 82.96% and the most abundant family was Pycnonotidae (16.6%). Comparison of diversity and evenness among seasons indicated that the abundance of birds was highest in summer ($H = 3.808$; $E = 0.313$). ANOVA showed significant variation in species richness ($F = 25.68$; $p < 0.000$) and abundance ($F = 17.51$; $p < 0.000$) of birds among seasons. Species richness declined monotonically with increasing elevation. We found no evidence of the mid-domain effect.

Project Title	:	Cumulative Environmental Impact Assessment (CEIA) studies of Hydro-Electric Projects of Sutlej river basin in Himachal Pradesh (HP)- Faunal Aspects.
Investigator(s)	:	Dr. Arun, P.R.
Researcher(s)	:	Mr. Murgesan M. - Research Associate Mr. Ramesh C. & Mr. Shanthakumar B – Senior Research Fellows; Mr. Sony R K – Junior Research Fellow
Funding Agency	:	Govt. of Himachal Pradesh through ICFRE
Project Duration	:	May 2012 to June 2013

Co-occurrence in serpent eagles (*Spilornis*) on the Andaman Islands, India

- Shivkumari Patel

The two Serpent-eagle(*Spilornis*) species on the Andaman Islands are believed to be ecologically separated. The Andaman Serpent-eagle (*Spilorniselgini*) is endemic to the Andaman Islands and is widely distributed in inland forests while the Crested Serpent-eagle (*Spilornischeela*) is known to occur in coastal forests. We studied their co-occurrence pattern using occupancy survey techniques. The Andaman Serpent-eagle, ASE with its detection probability (0.275±SD0.064) was found to be more abundant (encounter rate: 0.319/km) as compared to the Crested Serpent-eagle, CSE (detection probability: 0.188±SD0.092; encounter rate: 0.202/km). Among all identified habitats (Evergreen Forest, Semi-Evergreen Forest, Deciduous Forest, Littoral Forest, Mangroves, Plantations and Agricultural fields)Andaman Serpent-eagle was found to be more common in Deciduous Forests (30% of total sightings) and was never sighted in Plantations, whereas Crested Serpent-eagle was encountered in all the identified habitatsbut was more common in the Mangroves (29% of total sightings). Of the total 25 sites surveyed, both species were encountered in 36% of sites, in 28% of sites only one of the two species (mostly ASE) were sighted and neither of the two were sighted in remaining 36% of sites. On mapping the sightings of both species, we found that these sympatric species have overlap in their distribution. At the stage of preliminary analysis Checkerboard score (C-score =0.083) test revealed a weak co-occurrence between these two species of serpent eagles.

Project Title	:	Conservation of the Andaman Serpent-eagle *Spilornis elgini* in the Andaman Islands: Phase – I
Investigator(s)	:	Dr.Manchi Shirish S.
Researcher(s)	:	Ms. Shiv Kumari Patel - Junior Research Fellow
Funding Agency	:	Raptor Research & Conservation Foundation, Mumbai
Project Duration	:	December 2014 to December 2016

Assessment of management strategies of bird hazards to aircraft in select Indian Air Force airfields

- S. Srinidhi

Bird Strike to aircraft is a serious problem in the aviation industry. Apart from causing crash of aircraft, bird strikes also cause estimated loss of millions of dollars every year. Different airports employ various strategies to reduce the bird hazard. In this context, Indian Air Force also employs various strategies to minimize the bird hazard. In the current study, the efficacy of a selected set of following three strategies were studied:.

1. Preventing garbage dumping sites up to a distance of 10 km from aerodromes to minimise hazard from birds such as Black Kites (*Milvus migransgovinda*).

2. Restriction on operations during the full moon nights to avoid bird strikes by Lapwings (*Vanellus*Spp.) and

3. Laying of '*Dhub'* grass (*Cynodon dactylon*) in the airfield area to minimise bird activity.

To study the effect of range restriction to the garbage dumping sites the number of Black Kites at different distances (and in different directions) was recorded through Point Count method. The Count was carried out one day in a month in Bengaluru. For studying the Lapwing activity in relation to phase of moon, the number of lapwings occupying the runway and their activity were recorded from the runway and taxi tracks for five nights per month. To evaluate the effect of *Dhub* grass, the bird species, number and their activity over the *Dhub* grass and the natural grass were recorded for at least three times a day every month.The preliminary results showed that the activity of Black Kites come down drastically at 10 km, though it was not reduced to zero.There was enhanced runway occupancy of the Lapwings observed around full moon nights when compared to their occupancy on other nights.Bird activity over the *Dhub* grass did not vary much as compared to the bird activity over the natural grass.

Project Title	:	Assessment of management strategies of the bird hazards aircrafts in selected Indian Air Force airfields.
Investigator(s)	:	Dr. P. Pramod
Researcher(s)	:	*Wing Cdr.* S Srinidhi- PhD Scholar
Funding Agency	:	NA
Project Duration	:	26 May 2014 to 25 May 2017

Heavy metal contamination in select species of birds in Gujarat

- V. Kirubhanandhini

Heavy metal contamination of the environment hasincreased in India with the advent of industrial revolution. Birds due to their position in the food chain, serve as good indicatorsof contamination in the environment. Dead birds of a few species were collected from Ahmadabad, Gujarat on opportunistic basis to understand the level of exposure to heavy metals.Tissues,namely muscle, liver, kidney along with gut content were studied.Samples (about 0.5 to 2 g) weredigested with Microwave Digestion System and analysedfor heavy metals, namely copper (Cu), lead (Pb), cadmium (Cd) and chromium (Cr) inAtomic Absorption Spectrophotometer. While the detection limit for copper and chromium was 0.002 ppm, the same for cadmium, and lead was 0.001 and 0.01 ppm respectively. Among the 13 species of birds studied, Indian Pond Heron had the highest(11.03 µg/g)load of total metals estimated followed by Eurasian Griffon Vulture. Indian Peafowl had the least (3.33µg/g). Among organs, kidney accumulated the highest levelfollowed by liver. Muscle accumulated the lowest.Among metals,Cd (1.7 µg/g) accumulated the maximumand Cr (1.4 µg/g)the least. According to feeding guilds, omnivoreshad the highest and insectivores the lowest level of total metal load. Literature suggests that concentrations up to 38.00 µg/g of Cu in bird tissues do not produce toxic effects in many species of birds world over. United States Environmental Protection Agency (2013) reported that 4 µg/g of Cr in bird tissues is considered as indicative of toxicity. According to World Health Organization (2002), permissible level of Pbfor bird tissues is 0.1 mg/kg and 0.05 mg/kgfor cadmium. Levels recorded in the current study are not indicative of any adverse effects to birds. However, it is evident that the species studied are exposed to varying levels of metal contamination.

Project Title	: Monitoring and Surveillance of Environmental contaminants in birds in India.
Investigator(s)	: Dr. S. Muralidharan
Researcher(s)	: Ms. V.Kirubhanandhini -Technical Assistant
Funding Agency	: Ministry of Environment, Forest and Climate Change (MoEF&CC), Govt. of India
Project Duration	: March 2010 to February, 2016

Documentation of the biodiversity of Sompeta wetland, Srikakulam District, Andhra Pradesh

- Mathew K. Sebastian

The Sompeta wetland complex spreads over nearly 1600 ha in Srikakulam District. An earlier study by SACON highlighted the biological importance and social relevance of this wetland. The present survey was taken up to document the biodiversity of selected taxa such as avifauna, butterflies and piscifauna and explore and suggest recommendations to enhance sustainable livelihood options for local stakeholders. One hundred and twenty five species of birds were recorded which included 48 species of water birds and 16 species of wetland-dependent birds. Five species of Near Threatened birds (IUCN 2015) such as Black-headed Ibis, Oriental Darter, Eurasian Curlew, Curlew Sandpiper, and Alexandrine Parakeet were also recorded. The survey also revealed the occurrence of uncommon species like Long-toed Stint, Whimbrel, Pacific Golden Plover and Black-breasted Weaver.Available data on the avifauna diversity indicated that Sompeta wetland complex is a fit case to be declared as an Important Bird Area.Thirty three species of butterflies, twenty three species of Odonata including 17 dragonflies and eight damselflies belonging to four familieswere also recorded. Regarding fish diversity, only few species of cat fishes and *Batrachusspp*.wererecorded.

From the preliminary assessment enhancement of livelihood options, it was found that the villagers who are the immediate stakeholders of the wetland complex possess high natural and social capital whereas the financial capital of the people is uneven. The Beela and the biodiversity of the Beela are the main natural capital of the surrounding population. Another notable feature of the villages is the existence of active Self Help Groups (SHG's) run by women. There is scope for establishing a cooperative diary benefitting the farmers rearing milch cows. Other livelihood options available are, development of ecotourism in the Beelas, harvesting and processing of Lotus tubers as a delicacy and preparation of mats from *Pandanus* leaves.

Project Title	:	Documenting the biodiversity of Sompeta wetland, Srikakulam District., Andhra Pradesh and developing biodiversity- mediated livelihood options for local communities.
Investigator(s)	:	Dr. Mathew K Sebastian, Dr. Arun, P.R., Dr. Rajah Jayapal & Dr. P. A. Azeez
Researcher(s)	:	Ramesh Kumar– Research Fellow
Funding Agency	:	Paryavaran Parirakshana Samiti, Sompeta
Project Duration	:	March 2016 to October 2016

Diversity and distribution of Odonata in Coimbatore District, Tamil Nadu

- Suhirta Muhil M.

Odonates are good indicators of freshwater ecosystem health. While Odonates from various parts of Western Ghats are increasingly documented, studies in Coimbatore currently pertain to only records from the forested areas from the Pre-colonial era and checklists of species from certain wetlands and paddy fields. Distribution of species in various parts of the Coimbatore district and their habitat and specificity to various aquatic habitats such as forest streams, rivers, permanent and seasonal lakes and paddy fields were studied for three years (2012-2016). Species diversity and composition from the habitats have been analysed. Seventy species belonging to 11 families were recorded in this study. Twenty one species were new additions to Coimbatore. The forest streams were observed as most speciose with 59 species followed by river systems with 50 species and tanks and paddy fields with a total of 33 species. We found that species assemblages are influenced by various factors such as the type of aquatic systems (lentic or lotic), the quality of water and also the nature of terrestrial and aquatic vegetation. This study attempts to provide base line information on Odonates of the region and assess the aquatic bodies in the District of Coimbatore, highlighting the value of Odonates as indicators of quality of environment and conservation importance.

Project Title	: Diversity and Ecology of Odonates in Coimbatore.
Investigator(s)	: Dr. P. Pramod
Researcher(s)	: Ms. Suhirtha Muhil M –PhD Scholar
Funding Agency	: NA
Project Duration	: September 2012 to July 2015

Occurrence and distribution of endemic flowering plants in the Sathyamangalam Tiger Reserve, Tamil Nadu

- L. Prakash

Eastern Ghats have broken hills with low elevation but very rich in species diversity with considerable number of endemic species**.**A study was conducted to document the occurrence and distribution of endemic flowering plants in Sathyamangalam Tiger Reserve (STR), southern Eastern Ghats. Vegetation survey was conducted in 14 different forest types of STR. A total number of 90 endemic flowering plant species belonging to 41 families, 73 genera were recorded. Of these, 76 (84.44%) were Peninsular Indian endemics, nine species were Western Ghats endemics (extended distribution to Eastern Ghats), three were Tamil Nadu endemics and two were Indian endemics. Highest Number of endemic species was represented by Poaceae (eight species) followed by Lauraceae and Acanthaceae (seven species each). The Largest endemic genera recorded in STR was *Barleria* (four species) followed by *Fimbristylis* and *Leucas* (three species each). Out of 90 endemic species, five species belonged to IUCN Threatened category (1 Critically Endangered, 2 Endangered and 2 Vulnerable). The life forms of the endemic plants indicated that herbs (34.44%) formed the majority, followed by trees (24.44%) and shrubs (17.78%) etc. Among the various forest types surveyed in STR, west coast semi-evergreen forest harboured higher number of endemics (n=34 species) followed by southern moist mixed deciduous forest (n=30 species). One of the endemics, *Vitexaltissima*(Verbenaceae) was distributed in seven of the 14 forest types surveyed.

Project Title	:	Status and distribution of Threatened plant taxa in Tamil Nadu.
Investigator(s)	:	Dr. P. Balasubramanian
Researcher(s)	:	Mr. C. Anbarasu -, Research Fellows Mr. L. Prakash - Technical Assistant
Funding Agency	:	Tamil Nadu Forest Department
Project Duration	:	August 2013 to March 2015

Co-occurrence in non-*Panthera* cats of Eaglenest Wildlife Sanctuary and Community Reserve, Arunachal Pradesh

-Prafull Choudhary

The North-Easternregion of Indiais among the richest in felids worldwide with 11 species occurring here and four (Clouded Leopard, Golden Cat, Marbled Cat and Leopard Cat) recorded from the Eaglenest Wildlife Sanctuary. There are several questions surrounding this guild in this region including their co-occurrence, habitat preference, diet and the absence of some expected members of the family e.g. Tiger, Leopard and Jungle Cat that occur in the neighbouring Pakke Tiger Reserve. In the current study (May 2014 to date) we aim to understand mechanisms facilitating their co-existence by correlating their morphologies to the structural aspects of the habitats they occupy and comparing their diets. We recorded presence of felids through camera-trapping and DNA-based identification of scats.We deployed 30 cameras in various formats for comparison. We collected scats and used molecular techniques to assign them to species. Assigned scats were analysed for prey remains which were identified under a dissection microscope. Bootstrap means and Confidence Intervals for the percentage of scats with particular prey remains were computed for comparisons. From a total effort of 8795 camera trap nights we had 134 camera-trap captures (1.52% success) of the four felids including four morphs of Golden Cat. We collected 451 scats and after analysis 296 (67%) were assigned to felids. Of these, 289scats were of Leopard Cat, 5 of Golden Cat, 1 of Clouded Leopard and 1 of House Cat. Results of overall diet of Leopard Cat from 76 scats showed a predominance of mammalian prey. We were able to differentiate four species of rodents from the prey remains. *Rattusandamanensis* (putative identity) was the most utilized prey species followed by a species of vole. An unidentified insectivore species was also consumed.

Project Title	:	Ecological species sorting in relation to habitat structure in the small cat guild of Eaglenest Wildlife Sanctuary, Arunachal Pradesh.
Investigator(s)	:	Dr.Shomita Mukherjee, Dr.Ramana Athreya & Dr P. V. Karunakaran
Researcher(s)	:	Mr. Prafull Choudhary - Programme Fellow
Funding Agency	:	Department of Science and Technology, Govt. of India
Project Duration	:	25.11.2013 to 24.11.2016

Diversity and distribution of selected faunal taxa in paddy fields

- Chaithra Shree J.

India has the largest area under rice cultivation. The paddy fields in India extend to 20 agro-ecological zones. They serve as habitats for various species of birds, butterflies and dragonflies that play important ecological roles. After the reconnaissance survey in a couple of paddy fields, three faunal taxa were identified as focal taxa (*viz*. birds, butterflies and odonates) for a more detailed study. Encounter data was collected using the point count method for birds and plot count for butterflies and odonates in paddy fields. This study was conducted in the highlands of Western Ghats from Northern Maharashtra to Southern Karnataka including Goan plains and coast. Data was collected from 38 locations. In fifteen minutes slots of observation time, total count of the three taxa were recorded using above mentioned methods. Eighty species of birds belonging to 36 families were recorded of which Ardeidae contributed the maximum number (nine species), followed by Estrilidae, Accipitreidae and Rallidae (five species each). Of the eighty species33.75% were wetland dependent. Fifty six species of butterflies belonging to five families were recorded, of which 25 species (51%) belong to Family Nymphalidae. Thirty four species of Odonata belonging to five families were recorded, of which 19 species were from Family Libellulidae and 10 species from Coenagrionidae.

Project Title	:	Biodiversity of paddy fields with reference to indicator taxa: Birds, Butterflies and Odonates.
Investigator(s)	:	Dr. P. Pramod
Researcher(s)	:	Ms. Chaithra Shree J. - PhD Scholar
Funding Agency	:	Indira Gandhi National Centre for Arts, Ministry of Culture, Govt. of India
Project Duration	:	01.11.2014 to 1.11.2017

Vocalizations of birds in AnaikattyHills –a preliminary analysis

- C. Divyapriya

Vocalization is an important system in animal communication, as this signal can travel in all directions and for a longer distance to reach the intended receiver to convey the specific message. Birds in Anaikatty hills inhabit in mixed dry deciduous forest and scrub jungle. About 76 passerines inhabit this forest area and share sound space for inter-specific and intra-specific interactions. This study is intended to document the pattern, trends of the vocal repertoire of passerine bird species of Anaikatty hills and to understand the physical characteristics of their calls. Common Iora (*Aeghthina tiphia*) was taken as a model passerine to study its acoustic communication and song repertoire. *A. tiphia* is a sexually dimorphic bird, inhabiting in scrub jungle and dry deciduous forest of Indian subcontinent. This study also compared the vocalizations of urban birds with their forest counterparts in Anaikatty hills to understand whether the background noise masks the communication of urban birds. Focal animal sampling technique was used for call recording and opportunistic recordings were also used for the analysis.

The minimum frequency of 36 passerine species (at least one from 24 families of passerines) was in accordance with the 'body mass and call frequency theory'. This study indicated that Common Iora possess about 6 distinct syllables, and have unique syllables that are performed either during active state or during inactive state. On comparing the calls of Asian Koel from city and Anaikatty hills, the urban bird had increased their minimum and maximum frequency, with higher note length and decreased inter-note gap (in contrast with the forest counterparts), to ensure their call transfer in urban noise (Acoustic Adaptative Hypothesis). While this study acts as a baseline data in understanding the vocalization of birds, further study will focus on documenting the patterns of passerine vocalization and repertoire of Common Iora.

Project Title	:	Vocalizations of birds in Anaikatty hills with special emphasis on Common Iora *Aegythina tiphia.*
Investigator(s)	:	Dr. P. Pramod
Researcher(s)	:	Ms. C. Divyapriya- PhD Scholar
Funding Agency	:	NA
Project Duration	:	01.11.2014 to 01.11.2017

Status of Mangrove habitats in Palk Bay - preliminary study

- Nishadh K.A

Mangroves form an important forest type along the intertidal zone. Palk bay located in south east part of Peninsular India has a long coast line. It is adjacent to the Gulf of Mannar Marine Biosphere Reserve, India's first marine Protected Area and harbours rich biodiversity that sustains the locals for their livelihood. The mangroves present in the area are least studied and very little is known about its current status. In this regard the present study was carried out to assess the status of mangrove habitat present along the Ramanathapuram District of the Palk Bay. The study was carried out during 29 December 2015 to 28 February 2016 and within a 200 m coastline belt marked for intensive field assessment along the 126 km length of the Ramanathapuram District. The mangrove was sampled based on quadrat sampling method. Variables such as mangrove species, its tree density, average height, GBH, and mangrove associates present in the plot were recorded.

A total of 92 plots were sampled among 12 mangrove patches mapped within the study area. From the preliminary analysis, it was found that the tree density varied between 1 and 63 trees per 10x10 meter plot and was dominated by *Avicennia marina* followed by *Avicennia officinalis*. A total of 14 mangrove associate species were recorded among the sampled mangrove patches.The *Sueada nudiflora* was the dominant species followed by *Aeluropus lagopoides*, *Salicornia brachiata* and other associated mangrove species mostly of grasses and shrubs. The tree height was ranging from 2 to10 m and stem diameter (GBH) between 10 and 84 cm. Based on GBH class evaluation, the mangrove patch in Devipattinam and Pathenendhal area of Palk Bay was observed to be of matured forest type and other patches had mixed age class individuals. .

Project Title	:	Ecological Status Assessment for Palk Bay
Investigator(s)	:	Dr. P. A. Azeez, Dr. Goldin Quadros, Dr.Shirish Manchi S, &Dr.Mahendiran Mylswamy
Researcher(s)	:	Akshaya Mohan Manne, Jins.V.J, &Nishadh. K.A – Project Fellows
Funding Agency	:	Indo-German Biodiversity Program
Project Duration	:	01.11.2015 to 30.06.2016

A study on teachers' awareness, attitudes and practice of environmental education in Coimbatore District, Tamil Nadu

- Chandran R.

Increasing threats to the resources of Earth, and to the health and stability of societies justify the urgent need for an environmentally informed citizenry for a sustainable future. In 2003, the Honorable Supreme Court of India mandated including Environmental Education (EE) as a compulsory subject in all branches of education. In general, it is considered that teachers are instrumental in implementing any successful curricula. Taking this into account, the present study was conducted to assess the teachers' awareness, attitudes and practice of EE with reference to Coimbatore region during the period of 2013 to 2016. A custom-made questionnaire was used for the survey and a total of 41 respondents from teachers were collected from 38 colleges throughConvenience Sampling Technique. Respondents were asked to answer with scores (1 to 5) and these scores were collated for each category and ranked, to obtain an overview of responses.

Preliminary results revealed that, teachers were not very concerned about rapid urbanization issues in their region. However, they noted that municipal solid-waste management is a serious concern for the city. The teachers showed positive attitudes towards both environmental issues and environmental education, though their awareness of environmental issues was low. Due to their poor EE qualifications,though EE practices were carried out through an array of activities, these were restricted to classroom teaching and to a lesser extent extracurricular and out of college activities. Electronic media and personal readings were most important sources of information for their knowledge on environmental issues. Since pre-service trainings are inadequate for preparing teachers for EE, teachers lackthe competence to teach environmental skills and develop environmentally active citizens.An overview of responses suggests that inadequate funding, time constraints and other responsibilities could have contributed towards an ineffective EE curriculum in these colleges.

Project Title	: The impacts of Environmental Education on higher education students.
Investigator(s)	: Dr. P. A. Azeez
Researcher(s)	: Mr. Chandran. R. - PhD Scholar
Funding Agency	: University Grant Commission
Project Duration	: 01.07.2011 to 31.11.2016