



ANNUAL REPORT

2020-21

ZOOLOGICAL SURVEY OF INDIA



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OF INDIA
1916



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VISION

Taxonomy towards conservation and sustaining biodiversity for future.

MISSION

Contribute towards the judicious conservation of the fauna by conducting explorations, undertaking taxonomic studies and also documenting the country's vast faunal diversity.

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From the desk of DIRECTOR



I feel privileged to present the Annual Report 2020-21 of Zoological Survey of India [ZSI] emphasizing the key points of the progress achieved during the year regarding surveys, updating faunal resources, new discoveries, assessment on the status of threatened species, biodiversity monitoring, advisory services, molecular studies, capacity building and outreach activities. ZSI scientists conducted 34 faunal surveys covering Protected Areas, different Ecosystems States/UTs and Quadrilateral highways. During the year, ZSI dealt with 120 research programmes on different faunal groups ranging from Protozoa to Mammalia. Besides, departmental programmes, 35 grants-in-aids projects funded by different agencies were also handled.

New faunal discoveries is one of the most significant and challenging task by ZSI. However, despite prevailing pandemic, 306 species have been added to the Indian fauna including 120 new species and 86 new records to India from Kingdom Protista and Kingdom Animalia covering Protozoa to Mammalia.

Scientific publications are a means of disseminating knowledge which can be utilized by other fraternities throughout the world and ZSI is playing a key role in this area and this year 755 different publications were achieved, among these 149 SCI papers with more than 160 impact cumulative factor is worth mentioning, besides 27 books, 191 research papers/articles in National and International journals, 376 book chapters and 12 newsletters were published.

Capacity building in various faunal studies is another noteworthy task undertaken by ZSI not only for scientists and faculties but also for students and other stakeholders, however due to pandemic these activities were restricted to online mode and 56 webinars and short term trainings were organized by ZSI Hq and its Regional Centres. More than 11,000 participants were benefited by these outreach activities.

Another important area of research by ZSI is DNA barcoding of new species, RET and species of economic importance and during the year the information was updated on BOLD/NCBI with the addition of 896 barcodes of 385 species.

ZSI is regularly rendering Identification and Advisory services to research and teaching institutions in India, Central and State Government/Agencies, NGO's, Industries and also to individuals on zoological specimens and related matters and this year 1556 specimens were identified belonging to 419 species from 73 Institute/dept/colleges.

Queries related to confiscated wildlife materials of different animals or parts of the body for the benefit of Court of Law to culminate wildlife crime are attended as and when received. This year 387 animal's /animal parts of confiscated Wildlife were received for providing identification services to 51 departments.

Infrastructure developments are being upgraded for improving the functioning and achievements, in this regard, two Molecular Systematic laboratories, one Centre for Sea Turtle Studies (EBRC, ZSI) and the foundation stone for the new building at SRC, ZSI - Chennai were inaugurated during the year.

I take this opportunity to extend my gratitude to entire fraternity of ZSI for their persistent support for efficiently achieving the mandates of ZSI for effective conservation of nature and its natural resources and achieving our sustainability goals.

JAI HIND



[Dr. Dhriti Banerjee]

02

EXECUTIVE SUMMARY

The Zoological Survey of India [ZSI] is a 105-year-old organization dedicated for taxonomical studies of faunal communities since its inception in the year 1916. This institution under the Ministry of Environment, Forest and Climate Change, Government of India is documenting the faunal resources of India in various diversified ecosystems by effectively conducting periodic surveys through its dedicated manpower. In recent years, much emphasis has been given to record the animals found in the Protected Areas, Biogeographic Zones and Ramsar Sites. Having acquired the data on faunal distribution in the country, the ZSI is providing inputs to the Ministry's policy-related issues especially on biodiversity management, climate change, wildlife forensic studies, environmental impact assessments in the ecologically fragile areas, status survey of threatened species etc.

In order to protect the biodiversity, 981 Protected Areas (PAs) sprawling over 5.03 per cent of the Country's geographical areas have been designated by the Government of India. Till date, the ZSI has covered 120 PAs and documented faunal elements present in these areas. Accordingly, the ZSI has so far documented 20,444 species from marine ecosystem, 9,457 species from freshwater ecosystem, 3,939 species from estuarine, 5,747 species from mangroves and 6,602 species from wetlands ecosystems.

Each year, the Zoological Survey of India conducts near about 100 field surveys as part of annual programme of research. However, due to COVID-19, we could conduct only 45 surveys. During this year in HQ office out of the 49 programmes 8 were completed and 30 are ongoing and two programmes were newly initiated. With regard to Regional Centres, out of 71 programmes, 6 were completed and 54 are ongoing and 11 are launched newly. The ZSI also get funds from external agencies to conduct research by submitting research proposals and accordingly this year ZSI managed to get 36 projects approved by 20 different funding agencies. These projects deals with taxonomy to ecology to status survey of endangered animal species.

ZSI is one of the largest faunal specimen repositories in the world, and it maintains voucher specimens as a reference material for the taxonomists, researchers, students and academicians to resolve the ambiguity for the identification of the taxon. The total holding of ZSI leads to 5.6 million specimens belonging to 31 different faunal groups in National Zoological Collections. The main task of the scientists of ZSI is to identify faunal species found within Indian boundaries. Accordingly during the year 1,20,403 specimens belonging to 6,626 species have been identified by the scientists of ZSI Headquarters and Regional Centres. Most of the specimens were backlog collections available with National Zoological Collections (NZC). All the species identified are also digitized with the habitat details for the benefit of the needy.





During the year 2020, the scientists of ZSI had described 120 species new to science which includes 5 subspecies belonging to different faunal groups. Furthermore, the scientific staff of ZSI also reported 86 species new to India hitherto previously not reported from within India.

Publishing research are part of ZSI's main activity and accordingly during the year we managed to publish 755 different publications of which 27 were books and 149 research articles in peer-reviewed SCI journals. In addition, 191 research articles in various journals published from India and abroad and most of them are NAAS rated journals.

The well-established DNA laboratory in HQ office and Regional Centres continue to upload barcodes of various animal species and accordingly this year the lab generated 6,379 barcodes. The following Regional Centres have such facility: Northern Regional Centre, Dehradun; Western Regional Centre, Pune; Freshwater Biology Regional Centre, Hyderabad; Southern Regional Centre, Chennai. Presently this facility has also been extended to Estuarine Biology Regional Centre, Gopalpur-on-Sea and High Altitude Regional Centre, Solan. As part of capacity building, the ZSI had conducted 56 webinars on various aspects of animal science. Due to COVID-19 we could not conduct any physical classes yet 11,000 participants mostly college students participated in these webinars and benefitted accordingly. Our capacity building efforts also target front-line forest staff from various states who participate basic training in identifying confiscated illegal wildlife articles by poachers and villagers.

The ZSI also signed MoU with various universities and institutions from India and abroad in the field of animal taxonomy and conservation. One of such significant MoU was between the ZSI and Canada's International Barcode of Life (iBOL) for strengthening of Biodiversity Digital Sequence Information as per CBD. This was done after the approval of union cabinet as per the set guidelines as this task involves sharing information about India's biodiversity with foreign country. The ZSI also signed 5 such agreements with Indian entities.

As part of Identification and Advisory services, during the year the ZSI had managed to identify 1,556 specimens (419 species) received from 73 Institutes / departments / colleges. Scientists and staff of ZSI played a key role in identifying these specimens. Apart from this services have been rendered to forest departments of various States and law enforcement agencies by identifying samples sent by them. Accordingly, ZSI provided reports to 387 such cases.

Though ZSI is the premier taxonomic research institution in the country, in recent years it enlarged its scope to address the issues related to species distribution modelling, development of Mobile App for species identification, formulating insecticides, forensic science, forest fire, human-wildlife conflict, ecosystem services, pollination, invasive species, livelihood and climate change for the advancement in research and the benefit of the general public at large.

As a whole, ZSI is relentlessly discharging its duties towards biodiversity conservation and human-wellbeing.

03

INTRODUCTION

The Zoological Society of India (ZSI) is one of the premier research institution in the country leading taxonomical research, established on July 1, 1916, to promote survey, explorations and research in order to improve our understanding of various aspects of our country's exceptionally rich faunal resources. ZSI is functioning under the Ministry of Environment, Forest and Climate Change (MoEFCC), Government of India. The scope of ZSI has expanded over the years in response to country's need and presently working on State Fauna, Conservation Areas including Protected Areas; Status Survey of Endangered Species; Documentation of faunal resources in different ecosystems, Biogeographic zones, Pollinators, Insect vectors, Digitization of faunal diversity, Mapping of faunal distribution in GIS platform, Molecular tools for taxonomy and forensic sciences, Long-term monitoring of



biodiversity to assess the impact of climate change, Environmental DNA studies; Palaeontological studies, Assessment of water pollution and Environmental Impact Assessment, Environmental Information System (ENVIS) on faunal diversity; Identification and Advisory services; Supporting policy and planning pertaining to Wildlife (Protection) Act, 1972; CITES, Red data Book, establishment of Marine Aquariums and development of Museum for awareness on conservation of biodiversity etc. ZSI acts as a custodian of the National Zoological Collections and is a Designated National Repository of Type and voucher specimens under Section 39 of National Biodiversity Act, 2002 of Government of India. The National Zoological Collections of ZSI comprises of more than 5.8 million faunal specimens belonging to as many as 60,000 animal species including about 10,000 from neighboring countries like China, Nepal, Bhutan, Myanmar, Pakistan, Bangladesh and Sri Lanka.

Primary Objectives

- Exploration, Survey, Inventorisation and Monitoring of faunal diversity in various states, some selected ecosystems and protected areas of India.
- Taxonomic studies of all faunal components.
- Status survey of Threatened and Endemic species.
- Preparation of Red Data Book, Fauna of India and Fauna of States.
- Bio-ecological studies on some important communities/species.
- Preparation of database for the recorded species of the country.
- Maintenance and Development of National Zoological Collections.
- Training, Capacity Building and Human Resource Development.
- Faunal Identification, Advisory services and Library Services.
- Publication of study-results, including documentation of Fauna of India and Fauna of States

Secondary Objectives

- GIS and Remote Sensing studies for recorded animal diversity as well as for selected threatened species.
- Chromosomal Mapping and DNA finger printing.
- Environmental Impact Studies.
- Maintenance of Museums at Headquarters and Regional Centres
- Development of ENVIS and CITES Centres.
- Research Fellowship, Associate ship and Emeritus Scientist Programme.
- Collaborative research programmes on Biodiversity with other Organizations.
- All India Coordinated Project on Taxonomy (AICOPTAX)

Principal Thrust Areas of Work (2020-21)

1. Faunal Inventorization of States and Union Territories:

Inventory of different Faunal group on the following States and Union Territories were undertaken, viz. U.T. of Lakshadweep, Andaman and Nicobar, Puducherry, Ladakh, Dadra & Nager Haveli and Bihar.

2. Faunal Inventorization of Ecosystems:

(1) Marine Ecosystem: East and West Coast of India, Digha Coast, Andaman and Nicobar Islands, Gulf of Mannar, Gulf of Kachchh, Lakshadweep, (2) Sunderbans: Bakkahali Island, Sagar Island, (3) Estuarine Ecosystem: Dhamara estuary, Tampara Lake, (4) Mangrove ecosystem: Odisha and Sunderbans, (5) Freshwater Ecosystem: Barak river, Hoogly, Chambal River, High altitude lakes and rivers, Bhoj, Govind Sagar, Chandratil, Riverine Ecosystems of Western Ghats, (6) Himalayan Ecosystem, (7) Desert Ecosystem: Semi-Arid and Thar Desert, (8) Cold desert of Himachal Pradesh and Jammu & Kashmir, (9) Temperate and Alpine Grasslands of Himalayas, (10) Deccan Peninsula.

3. Faunal Inventorization of Conservation Areas:

Gulf of Mannar Biosphere Reserve, Gahirmatha Marine Sanctuary and Lakhari Valley Wildlife Sanctuary (WLS) Odisha, Buxa TR, Mahananda WLS, Gorumara-Chapramari WLS, Neora Valley NP, Singalila NP, Sundarban NP & Biosphere Reserve, Sajnekhali WLS, Lothian WLS, and Haliday WLS, Bethuadahari WLS, Ballavpur WLS, Ramnabagan WLS, Yawal WLS, Gautala WLS, Agasthyamalai Biosphere Reserve, Amrabad and Kawal Tiger Reserve, Coringa Wildlife Sanctuary and Bunning and Zailad WLS, Manipur, Valmiki Tiger Reserve, Manas National Park, Sanjay, Panna and Fossil National Parks, Gandhisagar, Ratapani, Palpur and Kuno Wildlife Sanctuaries including Sehore and Raisen, Purna WLS and Mookambika WLS.

4. Status Survey of Endangered Species:

Status Survey of coral and associated macrofauna of islands of Andaman and Nicobar, status survey of Otters from mangrove ecosystem of east coast of India, Windowpane Oyster *Placuna placenta*, Hispid Hare, Nilgiri marten *Martes gwatkinis* in the Western Ghats and Andaman Teal *Anas albogularis* in Andaman Islands along with long term monitoring of olive ridley sea turtles along Odisha coast and distribution of Freshwater turtles of India as well as status survey of CMS-CITES avian species of India.

5. Ecological and Behavioral studies:

Long term monitoring of olive ridley sea turtles, ecology of *Aedes* Mosquito vectors (Culicidae: Diptera) of Dengue, Chikungunya and Zika.

6. Taxonomic Studies:

Protozoa, Mollusca, Marine sponges, Echinodermata, Rotifera Trematoda, Nematodes, Marine Crabs, Hymenoptera, Termites, Lepidoptera, Coleoptera, Odonata, Collembola, Thysanura, Orthoptera, Hemiptera, Tettigonidae, Diptera, Oribatid Mites, Ixodid Ticks, Spiders, Fishes, Ephemeroptera, Oligochaeta, Fishes, Amphibia, Reptiles, Birds, Mammals, etc.

7. Maintenance of National Zoological Collections (NZC):

Preservation and Maintenance of NZC, holding more than 20,000 Type specimens

8. Advisory, Training and Extension Services:

Provided as and when sought by different Institutions/ Organizations and confiscated wildlife material for law enforcing authorities.

9. Computerization and Dissemination of Data:

Computerization of registered collection of Types and other specimens are being carried out along with digitization of the specimens. Interactive Identification and Information System, Primary Type Information Systems already initiated. Digitization of ZSI publication is freely available on website (www.faunaofindia.nic.in).

10. Collaborative Research Programmes/Projects:

ZSI is involved in many collaborative research programmes with several Institutes and Universities across the country.

11. Checklist of faunal groups:

More than 80 Checklist are uploaded in ZSI webportal (zsi.gov.in).

ZSI HEADQUARTERS KOLKATA

Headquarters of ZSI has Scientific Divisions / Sections, Library, Publication, Identification and Advisory, ENVIS centre, Field Survey, Training and Extension, Fauna Division, Museum and Taxidermy Division, Photography Section, Art Section, Scanning Electron Microscopy Unit and Data Centre. Besides, it also holds 7 zoological galleries in Indian Museum. These units support research work of the scientists.

The Scientific Divisions and Sections at ZSI Headquarters undertake studies on various animal groups from Protozoa to Mammalia. The different sections of headquarters are:

01 SECTION PROTOZOOGY

Protozoology Section is mainly dealing with the studies on single celled, eukaryotic organisms, which are mostly microscopic and display enormous variability in shape, size and structure. The major contribution of this section includes the taxonomic account of 1500 species i.e., ~ 44% of the known Indian protozoan species is published from this section, including the description of 96 new species and 4 new genera. The total collection holding of this section is about 9700 specimens with 974 species. The type collections include 321 slides of 109 species of free-living and parasitic protozoans. Among that about 1130 slides of ciliates, 153 of which are types slides representing 49 holotypes and 104 paratype.

Presently the research of the section focuses on the Taxonomy and Ecology of freeliving protozoans, particularly Testate Amoebae (Amoebozoa, Rhizaria) and Ciliates (Alveolata, Ciliophora) from freshwater, marine (Ciliates, Dinoflagellates, Foraminifera, Radiolarians) and soil ecosystem. A total of 7 research programmes are operational in this section, in which one programme dealing with Protected Areas and other 6 are based on ecosystem oriented research. Two externally funded programmes (DST-SERB) on protozoans and Gelatinous zooplankton are also dealt by this section namely, Seasonal diversity and distribution of gelatinous zooplankton and its ecological and economic implications in the marine ecosystems of northern Bay of Bengal and Barcoding of free living protozoan ciliates from the conserved aquatic ecosystems of Himachal Pradesh.

02 SECTION PLATYHELMINTHES

Platyhelminthes section deals with Phylum Platyhelminthes or flatworms which include the planarians, flukes and tapeworms. It is mainly working on the following groups of organisms: Trematode, Cestode and Monogenean parasites of Vertebrates and Acanthocephala. More than 38 programmes have been handled by the section and completed the database of 18 States and UTs. Database on Platyhelminthes species of 5 Biogeographic zones have been completed so far. Altogether 89 Families of Platyhelminthes and Acanthocephala have been dealt till date. The section has total holdings of 22359 comprising (Identified 22084 + Unidentified 275) including 452 Type Collections. Three Programmes have been completed in this year and presently the section is involved in 3 ongoing programmes on Trematodes of Fishes.

03 SECTION NEMATHELMINTHES

Nemathelminthes section deals with the following groups of organisms: Soil-inhabiting nematodes comprising Bacterivorous, Fungivorous, Plant-Parasitic, Predatory and Omnivorous, Entomopathogenic nematodes and Helminth parasites of Vertebrates. More than 46 programmes have been handled by the section and completed the database of 25 States and UTs. The present holdings of the section include 26,506 identified specimens and 7330 vials of unidentified wet collections. Besides, Type collections include 187 slides and 249 specimens of wet collections. DNA barcodes of 12 species helminthes from herpetofauna have been submitted to NCBI.

04 SECTION GENERAL NON-CHORDATA

General Non-Chordata section is holding the groups that are associated with Corals and coral reef habitat such as Porifera, Soft corals, Octocorals, Polychaetes, Echinodermata and minor-phyla. It also includes the terrestrial group, Annelida. The section houses 8,42,105 specimens which includes Porifera, Cnidaria, Annelida, Echinodermata and Minor-phyla. Among these, 1640 specimens are Type specimens.

05 SECTION CRUSTACEA

The section holds Crustacean specimens like Shrimps, Crabs, Hermit crabs, Woodlice, and many Planktonic forms like Cladocerans, Copepods, Ostracods etc. These specimens were collected from India and adjacent countries during various period (from 1850 to till date). The specimens received from several countries across the world, specimens inherited from Asiatic Society of Bengal, Indian Museum and valuable type specimens are maintained in the National Zoological Collections of Crustacea Division. At present the Crustacea Division holds more than 109984 specimens of crustaceans including 6515 Types specimens.

06 SECTION MOLLUSCA

Many distinguished naturalists significantly contributed in documenting the molluscan fauna of Indian subcontinent in early years of eighteen century and are proud members of the Malacology Division of Zoological Survey of India. Noteworthy to mention about the founder Director of ZSI, Dr. N. Annandale, H.H. Godwin-Austen, G. Nevill, W.T. Blanford during British period and during post independent India, Dr. N.V. Subba Rao, Dr. K.V. Surya Rao, Dr. A. Dey and others who has substantially contributed towards enriching malacofaunal collections of ZSI. Mollusca Section deals with the following group viz. Gastropoda, Bivalvia, Cephalopoda, Scaphopoda, Placophora and Aplacophora of both aquatic and terrestrial habitats and collections includes from Kashmir to Kanyakumari and from Indian Ocean bed as well as Chilika lagoon to high altitude wetlands of Himachal Pradesh and Arunachal Pradesh. More than 50 research programmes completed and Fauna volumes dealing with Mollusca have been published by the section and completed the database of 23 States and UTs. During the reporting year, the scientists of the section have completed two programmes related to fauna of Chilika and Mollusca of West coast of India. Also there are seven ongoing programmes and two externally funded project being undertaken by the scientists of the section. This year, there are 11 book chapters published, 8 peer reviewed publications in referred journals and 16 international impact factor journals. The sectional holding is 2,06,702 as on December 2020 with one type collection deposited in the National Zoological Collections of Mollusca Section. Almost all visitors pay their visit to the displays and collections present in the section, apart from the research community, who frequently consults Mollusca Section for their research work on taxonomic revisions.

07 SECTION CEL

CEL (Central Entomology Laboratory), the National repository of Insect Types, hosting types from different parts of the world. The section deals with the following groups of organisms: Formicidae, Mutillidae and Chalcididae (Hymenoptera). The section holds different categories of Types belonging to 22 orders of insects like Diptera, Coleoptera, Lepidoptera, Hemiptera, Hymenoptera, Orthoptera, Mantodea, Phasmatodea, Thysanoptera, Dermaptera, Ephimeroptera, Odonata, Trichoptera, Neuroptera, Phthiraptera, Plecoptera Thysanura, Dictyoptera, Embioptera, Siphonoptera, Strepsiptera and Psocoptera. The section has total holdings comprising 29710 specimens of which 27821 specimens are identified and 1889 specimens are unidentified. The section also has total holdings of Type collections which consist of 14012 specimens of 22 insect orders. Presently the section is involved in ongoing programme on Studies on Formicidae and Chalcididae (Hymenoptera) of Deccan Peninsula.

08 SECTION ISOPTERA

Isoptera Section deals with the taxonomy of termites. The section had its inception in 1956 and was well known through the works of internationally renowned experts like Dr.M.L. Roonwal, Dr. O. B. Chottani, Dr. Geeta Bose and Dr. P.K. Maity. More than 22 programmes have been handled by the section. All 6 families of termites have been dealt with. The section has a total of nearly 343 species. The section holds 3857 vials of termite specimens, of which 3428 are identified. The section also has 1059 Type Collections. Presently the section is involved in 6 ongoing programmes on Termite taxonomy of states including Manipur, Assam, West Bengal and Union territories of Lakshadweep, Puducherry and Daman Diu and Nager Haveli.

09 SECTION LEPIDOPTERA

Lepidoptera Section is primarily involved in collection, preservation, identification, cataloguing/ computerization, digitization and documentation of Lepidopteran (moths and butterflies) fauna of our country. The section holds 105568 specimens of which 65416 are named specimens and the rest 40152 are unnamed specimens. There are 4024 species and subspecies of butterflies and about 1800 species and subspecies of moths. Lepidoptera section is honored in having the collection of 49 countries (including India) and 458 Types (Types are deposited in the Central Entomological Laboratory of ZSI, Kolkata). The first registered specimen of Lepidoptera section is a male butterfly, *Hasora umbrina* Mab., collected by N. E. Celebes and was catalogued by Cap. Evans on October 01, 1931. The collections of L. de. Niceville, K. Jordan, W.H. Evans, E. E. Green, G. C. Dudgeon are some of the important collections housed in the Lepidoptera section. So far, the scientists and scientific staff of the Lepidoptera section has provided Identification and advisory services to more than 150 institutions.

10 SECTION HYMENOPTERA

Hymenoptera section is dealing with pollinators, parasitic and predatory groups of hymenopteran families (Apidae, Halictidae, Megachilidae, Encyrtidae, Mymaridae, Evanidae, Vespidae, Sphecidae etc.). Major role of the section is collection, preservation, identification, cataloguing, digitization and computerization of hymenopteran fauna. Presently the section is involved in four research programs including a DST-SERB funded project entitled "Parasitic wasps of the families Encyrtidae and Mymaridae (Hymenoptera: Chalcidoidea) and their utilization in management of sucking insect pests on Agricultural and Horticultural crops of Northeast India". The section has total holding comprising 40632 specimens, out of which, 22538 specimens are identified. Three new species were described and 10 research papers as well as 08 Book chapters were published during the year.

11 SECTION COLEOPTERA

The Coleoptera section came into existence in 1927. The beetle section has privilege of prestigious collection made by renowned scientists i.e. S.W. Kemp, S.L. Hora, N. Annandale, F.H. Gravely, Edward & Arangua, J. Wood Mason, E. Heutiaux, H.J. Pruthi, B.N. Chopra, Lord Carmichael, Fleutiaux, M.L. Roonwal, Atkinson, T.G. Vazirani, and A.P. Kapoor. The section includes holding of the beetles i.e. 3,14,425 specimens. The section has presently 1,096 type species along with more than 55,361 identified and registered specimens. Currently the section is involved in the studies of the beetle fauna for the union territories and states such as Lakshadweep, Dadra Nagar Haveli, Himachal Pradesh, Arunachal Pradesh, West Bengal, Assam, Nagaland, Manipur, Tripura, Meghalaya, and Mizoram. The section is participating in following major Annual Programme of Research i.e., Fauna of Deccan Peninsular Biogeographic Zone, Taxonomic studies on tribe Sericini (Coleoptera: Scarabaeidae: Melolonthinae) of India, Faunal Diversity of Anjaw district, Arunachal Pradesh, and State Fauna of Bihar: Invertebrates (Coleoptera). The major families currently dealt in the section are Carabidae, Dytiscidae, Noteridae, Gyrinidae, Haliplidae, Hydrophilidae. Scarabaeidae, Geotrupidae, Lucanidae, Passalidae, and Coccinellidae.

12 SECTION MISCELLANEOUS INSECT ORDER (MIO)

The MIO Section is one of the old sections at ZSI Headquarters, the official registration of specimens started in March 1973. The section holds both dry and wet collections belonging to insect orders like Odonata, Trichoptera, Neuroptera, Ephemeroptera, Psocoptera, Embioptera and Dermaptera and comes to a total of 485 species under 205 genera of 63 families. Some very old collections are from outside India, including countries like, Burma, Germany, Canada, USA, USSR, Croatia, Indonesia, etc. The section has a total of 13,653 specimens, of which 12,344 are identified. All the Type specimens are retained in Central Entomological Section.

More than 15 programmes have been handled by the section. Currently the section is involved in the studies of Odonata, Neuroptera, Trichoptera, of states like Assam, West Bengal, Union territories of Lakshadweep and also Daman Diu and Nager Haveli, and also on insect pollinators of West Bengal. Molecular barcoding work of Superfamily Platygastroidea under Hymenoptera is also under progress.

13 SECTION APTERYGOTA

The Apterygota are most primitive, wingless hexapods usually found in moist places such as soil, forest leaf litter, humus, under stones, caves, in ant and termite nests. More than 34 programmes have been handled by the section and completed the database of 11 States and UTs. Five groups- like Collembola, Protura, Diplura, Archaeognatha and Zygentoma have been worked out. More than 220 research publications including Pictorial handbook of Collembola and Thysanura, and revisionary studies of Collembola have been published. Presently the section is involved in 6 on-going programmes. The section has a holding of 39,080 specimens of Apterygota of which 24,799 specimens are identified and 14,281 specimens are unidentified. Type Collection includes 838 specimens belonging to 101 species.

14 SECTION ORTHOPTERA

Orthoptera Section deals with Orthoptera, Blattodea, Mantodea, Phasmida and Dermaptera. The section has holdings of 42787 specimens of which 37105 (Orthoptera-30226, Blattodea-909, Mantodea-488, Phasmida-314 and Dermaptera -5168) are named specimens. Type specimens of Orthoptera are deposited in Central Entomological Laboratory of ZSI, Kolkata. More than 45 programmes have been handled by the section and completed the database of 25 States and UTs. Presently the section is involved in 5 ongoing programmes on Orthoptera.

15 SECTION HEMIPTERA

Hemiptera Section is the largest among hemimetabolous insects and has a holding of 149223 specimens (identified-50943) of terrestrial, semi aquatic and aquatic bugs. Collection, preservation, identification, registration, digitization and documentation of the true bugs is primary mandate of the Section. Major achievements of the section are Fauna of India-Aphididae (8 vols.), Checklist of the Scale Insects and Mealybugs of South Asia, A review of Indian coccids, Assassin bugs (Reduviidae: Heteroptera) from Chhattisgarh, India, Handbook on Major Hemipteran Predators of India, Catalogue of Reduviidae of India.

In recent past, experts of the section have documented Faunal Diversity of Bhoj Wetland, Bhopal, Madhya Pradesh, India (A Ramsar Site), True Bugs of Central India, (Chhattisgarh and Madhya Pradesh), Hemipteran fauna of Western Ghat, East Kolkata Wetlands, Faunal diversity of Telangana-Hemiptera, Hemipteran fauna of Indian Himalaya, Kanyakumari Wildlife Sanctuary, Mangrove Ecosystem in India, Uttar Pradesh, Maharashtra, Punjab, Haryana and Tripura, and presently engaged in the documentation of Hemipteran fauna of Assam, Himachal Pradesh, Satkosia Tiger Reserve, Tarai Grassland of Gangetic plains, Buxa Tiger Reserve, Gorumara NP and Chapramari WLS, Mahananda WLS, Neora Valley NP, Singalila NP, Hemipteran predators of agroecosystem of Bihar, aquatic and semi-aquatic Hemiptera of important floodplain Wetlands of Manipur, Fauna of Deccan Peninsula - Hemiptera and Hemipteran fauna of Puducherry UT.

16 SECTION DIPTERA

Diptera has continually captivated humanoid from eras several time due to its discrepancy, sometime for being a favourable acquaintance or else sometime for playing a disastrous weapon. With the legacy of more than 59 years of fly research, Diptera section (Estd: 1962) is currently carrying out research to solve this discrepancy in both classical and applied field of fly taxonomy. Diptera section deals with the following groups of organisms: Diptera of Vector importance, predatory group, pollinating efficiency, forensic importance and some other groups of economically important Diptera.

More than 86 programmes have been handled by the section and completed the database of 17 States and UTs. 92 families of Diptera have been dealt till date. The section has total holdings comprising a national zoological collection of 97,287 specimens which includes 95,756 specimens in General Collections and 1531 samples in Type Collections. A group of young researchers (more than 10) also completed their Ph. D. from this section with a notable research publication and established themselves in different organization. Presently the section is involved in 5 ongoing programmes on Diptera.

17 SECTION ACAROLOGY

The section deals with Soil mites, Plant mites, Parasitic mites, Water mites and Ticks. Thirty five programmes have been handled by the section and completed the database of 18 States and 2 UTs. More than 18 families of plant mites, 95 families of soil mites, 08 families of parasitic mites and 01 family of water mite and 03 families of ticks have been dealt till date. The section has a total holding comprising 16,128 General Collections and 416 Type Collections. Presently the section is involved in 05 ongoing programmes on Soil mites.

18 SECTION ARACHNIDA

Arachnida Section deals with the following groups of organisms: Spiders (Order: Araneae) Scorpions (Order: Scorpiones), Pseudoscorpions (Order: Pseudoscorpiones), Whip Scorpions (Order: Thelyphonida) Opiliones (Order: Opiliones), Sun spiders (Order: Solifugae), Sea Spiders (Class: Pycnogonida), Centipedes (Class: Chilopoda) and Millipedes (Class: Diplopoda). 15 programmes have been handled by the section and completed the database of 19 states and UTs. Forty-one families of spiders have been dealt till date. The section has a total holding comprising of 35,459 general collections and 2586 examples of Type collections. Presently the section is involved in 03 ongoing programmes.

19 SECTION MARINE FISH

Marine Fish Section deals with all marine fishes grouped under 60 orders. It has a holding of 497-037 (approximately) identified and 4446 unidentified collections. The identified collection includes several exotic species obtained through exchange in past, collections made by Asiatic Society of Bengal (collected in 19th century) and collections of Sir Francis Day (collected 160 years back). In addition, there are 1012 Type material of 432 species. The section has completed about 50 programmes and now involved in many ongoing programmes.

20 SECTION FRESHWATER FISH

The freshwater fish section of the Zoological Survey of India, Kolkata is the largest repository for freshwater fishes in the country hosting 3.4 lakh specimens including 1283 Type specimens. It includes century-old collection made by the Asiatic Society of Bengal which was later handed over to Zoological Survey of India. Collections made by the eminent scientists/researchers of the country and abroad are being maintained in the section.

21 SECTION AMPHIBIA

At present, the section is involved in several programs on Anurans (frogs and toads), Agamid Lizards of India and Faunal Diversity of Singalila National Park, West Bengal. Thirty programs have been handled by the section and have completed the databases of all the States of north-eastern and northern India except Nagaland and Jammu, Kashmir and Ladakh. Fourteen families of Indian amphibians belonging to all 3 orders have been dealt till date comprising of 169 species. The present holdings of the section include 36293 specimens comprising 35503 identified specimens and 790 unidentified wet collection specimens. Besides, the section also possesses 143 specimens from other countries and 326 Type specimens. This year the scientists described four new species of reptiles (three lizards and one snake).

22 SECTION REPTILIA

Reptilia section deals with the following groups of organisms: Order 1. Loricata (Crocodiles), Order 2. Testudines (Turtles and Tortoise), Order 3. Squamata Suborder: Sauria (Lizards), Suborder: Serpentes (Snakes). Twenty five programmes have been handled by the section and completed the database of 18 States and 2 Uts and 19 Families of Reptiles have been dealt till date. The section has a total holding comprising 33,725 General Collections and 527 Type collections. Three groups and 19 families were worked out till date. Presently the section is involved in 2 ongoing programmes on Reptiles.

23 SECTION BIRD

The bird section includes 50,000 specimens of around 600 species of birds. All collections have been made from within and outside Protected Areas from not only India but also from various neighboring countries and others. Of which 43933 specimens have been identified up to species level and the remaining are being identified on monthly basis, 291 species belonging to 105 species were identified from backlog collection. The most significant aspect of collections in bird section is of Type specimens collected over a period of more than 200 years. In bird section 504 Type specimens of birds are being preserved. Bird section is engaged in several research programmes.

24 SECTION MAMMAL & OSTEOLOGY

The Mammal & Osteology Section holds 29,385 dry and wet specimens of various mammalian species besides 300 Type collections. There are three galleries, namely Zoological gallery, Osteological gallery and Wet collection cum osteological galleries are open for researchers, students, academicians and public as well. Presently the section is involved in 02 ongoing programmes on Mammals of Gorumara National Park & Chapramari Wildlife Sanctuary and Mahananda Wildlife Sanctuary, North Bengal.

25 SECTION PALEOZOOLOGY DIVISION: INVERTEBRATE & VERTEBRATE PALAEOZOOLOGY AND PREHISTORIC ZOOLOGY SECTION

Palaeozoology Division of ZSI is the repository of the immense important collection of zooarchaeological remains from different archaeological sites of Indian subcontinent, collected from the excavations mostly by Archaeological Survey of India, also Directorate of State Archaeology, universities, individuals and other institutions. Till date ZSI worked out specimens from more than fifty archaeological sites and custodian of the zooarchaeological remains from more than 40 different prehistoric sites of the Indian subcontinent. The repository of Prehistoric Zoology Section is holding collections from Harappa, Mohenjodaro, Rupar, Lothal, Rangpur, Kalibangan, Nagarjunakonda, Hastinapur, Ujjain, Burzahom, Kausambi, Taxilla, Tilaurkot & Kodan (Nepal), Andaman Kitchen Midden site and many other important sites. Prehistoric zoology section also has a great collection of modern comparative collection of different domestic as well as wild species which is very important for the study of animal remains. From recent excavations by ASI Patna and Bhubaneswar Branch at Uraon and Bharatihuda respectively, a good number of zooarchaeological remains has been sent to ZSI.

Vertebrate and Invertebrate Palaeozoology sections are holding a lot of vertebrate (fish, reptile and mammal) and invertebrate fossil (Mollusca, Echinodermata) collections from different fossil bearing sites of India like Siwalik, Ariyalur, Tiruchirapalli, Rajasthan, Gujarat, Susunia, Northeast India and others. Recently, Prehistoric Zoology Section received two lots of important collection of animal remains from Odisha and Bihar, deposited by ASI. More than 25500 specimens are present in the holdings of three sections of Palaeozoology Division. This year, one Museum was set up for display of more than 700 exhibits consisting of important fossils and subfossil specimens from the collection repository of the Division.

26 SECTION WILDLIFE & CONSERVATION

The section deals with wildlife ecology specially population and habitat ecology for the conservation and management of wildlife species. A number of research projects in the section is implementing largely focused on population assessment, habitat ecology in different landscapes of the country. The section has implemented several projects in the past and is currently implementing demand driven and action projects in Indian Himalayan Region, Gangetic plains and North Eastern State of Mizoram. The wildlife section is also implementing consultancy projects covering different aspects of wildlife management in the country. Most recently also ventured into landscape ecology as well as soundscape ecology studies in Himalayan region. The section is also organizing training to different stakeholders for enhancing the capacity with respect to wildlife monitoring. At present the section is implementing one project on Ichthyofauna habitat ecology.

27 SECTION ECOLOGY

Ecology section was formed on 9th June 2017 by merging two sections, i.e. Animal Behavior and Animal Population. This section deals with ecological work and also the taxonomy of the fauna related to the ecological work. Presently the section is involved in five ongoing programmes on Dermaptera and Odonata of Coringa WLS, Andhra Pradesh, Union Territory of Puducherry and taxonomic studies of Dermaptera and Plant parasitic nematodes of Deccan Peninsula. The identified specimens of Dermaptera has been registered and deposited in the Orthoptera Section.

28 SECTION SOIL ZOOLOGY

Soil Zoology section deals with taxonomical and ecological studies on microscopic protozoans to macroscopic mammals. Enormous projects were handled on mammals, mollusca, insects, mites, earthworms and protozoans inhabiting in soil. The identified specimens reported were deposited in sections respective to the group of fauna. At present the collection holdings of 1286 microslides of protozoans mainly on testate amoeba are present in the section. The section renders internship and training to post graduate students, research scholars on soil fauna. Currently section 3 research programmes on protected and conservation area and on National Highways project focuses on soil protozoans (Rhizopoda) of India.

29 DNA AND MOLECULAR SYSTEMATICS LABORATORY

The establishment of the Centre for DNA Taxonomy (CDT) under Molecular Systematics Division (MSD) was initiated in 2011 at the Zoological Survey of India (ZSI). The section was formally inaugurated on 19 May 2012 and could be operational in the year 2013. Apart from HQ Kolkata, four regional centers (WRC, Pune; NRC, Dehradun; FBRC, Hyderabad; and SRC, Chennai) were also established to generate DNA barcode sequences of Indian fauna. As of now, the CDT, MSD, HQ has generated 7149 DNA barcode data of various animal taxa, especially the spiders, insects, amphibians, reptiles, birds and mammals. The generated DNA barcode data has contributed greatly to the global databases (GenBank and BOLD) to accelerate the systematics and evolutionary research. The section has a current holding of 12119 specimens, comprising 7818 identified and 4301 unidentified specimens. Several externally funded projects funded by the Department of Science and Technology (DST), Council of Scientific and Industrial Research (CSIR), Indian Council of Agricultural Research (ICAR), Ministry of Environment Forests and Climate Change (MoEFCC) have been completed by the section. Comparative Mitogenomics, Environmental Metagenomics, Gut Microbiome, DNA Metasystematics, Wildlife Forensics, and Population Genetics are some of the current thrust areas of the Centre. At present, the scientists at CDT MSD are handling four in-house and two externally funded projects.

30 SECTION MUSEUM & TAXIDERMY

Museum and Taxidermy maintains the seven Zoological galleries in Indian Museum Kolkata. Along with the Museum exhibits, it has Reserve and Loan collections in the Taxidermy Section. Five programmes have been handled by the section and completed the database of 3 States. The section has a total holding comprising 2939 General Collections and one Type Collection (Whole skeleton of Common Minke Whale) display in the Mammal Gallery of Indian Museum. Mammals, Birds and Insects groups were worked out till date. Presently the section is involved in one ongoing programme ie. Faunal diversity of Neora Valley National Park, West Bengal.

04

RESEARCH PROGRAMMES: HEADQUARTERS



ZSI is the only research institute in India working from primitive organisms belonging to Kingdom Protista to the highly evolved Mammalia of the Kingdom Animalia. Scientific research are being carried out on fauna inhabiting different Ecosystems, Protected Areas, States & UTs, Biogeographic zones as well as Conservation areas and status of Threatened species. Besides taxonomic studies and ecology, latest techniques in lifesciences like Metagenomics, Forensics and GIS applications are also studied by the scientists of ZSI.

During this year, out of the 49 In-house programmes, 8 completed, 39 are ongoing and 2 programmes were newly inducted by ZSI, HQ.

1 Fauna of Chilika Lake, Odisha

Coordinator: Dr. Basudev Tripathy

Investigators: Subject experts from ZSI HQ and Regional Centres.

Period: April 2016 to March 2019

Status: Completed

Objective: To study and inventorize the fauna of Chilika lake, Odisha.

Outcome: A detailed investigation on the current status and changes of the faunal diversity of Chilika Lagoon with special reference to indicator faunal groups have been carried out. It was also attempted to compare the faunistic composition available from the present study with those documented by earlier studies conducted during 1915-24, and 1985-87 by ZSI on Chilika lake. Additionally, terrestrial fauna were also studied and some of them are for the first time documented from Chilika lagoon. It is worthy to mention that against 1311 species reported, this study documented 1126 species in total including new groups not studied earlier.

2 Morphological and molecular systematics of Thysanoptera of Odisha & Gujarat

Investigators: Dr. Kaomud Tyagi & Dr. Vikas Kumar

Period: April 2017 to March 2020

Status: Completed

Objective: Morphological and molecular systematics of Thysanoptera of Odisha & Gujarat.

Outcome: The systematic account of the order Thysanoptera from Gujarat and Odisha comprise 76 species in 58 genera under four families: Aeolothripidae (3 species), Stenurothripidae (1 species), Thripidae (48 species: 2 species of Dendrothripinae, 8 species of Panchaetothripinae, 1 species of Sericothripinae, 37 species of Thripinae) and Phlaeothripidae (26 species: 11 species of Idolothripinae, 17 species of Phlaeothripinae). Each species diagnosis, studied material and distribution is also provided. A total of 100 mitochondrial COI sequences of 45 species were generated and analyzed in the present study.



Frankliniella schultzei (Trybom, 1910)

3 ZSI-National Faunal Genome Resources (ZSI-NAGR): Sequencing Fifty Animals Mitogenomes-Phase-I

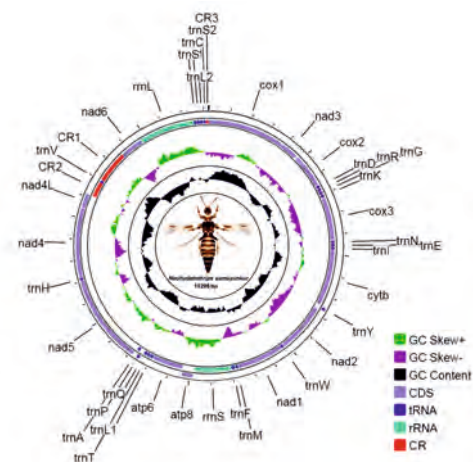
Investigators: Dr. Kailash Chandra & Dr. Vikas Kumar

Period: April 2017 to March 2020

Status: Completed

Objective: ZSI-National Faunal Genome Resources (ZSI-NAGR): Sequencing fifty Animals Mitogenomes-Phase-I

Outcome: Generated data of complete mitogenome of 50 species of animals, which include Arthropoda (41), Reptiles (4), Bird (2), and Mammals (3). These mitogenome data were compared to earlier published mitogenome to see the skewness, AT composition, Gene arrangement pattern, phylogeny, molecular time estimation and evolution.



The mitochondrial genome of the marigold thrips, *Neohydatothrips samayunkur* (Kudo, 1995)

4 Diversity of deep sea copepods from east coast of India-Bay of Bengal

Investigator: Dr. Honey U. K. Pillai

Period: April 2018 to March 2020

Status: Completed

Objective: To explore and inventorize deep sea copepods from East coast of India-Bay of Bengal.

Outcome: The study recorded 62 species of copepods belonging to 41 genera of 27 families from the 1000m depth locations on the east coast of India- Bay of Bengal.

Significant findings: Among the different species identified small sized copepods belonging to the families Paracalanidae, Oncaidae and Oithonidae were observed as the generally abundant in the study area. *Candacia samassae* Pesta, 1941, *Scottocalanus securifrons* T.Scott, 1894, *Haloptilus setuliger* Tanaka, 1964, *Heterorhabdus papilliger* Claus, 1863 were noticed as rare occurrence from the area.



Miracia efferata (Dana, 1849)

5 DNA Barcoding of Vertebrate Fauna present in National Zoological Collection (NZC) of ZSI w.s.r. to Primates

Investigators: Dr. Mukesh Thakur, Dr. C. Venkatraman & Dr. Vikas Kumar

Period: April 2017 to March 2020

Status: Completed

Objective: DNA Barcoding of Vertebrate Fauna present in National Zoological Collection (NZC) of ZSI w.s.r. to Primates.

Outcome: A total of 276 samples belonging to 70 species of mammals comprising Indian pangolin, Chinese pangolin, Snow Leopard, Common Leopard, Bengal Tiger, Red Panda, Jungle cat, Grey Wolf, Red Fox, Barking deer, Goral, Chital, Sambar and a few species of primates. Including several rare, endangered and threatened (RET) species were collected from the National Zoological Collection of ZSI HQ. In addition, samples were received from recent field surveys also. In total, 1990 sequences/barcodes of 43 mammalian species were generated.

6 Fauna of Assam

Coordinator: Dr. Dhriti Banerjee

Investigators: Subject experts

Period: April 2017 to March 2020

Status: Completed

Objective: To identify and inventorize the fauna of Assam.

Outcome: Altogether 10344 examples were collected from 8 different invertebrate faunal groups (i.e. Nematoda, Collembola, Odonata, Orthoptera, Hemiptera, Hymenoptera, Diptera and Mollusca) over a period of 3 years and 969 species have been identified.



Eristalinus (Eristalinus) arvorum (Fabricius, 1787)

7 Taxonomic study of Eels of the order Anguilliformes of the east coast of India

Investigators: Dr. A. Mohapatra, Shri. S. S. Mishra & Shri. P. C. Tudu.

Period: April 2015 to March 2018

Status: Completed

Objective: To study the Eels of the order Anguilliformes of the east coast of India

Outcome: During the work of three years, 51 species belonging to 7 families and 24 genera were documented. Muraenidae was the most diverse family with 22 species followed by Ophichthidae with 15 species and Congridae with 12 species. During this work, 10 new species were described. Eleven species were reported for the first time from Indian coast and 3 species were reported for the first time from the east coast of India. Many species were reported for the first time from different states of east coast of India. One species *Ophichthus chilensis* Chaudhuri 1916 is revalidated during the study.

8 Studies on the Faunal Diversity of Urban lakes of Kolkata

Investigators: Dr. K. Valarmathi, Dr. P. G. Sethy & Santanu Mitra

Period: April 2017 to March 2020

Status: Completed

Objective: To study the faunal diversity of Urban lakes of Kolkata.

Outcome: The findings of the study were published in the Book "Biodiversity profile of East Kolkata Wetlands" comprising 1288 species of fauna belonging to 25 groups.

9 Diversity and ecology of protozoan ciliates based on morphology and molecular analysis from the Ganga (Hooghly) river

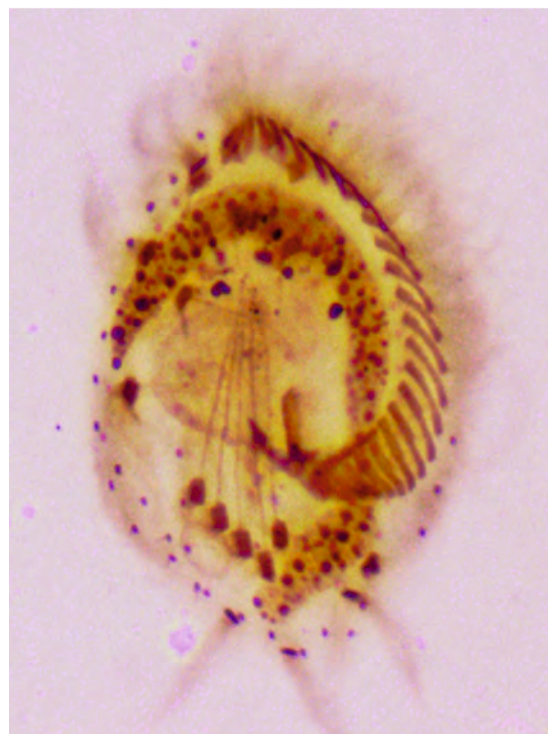
Investigator: Dr. Santosh Kumar

Period: April 2018 to March 2021

Status: Ongoing

Objective: To investigate the diversity of free living protozoan ciliates based on morphology and molecular analyses and their comparison with previous reports.

Progress: A total of 23 species belonging to 20 genera were identified. Molecular sequences have also been generated for the selected species.



Euplotes affinis (Dujardin, 1841) Perty, 1852

10 Fauna of Lakshadweep

Coordinators: Dr. Anjum N. Rizvi, Dr P.M. Sureshan & Dr Rajkumar Rajan

Investigators: Subject experts

Period: April 2017 to March 2022

Status: Ongoing

Objective: To identify and inventorize the fauna of Lakshadweep with special reference to terrestrial fauna.

Progress: Identifications from previous collections include 28 species of Testate Amoebae, 10 species of Ciliates, 76 species of Nematodes, 22 species of Araneae, 3 species of Centipedes, and one species of Mantodea. Twenty species of soil nematodes are recorded for the first time from Lakshadweep.

11 Fauna of Gahirmatha Marine Sanctuary in Odisha

Investigator: Dr. Basudev Tripathy

Period: April 2018 to March 2022

Status: Ongoing

Objective: To study the fauna of Gahirmatha Marine Sanctuary in Odisha.

Progress: Altogether 830 specimens belonging to 208 species, 110 genera and 76 families of mollusca have been identified so far (Gastropoda-112 species, 57 genera 43 families and Bivalvia-96 species, 53 genera and 33 families).



Crocodylus porosus Schneider, 1801

12 Fauna of Daman, Diu, Dadra & Nagar Haveli

Coordinators: Dr. Rajmohana. K & Dr. G. P. Mandal

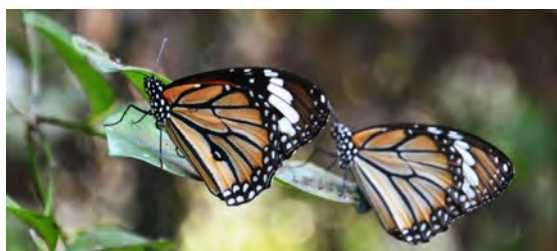
Investigators: Subject experts

Period: April 2017 to March 2020

Status: Ongoing

Objective: To identify and inventorize the fauna of Daman, Diu, and Dadra & Nagar Haveli.

Progress: A total of 13 chapters comprising 455 species including Collembola, Nematoda, Odonata, Orthoptera, Coleoptera, Lepidoptera (Butterflies), Isoptera, Diptera, Freshwater fishes, Amphibians, Reptiles and Mammals have been received so far.



Danaus genutia (Cramer, 1779)

13 Efficacy of DNA barcoding in identification of Platygastroidea (Hymenoptera) from India

Investigators: Dr. Rajmohana K., Dr. Vikas Kumar & Dr. Kaumod Tyagi

Period: April 2017 to March 2020

Status: Ongoing

Objective: To evaluate the efficacy of DNA barcoding in identification of Platygastroidea (Hymenoptera) from India.

Progress: Morphological Identification completed for 63 species. Genomic DNA isolated from 24 species. DNA Sequencing completed of 4 species.

14 Taxonomy and ecology of Aedes mosquito Vectors (Culicidae: Diptera) of Dengue, Chikungunya and Zika

Investigators: Dr. D. S. Suman & Dr. Vikas Kumar

Period: April 2018 to March 2021

Status: Ongoing

Objective: Taxonomy and ecology of *Aedes* Mosquito vectors (Culicidae: Diptera) of Dengue, Chikungunya and Zika.

Progress: One survey conducted and 34 species identified: 15 *Anopheles*, 4 *Aedes*, 1 *Armigeres*, 14 *Culex*. DNA barcode under progress. Survival and reproductive potential studies, species specific acoustic data generated for more than 10 species.

Significant findings: One new species. 10 gene sequences to NCBI have been submitted. *Wolbachia* bacteria has been reported from *Aedes aegypti* and *Aedes albopictus* populations. One patent filed on "Automated surveillance system for mosquitoes and other insects" using sound.



Mosquito habitat in high altitude hilly region of Kodaikanal, Tamil Nadu

15 Faunal inventorization of Bunning & Zeilad Wildlife Sanctuaries, Manipur

Investigators: Dr. L. Kosygin Singh & Dr. S.D. Gurumayum

Period: April 2018 to March 2021

Status: Ongoing

Objective: To study the fauna of Bunning &

Zeilad Wildlife sanctuaries, Manipur.

Progress: Identified 27 species of Fishes, 14 species of Reptiles, 12 species of Amphibians, 24 species of Termites (Isoptera), 5 species Mollusca, and 6 species of Crustacea. Significant findings include two new species viz., *Glyptothorax giudikyensis*, Singh & Gurumayum, 2020 and *Ceylonitermes nivedita*, Bask *et al.*, 2020. *Ahmaditermes pyricephalus* Akhtar is collected for the first time India and another 10 species of termites for the first time from Manipur.

16 Status Survey of Hispid Hare

Investigator: Dr. G. Maheswaran

Objective: To evaluate the population status of Hispid Hare.

Period: April 2017 to March 2020

Status: Ongoing

Objective: To ascertain the status of Hispid Hare

Progress: DNA analysis of Hispid Hare pellets collected during survey is in progress.



Collection site inside Bunning Wildlife Sanctuary

17 Long term monitoring of Olive Ridley sea Turtles along Odisha coast

Investigator: Dr. Basudev Tripathy

Period: April 2018 to March 2022

Status: Ongoing

Objective: Long term monitoring of Olive Ridley sea turtles along Odisha coast.

Progress: Tagging of olive ridley sea turtles initiated from January 2021 onwards and as on March ~2000 males and female turtles have been tagged along the coast of Odisha. There are tag return from recently tagged and earlier tagged turtles on the beach.



Lepidochelys olivacea (Eschscholtz, 1829)

18 Faunal diversity of Coringa Wildlife Sanctuary, Andhra Pradesh

Coordinator: Dr. C. Raghunathan

Investigators: Subject experts

Period: April 2018 to March 2022

Status: Ongoing

Objective: To document the faunal diversity of Coringa Wildlife Sanctuary, Andhra Pradesh.

Progress: A total of 1558 faunal samples including 7 lots. of Zooplanktons were collected during the survey belonging to 14 faunal groups: Cnidaria, Platyhelminthes, Nemertea, Polychaeta, Hemiptera, Coleoptera, Isopoda, Amphipoda, Cirripedia, Decapoda, Mollusca, Echinodermata, Pisces and Reptilia. Total number of 44 species have been identified which includes seven faunal groups consisting of one species of Cnidaria, 02 species of Decapoda, 16 species of Mollusca, one species of Echinodermata, one species of Brachipoda, one species of Reptilia and 22 species of Pisces. Three species of fishes and one species of slug has been reported first time from the Indian Ocean. Three species of fishes and 2 species of slugs were reported first time from Andhra Pradesh Coast.



Mangrove habitat of Coringa Wildlife Sanctuary

19 Zooarchaeology of Faunal remains of Kalibangan, Rajasthan – An Indus Valley site

Investigator: Mrs. Supriya Nandy

Period: April 2017 to March 2020

Status: Ongoing

Objective: To study the Zooarchaeology of Faunal remains of Kalibangan, Rajasthan – An Indus Valley site.

Progress: Identified 1075 specimens belonging to 19 species of 9 families under six orders viz.: Bovidae, Suidae, Cervidae, Rhinocerotidae, Equidae, Canidae, Felidae, Trionychidae and Geoemydidae.



Fragment of limb bone *Bos indicus* Linn. from Kalibangan archaeological site, Rajasthan

20 Status Survey of Brown Bear in Western Himalayas

Investigators: Dr. Lalit Kumar Sharma, Dr. Mukesh Thakur & Dr. C. Venkatraman.

Period: April 2017 to March 2020

Status: Ongoing

Objective: To assess the status of brown bear in Western Himalayas.

Progress: Distribution and conservation status of Himalayan brown bear (HBB) has been assessed for its entire range in Himalayas. Brown bear is

reported to be present in 32 PAs including National Parks and Wildlife sanctuaries. It is fairly common in PAs such as Kugti WLS, Few ranges of Lahaul Valley, wildlife areas of Drass, Tajwas WLS, Overa-arun WLS, Kazinag National Park. The highest suitable areas for HBB on the basis of the highest model argument, was found to be 20642 km², for the present habitat and climatic scenario, which have been reduced to 5494 km² and 5600 km² in RCP 4.5 and 8.5 respectively for the year 2050. The comparative evaluation for the habitat quality estimation suggests, further degradation of habitat for the species. Using the highest model agreement output, configuration analysis result suggests more than 40% decline in NP (No. of patches) for both the RCP (4.5 and 8.5) scenarios in 2050 with reference to the present.

21 Faunal diversity of Ganga (Gangotri to Gangasagar)

Coordinator: Dr. Lalit Kumar Sharma

Investigators: Subject experts at ZSI HQ/ NRC/ GPRC

Period: April 2017 to March 2020

Status: Ongoing

Objective: To assess the faunal diversity of Ganga from Gangotri to Gangasagar

Progress: Information on various vertebrate taxons was collected and the species present in the study riverscape were documented. The DNA analysis of the samples pertaining to taxonomic richness and abundance of different taxon is in progress. Furthermore, a checklist of faunal diversity based on the existing publications for the entire Gangetic biogeographic zones as well as for the riverscape of the river have also been compiled.



View near Gangotri

22 Morphological and Molecular study of Mulletts (Mugiliformes: Mugilidae) of India

Investigators: Shri. S. S. Mishra & Dr. Vikas Kumar

Period: April 2014 to March 2018

Status: Ongoing

Objective: To study the morphology and molecular characterization of Mulletts of India.

Progress: Morphological delimitation of newly erected genera - *Crenimugil*, *Osteomugil* and *Minimugil* has been done and a necessary identification key based on morphological characters has been prepared. DNA sequence of four species has been uploaded with NCBI. Morphological and molecular data on all species are under analysis.

23 Studies on the cardinal Fishes (Perciformes: Apogionidae) of West Coast of India

Investigator: Shri. S. S. Mishra

Period: April 2014 to March 2017

Status: Ongoing

Objective: To study the cardinal fishes of West Coast of India.

Progress: Key to the genera of cardinal fishes of India (24 genera are known from India now after molecular studies done elsewhere) has been prepared. Only 18 species could have been collected from the west coast of India while 31 species from the east coast. To make it a full fledged work 52 species reported from Andamans and 32 species from Lakshadweep are taken into consideration. Details of a total 75 species known from India are under preparation.

24 DNA Barcoding studies on *Holotrichia* complex (Scarabaeidae: Coleoptera) on sugarcane crops from North and Central India

Investigators: Dr. Kailash Chandra, Dr. Vikas Kumar & Dr. Devanshu Gupta

Period: April 2016 to March 2019

Status: Ongoing

Objective: DNA Barcoding studies on *Holotrichia* complex. (Scarabaeidae: Coleoptera) on sugarcane crops from North and Central India

Progress: During the project, 24 species of the genus *Holotrichia* were identified and male genitalia of 9 species were illustrated: *H. farinosa* Nonfried, 1891; *H. fissa* Brenske, 1894; *H. longipennis* (Blanchard), *H. nagpurensis* Khan and Ghar, 1982; *H. nicobarica* Chandra, 1992; *H. rustica* (Burmeister, 1855), *H. sculpticollis* (Blanchard, 1851), *H. serrata* (Fabricius, 1781) and *H. tetarana* Brenske, 1896. The re-descriptions of these 24 species were written along with the habitus photographs. Additionally, 64 DNA barcode sequences were also generated for studying closely related species.

25 Fauna of Buxa Tiger Reserve, West Bengal

Coordinators: Dr. S. I. Kazmi & Dr. A. Ramesh Kumar

Investigators: Subject experts

Period: April 2017 to March 2020

Status: Ongoing

Objective: To explore and inventorize the fauna of Buxa Tiger Reserve.

Progress: Based on the survey and available material with Zoological Survey of India, 1195 species have been identified which includes 39 species of Protozoa (Ciliate and Rhizopoda), 34 species of Nematodes, 40 species of Platyhelminthes, 11 species of Collembola, 327 species of Coleoptera, 88 species of Hemiptera, 172 species of Hymenoptera, 66 species of Orthoptera, 38 species of Neuroptera, 150 species of Lepidoptera, 13 species of Isoptera, 59 species of Odonata, 31 species of Mollusca, 08 species of Fishes, 11 species of Amphibia, 26 species of Reptilia and 82 species of Mammals. Observations were made on species of Amphibians, Reptiles and Mammals.

26 Fauna of Mahananda Wildlife Sanctuary, West Bengal

Coordinator: Dr. Shelley Acharya

Investigators: Subject experts

Period: April 2017 to March 2020

Status: Ongoing

Objective: To explore and inventorize the fauna of Mahananda Wildlife Sanctuary, West Bengal.

Progress: A total of 790 species have been identified. The faunal groups include 46 species of Protozoa, 36 species of Platyhelminthes, 52 species of Nemathelminthes, 5 species of Decapoda, 3 species of Isopoda, 27 species of Mollusca, 32 species of Ants- Formicidae, 38 Hemiptera, 40 Hymenoptera, 15 Coleoptera, 10 Apterygota, 83 Lepidoptera, 15 Isoptera, 3 Diptera, 24 Odonata, 54 Arachnida, 66 Orthoptera, 51 Acari, 9 Annelida, 8 Crustacea, 22 freshwater Fishes, 5 Amphibia and 56 species of Reptilia. The observations were made on 55 species of Birds and 57 species of Mammals.

27 Fauna of Neora Valley National Park

Coordinator: Dr. P. G. S. Sethy

Subject Investigators: Subject experts

Period: April 2017 to March 2020

Status: Ongoing

Objective: Inventorisation of fauna of Neora Valley National Park.

Progress: A total of 214 species have been identified from the collections. It includes, 22 species of Protozoa, 155 species of Lepidoptera, 09 species of Odonates, 05 species of Thrips, 3 species of Annelida, 2 species of Scorpion, 8 species of Fish and 10 species of Reptiles.



Amolops marmoratus (Blyth, 1855)



Herd of Bison, *Bos gaurus* (Smith, 1827)

28 Fauna of Gorumara National Park and Chapramari Wildlife Sanctuary

Coordinators: Dr. M. E. Hassan & Dr. R. Goswami

Investigators: Subject experts

Period: April 2017 to March 2020

Status: Ongoing

Objective: To inventorize the fauna of Gorumara National Park and Chapramari Wildlife Sanctuary.

Progress: Eleven faunistic surveys were conducted and 16 faunal groups were collected and identified. A total of 457 species have been identified from the collections made so far comprising 41 species of testate Amoeba, 11 species of Ciliate, 75 species of Nematoda, 12 species of Earthworm, 9 species of Collembola, 4 species of Diptera, 90 species of Lepidoptera, 71 species of Orthoptera, 62 species of Hemiptera, 60 species of oribatid Mites, 6 species of Crustacea, 24 species of Mollusca and 09 species of Isoptera. Observations were made on 11 species of Mammals. One species of Collembola, *Cyphoderopsis gorumaraensis* described as new to science.



Lesser whistling teal, *Dendrocygna javanica* (Horsfield, 1821)

29 Fauna of Singalila National Park

Coordinator: Dr Kaushik Deuti

Investigators: Subject Experts.

Period: April 2018 to March 2021

Status: Ongoing

Objective: To document the faunal diversity of Singhalila National Park

Progress: One survey conducted in March, 2021 and 3072 specimens of invertebrates (Lepidoptera, Diptera, Hemiptera, Hymenoptera, Coleoptera, Orthoptera, Dermaptera, Trichoptera, Neuroptera, Isopoda, Mollusca) collected. Sighted 46 species of birds and 4 mammals and most of them photographed.



Black-faced Laughing Thrush, *Trochalopteron affine* (Blyth, 1843)

30 Fauna of Eastern Ghats

Coordinator: Dr. Swetapadma Dash

Investigators: Subject Experts from HQ and SRC

Period: April 2018 to March 2021

Status: Ongoing

Objective: To assess the faunal diversity of Eastern Ghats

Progress: A total of 375 species comprising 24 species of Protozoa, 10 species of Rhizopoda, 29 species of Rotifera, 26 species of Cladocera and 24 species of Ostracoda, 36 species of Orthoptera, 12 species of Diptera, 9 species of Coleoptera, 22 species of Odonata, 146 species of Lepidoptera, 12 species of Acari, 17 species of spiders and 8 species of Fishes have been identified.

31 Taxonomic Revision of Potamid Freshwater Crabs of India

Investigator: Mr. Santanu Mitra

Period: April 2019 to March 2022

Status: Ongoing

Objectives:

- To document a detailed taxonomic study on all the Potamid species in India, by surveying some important biogeographic area and by studying the preserved named and unnamed specimens present in ZSI HQ & Regional Centres.
- To revise the taxa and to conduct a cladistic analysis to investigate the phylogeny (especially generic relationships) of Potamid freshwater crabs.

Progress: One survey conducted to Uttarakhand and 56 examples of freshwater crabs were collected. Identified Potamid crabs collected from earlier surveys into 15 species and 9 species from recent surveys. Revision of subfamily Potamiscinae is in progress. Two new species *Potamiscus takedai* Pati, Mitra, Yeo, 2020 and *Badistemon fulvum* Mitra, Monica and Waikhom, 2020 have been published.



Maydellia thelphusa lugubris (Wood-Mason, 1871)

32 Biogeography and systematic revision of freshwater mollusca *Gyraulus* (Gastropoda: Heterobranchia: Planorbidae) of India

Investigator: Dr. Basudev Tripathy

Period: April 2019 to March 2022

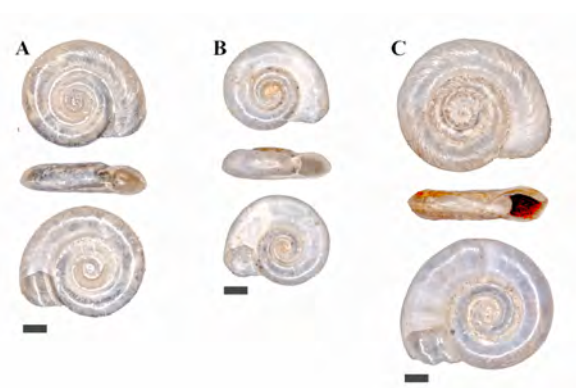
Status: Ongoing

Objective: Taxonomic revision of the genus *Gyraulus* (Gastropoda)

Progress: A total of 300 examples collected during the last year surveys, belonging two species viz. *Gyraulus convexiusculus* (Hutton, 1849) and *Gyraulus labiatus* Benson, 1850 were identified and from the collections present in the

National Zoological Collections in the Mollusca Section of ZSI, Kolkata, a total of six species catalogued: *Gyraulus convexiusculus* (Hutton, 1849) – cosmopolitan in distribution, throughout India. *Gyraulus labiatus* Benson, 1850 – recorded so far from seven states only (50% endemic). *Gyraulus pankongensis* von Martens, 1882 – only recorded from trans – Himalayan region (80 % endemic). *Gyraulus rotula* (Benson, 1850) – only reported from five states (60% endemic). *Gyraulus ladacensis* (G. Nevill, 1878) – except from type locality in Ladakh, so far not reported from anywhere in India. *Gyraulus barrackporensis* Clessin, 1886 – although type locality is Barrackpore in West Bengal, however, it is a common species throughout India.

Gyraulus euphraticus (Mousson, 1874) - only reported from five states (60% endemic). *Gyraulus saltensis* Germain, 1922 – reported from salt marshes, saline areas of India, even from Rajasthan and Punjab.



A. *Gyraulus barrackporensis* (Clessin, 1886), B. *Gyraulus convexiusculus* (Hutton, 1849), C. *Gyraulus euphraticus* (Mousson, 1874)

33 Taxonomic studies on Moths (Lepidoptera: Insecta) of Deccan Peninsula of India

Investigators: Dr. Navneet Singh, Dr. P.C. Pathania, Mr. Suresh Shah, Mr. Purnendu Mishra and Dr. Rahul Joshi (GPRC, ZSI Patna).

Period: April 2019 to March 2022

Status: Ongoing

Objective: Taxonomic inventORIZATION of Lepidopteran fauna of Deccan Peninsula

Progress: A total of 138 species under 484 examples of moths have been identified, registered and computerized.

34 Studies on Insect Pollinators of West Bengal

Investigator: Dr. K. Rajmohana

Period: April 2019 to March 2022

Status: Ongoing

Objective: To study the insect pollinators of West Bengal.

Progress: One survey to district of Murshidabad was undertaken and collected 811 examples of different insect orders. Identification include 3 species of Hymenoptera and 7 species of Diptera.

35 Fauna of Sunderban NP, Sajnekhali WLS, Halliday Island WLS and Lothian WLS, West Bengal

Coordinator: D. Suresh Chand

Investigators: Subject experts

Period: April 2019 to March 2022

Status: Ongoing

Objectives: To inventorize the fauna of Sunderban NP, Sajnekhali WLS, Halliday island WLS and Lothian WLS, West Bengal.

Progress: One survey was undertaken and collected 862 specimens belonging to 12 groups. Besides these 136 soil samples and 56 water samples were also collected. Identification during the period include 7 species of Fishes, 10 species of Mollusca, 18 species of Orthoptera and 49 species of Trematodes.

36 Study of Hemiptera fauna of Agro-ecosystem of Bihar and identification of some potential hemipteran predators

Investigators: Dr. M. E. Hassan, Dr. Sandeep Kushwaha & Mr. P.C. Saha.

Period: April 2019 to March 2022

Status: Ongoing

Objective: To study the Hemipteran fauna of Agro-ecosystem of Bihar and identification of

some potential hemipteran predators.

Progress: A total of 1662 specimens were identified pertaining to 38 species under 31 genera and 9 families, including 12 species of hemipteran predators.

37 Studies on the aquatic and semi-aquatic Hemiptera of important floodplain Wetlands of Manipur, North-East India

Investigator: Dr. Jennifer Lyngdoh

Period: April 2019 to March 2022

Status: Ongoing

Objective: To study the aquatic and semi-aquatic Hemiptera of important floodplain Wetlands of Manipur, North-East India.

Progress: Identified 1007 specimens of water bugs belonging to 21 species under 14 genera and 8 families. Three species recorded new from the state - *Anisops bouvieri* Kirkaldy, 1904, *Gerris (Gerris) nepalensis* Distant, 1910 and *Rhagadotarsus (Rhagadotarsus) kraepilini* Breddin, 1905.

38 Faunal Diversity of Wildlife Sanctuaries of West Bengal (Bethuadahari WLS, Bibhutibhushan WLS, Ballavpur WLS, Ramnabagan WLS)

Coordinator: Dr. Dhriti Banerjee & Dr. G. P. Mondal

Investigators: Subject Experts

Period: April 2019 to March 2021

Status: Ongoing

Objective: To undertake faunal inventories for documentation of the fauna of the protected areas of the state.

Progress: One survey was conducted. A total of 1126 examples was collected of which 1056 diverse groups of dipteran examples and 70 non dipteran examples. Identification under progress, 35 species identified till date.

*Chrysomya rufifacies* (Macquart 1843)

39 Fishes of the Siang River, Brahmaputra drainage, Arunachal Pradesh, North East India

Investigators: Dr. L. Kosygin Singh, Dr. S.D. Gurumayum (APRC, ZSI) & Mr. Shibananda Rath

Period: April 2019 to March 2022

Status: Ongoing

Objective: To study the fish diversity of the Siang River, Brahmaputra drainage, Arunachal Pradesh.

Progress: A total of 55 examples of fishes identified belonging to 9 species, 8 genera, 4 families and 2 orders.

40 Distribution and incidence of Freshwater Turtles in India

Investigators: Dr. P. G. S Sethy, Dr. Pratyush Mohapatra (CZRC, ZSI), Dr. K. Deuti, Mr. S. Raha and Mr. Sumidh Ray

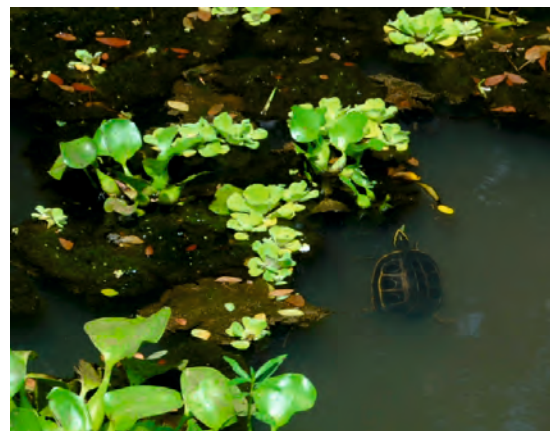
Period: April 2019 to March 2021

Status: Ongoing

Objective: To perform ecological studies on all the 23 species of freshwater turtles of India.

Progress: The survey was conducted in various sites of two Medinipur districts of West Bengal (Purbo and Paschim Medinipur) for Indian eyed turtle *Morenia petersi* (Anderson, 1879) a Vulnerable fresh water turtle. Aquatic vegetation in the habitats of *Morenia petersi* identified as *Eichhornia crassipes*, *Pistia stratiotes*, *Ipomea*

aquatica, *Salvinia molesta*, *Coix lachryma*, *Mikania micrantha*. The range of pH of water was 6.31- 7.79. The range of dissolved oxygen was 9.4-12.5 mg/L. The range of conductivity was 154.1 to 444.5 ($\mu\text{S}/\text{cm}$). Temperature of the aquatic habitats ranged from 25.7°C to 27°C. DNA analysis of the species is under process.

*Morenia petersi* (Anderson, 1879)

41 Taxonomic study and distribution of Agamid lizards of India

Investigators: Dr. P. G. S Sethy, Dr. Pratyush Mohapatra (CZRC, ZSI), Dr. K. Deuti & Mr. S. Raha

Period: April 2019 to March 2021

Status: Ongoing

Objective: To study taxonomic revision of Agamid lizards of India.

Progress: Seven out of the 19 genera of Agamid lizards in India completed by studying 21 out of 68 species found in India. About 600 specimens, 21 species identified and catalogued. One new species of *Sitana* (*Sitana sushili*) has been published.

*Ptyctolaemus gularis* Peters, 1864

42 DNA Metasystematics studies for the assessment of the Macrobiome and Microbiome in Freshwater Ecosystem with relation to the noxious pollutants

Coordinator: Dr. Vikas Kumar

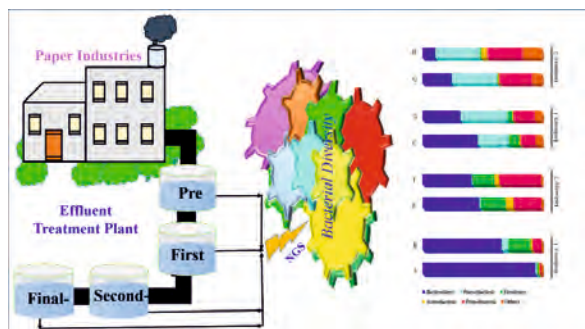
Investigators: Dr. Inderjeet Tyagi & Dr. Kaomud Tyagi

Period: April 2019 to March 2022

Status: Ongoing

Objective: To study DNA Metasystematics for the assessment of the Macrobiome and Microbiome in freshwater ecosystem with relation to the noxious pollutants.

Progress: One Survey in Uttar Pradesh State has been conducted. Total 150 water samples in triplicate from multiple sites of villages affected with different waterborne diseases have been collected. DNA isolation of these water samples have been done. Metal ions and water quality of these water samples by using physico-chemical parameters is under process.



Schematic representation of bacterial diversity in paper industries

43 Insights into the Gut Microbiome of thrips (Thysanoptera: Insecta) from India

Co-ordinator: Dr. Vikas Kumar

Investigators: Dr. Kaomud Tyagi & Dr. Inderjeet Tyagi

Period: April 2019 to March 2022

Status: Ongoing

Objective: Insights into the gut microbiome of thrips (Thysanoptera: Insecta) from India.

Progress: Data analysis of ten species of thrips is under process. Specimens collected in March 2020 were used in the Whole Metagenome Sequencing (WMS). Bacterial genus *Wolbachia* and *Arsenophonus* are detected as the most dominant genera.

44 Faunal diversity of Mudflats

Coordinator: Dr. C. Raghunathan

Investigators: Dr. G. Maheswaran, Dr. K.G. Emiliyamma, Dr. Anjum N. Rizvi, Dr. H. U. K. Pillai, Dr. S. Balakrishnan, Dr. J.S. YogeshKumar, Dr. Chitra, J, Dr. C.R. Sreeraj, Dr. Tamal Mandal & Dr. P.C. Tudu

Period: April 2019 to March 2022

Status: Ongoing

Objective: To identify the faunal communities of mudflat ecosystems of India.

Progress: One faunal survey was conducted for 10 days covering mudflats of West Bengal and Odisha. A total of 1758 specimens were collected belonging to 10 faunal groups: Insecta, Mollusca, Polychaete, Barnacles, Branchiopods, Sea anemones, Hermit crab, Fishes, Crabs and Bryozoa. Along with this, 27 zooplankton samples, 36 (with duplicate 72) meiobenthos samples and 36 sediment samples were collected for protozoan study and 36 sediment samples were collected for ciliate study. The sorting of specimens is under progress.



Mudflat of Point Calimere

45 Faunal diversity of Puducherry State

Coordinator: Dr. C. Raghunathan

Investigators: Dr. K.G. Emiliyamma, Dr. C. Venkataraman, Dr. K. Valarmathi, Dr. H. U. K. Pillai, Dr. J.S. Yogesh Kumar, Shri.S.S. Mishra, Dr. Chitra, J, Dr. A. Ramesh Kumar, Dr. Tamal Mandal & Mr. Debdulal Saha.

Period: April 2019 to March 2022

Status: Ongoing

Objectives:

- To identify the faunal communities of terrestrial, freshwater, riverine, estuarine, mangrove, coastal and marine ecosystem of Puducherry State.
- To estimate the density, diversity and distribution of faunal communities.

Progress: One faunal survey was conducted for 16 days and 2884 specimens were collected belonging to 8 entomofaunal groups. Out of this, 107 specimens consist of 27 species of 10 families of Hemiptera were identified. Identification of other groups are under progress. A total of 48 specimens belonging to 17 species (15 species of Mollusca and 2 species of Echinodermata) were identified from the previous survey.

46 Studies on the ciliates and bacterial communities associated with corals based on morphology and molecular tools

Investigators: Dr. Santosh Kumar & Dr. Vikas Kumar

Period: April 2019 to March 2022

Status: Ongoing

Objective: Diversity of free-living protozoan ciliates and bacteria associated with live and dead Corals.

Progress: Survey was conducted in Gulf of Mannar marine National Park and Palk Bay [Gulf of Mannar Islands (Kariyachalli Island, Puzhuvanichalli Island, Nallathanni Island, Shingle Island and Poomarichan Island)]. Identified 3 species of ciliates. All three species are new record to Indian fauna and are also associated with live corals. Bacteria- over 400 species have been recorded on the metagenomics analysis conducted.



Puducherry coast

47 Grazers impact on Benthic Invertebrate recruitment – A spatial approach in Gulf of Mannar and Palk Bay

Investigator: Dr. N. Marimuthu

Period: April 2019 to March 2022

Status: Ongoing

Objectives: To inventorize the recruitment pattern of invertebrates on the installed artificial substrate (Recruitment tripods) and the impact assessment of the grazers on the recruitment period.

Progress: One survey conducted. An underwater experimental setup (32 nos. of Tripods and 4 nos. cages) in three Islands (Kariyachalli Island, Puzhuvanichalli Island, Nallathanni Island) was erected for the collection of Invertebrate spats and recruits in the forthcoming surveys.

48 Zooarchaeological study of faunal remains from Bharatihuda Archaeological Site, Dist. Cuttack, Odisha

Investigator: Mrs. Supriya Nandy

Period: April, 2020 to March 2023

Status: Initiated

Objectives: An inventory will be made by critical study of each of the specimens of the faunal remains from Bharatihuda Archaeological Site present in the repository of Prehistoric zoology section of ZSI including the identification of the element represented by the specimens in the sample and taxonomic identification, wherever possible up to Genus/species level. Analysis will be made further for the taphonomy and the modifications in the faunal assemblage.

Progress: More than 450 fragmentary specimens sorted group wise and identified for the elements represented from Bharatihuda site. So far identified 85 specimens belonging to 11 species of 10 Genera and seven families viz. Bovidae, Suidae, Cervidae, Rhinocerotidae, Canidae, Trionychidae and Geoemydidae. Finding of a number of wild species including Rhinoceros from prehistoric periods of Odisha is noteworthy.

49 Faunal diversity along the periphery of Indian highways – Golden Quadrilateral

Coordinator: Dr. C. Raghunathan

Co-coordinator: Dr. Devanshu Gupta

Investigators: Scientists and Scientific Staff from HQ and Regional Centres

Period: April, 2020 to March 2023

Status: Initiated

Objectives: To assess the faunal diversity along the peripheral region of Golden Quadrilateral Highways passing through 13 states of India; record the road kill animals along the Golden Quadrilateral Highway; to demark the high faunal diversity areas in the Highways also with their risk and draw mitigation measures to minimize the road kill.

Progress: A month long survey was conducted by two teams of scientists and research scholars on Golden Quadrilateral Highway connecting the four metro cities, covering an area of 5846 Km Which includes 13 states of India Viz; West Bengal, Odhisha, Andhra Pradesh, Tamil Nadu, Karnataka, Maharashtra, Gujarat, Rajasthan, Haryana, Delhi, Uttera Pradesh, Bihar and Jharkhand. Approximately 30,000 specimens were collected during the survey which includes 32 groups, Annelida, Diplopoda, Araneae, Acari, Crustacea, Myriopoda, Isopoda, Thysoneura, Colembola, Phasmida, Odonata, Orthoptera, Blattoidea, Manttoidea, Dermeptera, Epimeroptera, Embioptera, Hemiptera, Thysanoptera, Neuroptera, Coleoptera, Diptera, Lepidoptera, Tricoptera, Isoptera, Hymenoptera, Mollusca, Pisces, Amphibia, Reptilia, Aves, Mammalia. Soil Sample was collected from 10 survey points and Water sample was collected from 14 survey points. Five species of Amphibians, 13 species of Reptiles and 60 species of Birds were observed and identified.

Significance: The most significant observation was made regarding the counting of road kill, a total of 15 road kills were observed which includes reptile and avian species besides canidae mammals. Besides, 6 scat samples, 3 tissue samples and 7 hair samples from the road kills were collected for DNA analysis.

05

RESEARCH PROGRAMMES: REGIONAL CENTRES

The 16 Regional Centres of ZSI are spread across the country and involved with research programmes on States, Conservation Areas and Ecosystems under their jurisdiction. During the year 2020-21, the Regional Centres of ZSI were involved in 71 research programmes. Among them 6 completed programmes, 54 ongoing programmes and 11 programmes were inducted during the reporting period.

1

NORTH EASTERN REGIONAL CENTRE (NERC), SHILLONG, MEGHALAYA

The North Eastern Regional Centre, Shillong is the first of the 16 Regional Centres of the Zoological Survey of India established on 6th March, 1959 with the primary objective of exploring and documenting the faunal diversity of northeastern region of India. The Centre's jurisdiction extends over six North East Indian states of Assam, Manipur, Meghalaya, Mizoram, Nagaland and Tripura. The North-East India biogeographic zone covering these six states constitutes about 5.2% of the total geographic area of the country. This region is situated in the transition zone of Palearctic and Indomalayan biogeographic realm and also constitute parts of Indo-Burma biodiversity hotspots. The Centre is engaged in documenting the myriad diversity of animal life forms in this biologically rich region. Till date, 127 research programmes covering various aspects of faunal diversity in the Northeastern states have been completed by the Centre. The scientists of the Centre published over 330 research papers and book chapters in various national and international journals, books of repute. At present, the Centre is handling three research programmes in the states of Assam, Manipur and Mizoram. The Centre maintains a museum exhibiting the faunal wealth of the northeastern region and also holds a collection of about 100,000 identified specimens and over 1,60,000 unidentified specimens representing various faunal groups. During the year 2020-21, out of the five running programmes, two were completed and three are currently in progress (including one initiated this year).

1 Resurvey of Siju Cave along with Krem Labit and Umlawan, Meghalaya (Cave Ecosystem)

Investigators: Officer-in-Charge and scientists of NERC

Period: April 2017 to March 2020

Status: Completed

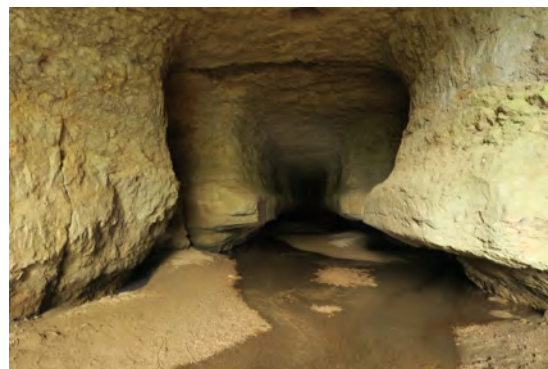
Objectives:

- To document the species diversity of various faunal groups in the cave ecosystem
- To record any changes in faunal diversity in recent times based on earlier faunal documentation.

Progress: Siju cave in South Garo Hills in Meghalaya were surveyed to determine the current status of faunal diversity, four surveys were undertaken between 2018-2020. A total of 273 examples of collected fauna were identified into 34 species under 10 major faunal groups from the cave system. The species composition

in the cave system was found to be somewhat similar (based on the species reported in 1924 surveys and the species recorded during the present surveys) although a significant reduction in the abundance of the species was observed. Very significant decline in bat populations over the years was also recorded.

Significant findings: Eight faunal species were newly recorded from the cave system as one species of Crustacea, one species of Blattodea, four species of Amphibia and two species of Chiroptera.



Entrance of Siju cave

2 Faunal Inventory of Murlen National Park, Mizoram

Investigators: Mrs. I. J. Kharkongor, Dr. U. Saikia, Dr. D. Khynriam, Mr. A. B. Meetei, Mr. A. Rana, & Mr. B. Saikia.

Period: April 2018 to March 2021

Status: Ongoing

Objective: To document the species diversity and status of various faunal groups in the National Park.

Progress: Identification during the year include 16 species of Lepidoptera, 2 species of Coleoptera, 1 species of Crustacea, 1 species of Cerambycidae and 3 species of Reptilia.



Landscape of Murlen National Park

3 Taxonomic studies of hill stream fishes of Meghalaya

Investigator: Dr. Dimos Khynriam

Period: April 2018 to March 2021

Status: Ongoing

Objective: Taxonomic studies of hill stream fish fauna in Meghalaya

Progress: A total of 2214 examples belonging to 167 species under 93 genera of fishes were identified.



Glyptothorax telchitta (Hamilton, 1922)

4 Diversity and status of small mammalian fauna (Chiroptera, Rodentia and Soricomorpha) of Manipur state, north eastern India

Investigator: Dr. Uttam Saikia

Period: April 2019 to March 2022

Status: Ongoing

Objectives:

- To document the small mammalian diversity (rodents, insectivores and bats) in the state of Manipur.
- To determine the abundance and conservation status of the small mammalian species in the study area.

Progress: Seven species of Chiroptera were identified. Besides, 88 examples of non-target species (Mollusca, Coleoptera, Lepidoptera, Crustacea, Amphibia, Reptilia) collected during the survey were also identified belonging to 33 species.

2

WESTERN REGIONAL CENTRE (WRC), PUNE, MAHARASHTRA

The Western Regional Centre (WRC) is one of the 16 Regional Centers of ZSI, which was established at Pune, Maharashtra during September 1959. The primary objective of this setup is to explore and document faunal diversity in its area of jurisdiction. WRC has completed various research programmes, including Fauna of India (Scorpiones and Araneae), Fauna of Ecosystem (Nathsagar wetland, Ujani wetland, and Northern Western Ghats), State Fauna (Maharashtra and Goa), Wildlife Sanctuaries (Bhimashankar, Koyna, Lonar, Phansad, and Radhanagari), National Parks (Chandoli, Navegaon, Pench, and Sanjay Gandhi), Tiger Reserves (Melghat and Tadoba-Andhari), and Status surveys (Indian Edible Nest Swiftlet and Western Tragopan). New taxa from various animal groups (Brachyura, Araneae, Opiliones, Scorpiones, Schizomids, Coleoptera, Diptera, Ephemeroptera, Hymenoptera, freshwater fishes, Amphibia, Reptilia, and Rodentia) that include over 120 new species, some new genera and one family have been described by the scientists of the centre. WRC holds National Zoological Collection and has over 1,90,000 specimens, including over 98,000 named collections and over 330 Type specimens. A museum, displaying nearly 500 specimens, serves to educate and generate awareness on faunal diversity and habitat. WRC also a DNA Barcoding laboratory, which has generated several DNA barcodes. The library of this center holds more than 4,000 books and many journals. WRC researchers have published a long list of books, book chapters, research articles, research notes, taxonomic reviews, monographs, catalogues, etc. WRC is a training center for Green Skill Development Programme and successfully conducted three courses (Foundation Course on Biodiversity Conservationists, and Advanced Courses on Parataxonomists and Parataxonomy including People's Biodiversity Register) sponsored by the Ministry of Environment, Forest & Climate Change. WRC provides identification and advisory services to many organizations.

1

Taxonomic studies of Amphibians of Western Ghats

Investigator: Dr. K.P. Dinesh

Period: April 2018 to March 2021

Status: Ongoing

Objective: Taxonomic study of Amphibians of Western Ghats.

Progress: A total of 216 examples are identified, under 49 species, 13 genera and 8 families. New distributional records were found from Arunachal Pradesh and Western Ghats. IUCN Red list assessment has been made for the frog species *Sphaerotheca pashchima* described during 2017 based on the field data, published data and genetic data.



View of Pambadam Shola National Park

2 Faunal diversity of Yawal Wildlife Sanctuary, Jalgaon district, Maharashtra

Investigators: Officer-in-Charge and Scientific Staff

Period: April 2018 to March 2021

Status: Ongoing

Objective: To ascertain the faunal diversity of Yawal Wildlife Sanctuary, Jalgaon district, Maharashtra

Progress: One survey was conducted and 912 examples under 41 groups were collected. Identified 325 species under 144 genera and 42 families.

3 Taxonomic studies of small mammals of Southern Western Ghats

Investigator: Dr. S. S. Talmale

Period: April 2019 to March 2021

Status: Ongoing

Objectives:

- To ascertain the small mammal (Rodents, Shrews, and Bats) diversity and distribution of Southern Western Ghats
- To develop small mammalian collection of WRC, ZSI, Pune.

Progress: A total of 12 species under 8 genera and 7 families were Identified. Also observation was made on small mammalian fauna like Malabar Giant Squirrel, *Ratufa indica* (Erxleben, 1777), Grizzled Giant Squirrel, *Ratufa macroura* (Pennant, 1769), Three striped Palm Squirrel, *Funambulus palmarum* (Linnaeus, 1766), Indian porcupine, *Hystrix indica* Kerr, 1792, Indian Flying Fox, *Pteropus giganteus* Brunnich, 1782 and Hill Shrew, *Suncus niger* Horsfield, 1851.

4 Faunal diversity of Gautala Autramghat Wildlife Sanctuary, Maharashtra

Investigators: Officer-in-Charge and Scientific Staff

Period: April 2019 to March 2022

Status: Ongoing

Objective: To ascertain the faunal diversity of Gautala Autramghat Wildlife Sanctuary, Maharashtra

Progress: Two surveys were conducted. During the first survey 792 examples belonging to 38 groups were collected and during the second survey 964 examples were collected. Identification include 286 species belonging to faunal groups: Decapoda, Arachnida (Scorpiones), Mollusca, Arachnida (Araneae), Coleoptera (Scarabaeidae), Coleoptera (Aquatic), Lepidoptera (Heterocera), Lepidoptera (Rhopalocera), Odonata and Orthoptera (Acrididae), while, observations were made on Birds and Mammals.



Semnopithecus entellus Dufresne, 1797

3

CENTRAL ZONE REGIONAL CENTRE (CZRC), JABALPUR, MADHYA PRADESH

Central Zone Regional Centre of Zoological Survey of India was established at Jabalpur on 24th February 1960 under Second Five Year Plan, to survey and document our knowledge of the faunal resources of Central India. Central Zone Regional Centre covers two states of Central India namely Madhya Pradesh (covering 52 Districts having 10 National Parks, 25 Wildlife Sanctuaries, 5 Tiger Reserves and 1 Biosphere Reserve) and Chhattisgarh (covering 28 Districts with 3 National Parks, 10 Wildlife Sanctuaries and 3 Tiger Reserve and 1 Biosphere Reserve shared with M. P.). In the National Zoological Collection of this centre, a total of 145297 numbers of holdings are catalogued comprising 77182 identified and 68115 unidentified specimens. This regional centre has completed 42 Research Programmes involving faunal exploration in various protected and non-protected areas of Madhya Pradesh and Chhattisgarh along with studies on status survey, behavior, taxonomic revisions/studies and State Fauna Series of Madhya Pradesh and Chhattisgarh. The scientists of this Centre are affiliated to Rani Durgavati Vishwavidyalaya, Jabalpur M.P. for Ph.D. guideship. The Centre is presently handling four ongoing programmes.

1 Faunal Diversity of Panna Tiger Reserve, Districts Panna and Chhatarpur, Madhya Pradesh

Investigators: Officer-in-Charge & Scientists of the Centre

Period: April 2016 to March 2019

Status: Ongoing

Objective: To study and document the faunal diversity of Panna Tiger Reserve through the field surveys.

Progress: A total of 111 species were identified and registered belonging to 01 species of Arachnida (Aranaea), 09 species of Orthoptera, 19 species of butterflies (Lepidoptera), 63 species of Moths (Lepidoptera), 10 species of Mollusca, 04 species of Amphibia and 05 species of Reptilia. Observations were made on 30 species of Birds and 10 species of Mammals.



Boselaphus tragocamelus (Pallas, 1766)

2 Faunal Diversity of Kanha Tiger Reserve and National Park, Madhya Pradesh

Investigators: Officer-in-Charge & Scientists of Centre & ZSI Hqs. Kolkata.

Period: April 2017 to March 2020

Status: Ongoing

Objective: To study and document the faunal diversity of Kanha Tiger Reserve and National Park through the field surveys.

Progress: A total of 102 species were identified and registered which belongs to 13 species of scorpions (arachnida), 37 species of butterflies (Lepidoptera), 42 species of moths (Lepidoptera), 08 species of Amphibia and 02 species of Reptilia. Further work is in progress.

3 Faunal Diversity of Sanjay, Panna and Fossil National Parks, District Panna & Chhattarpur, Madhya Pradesh

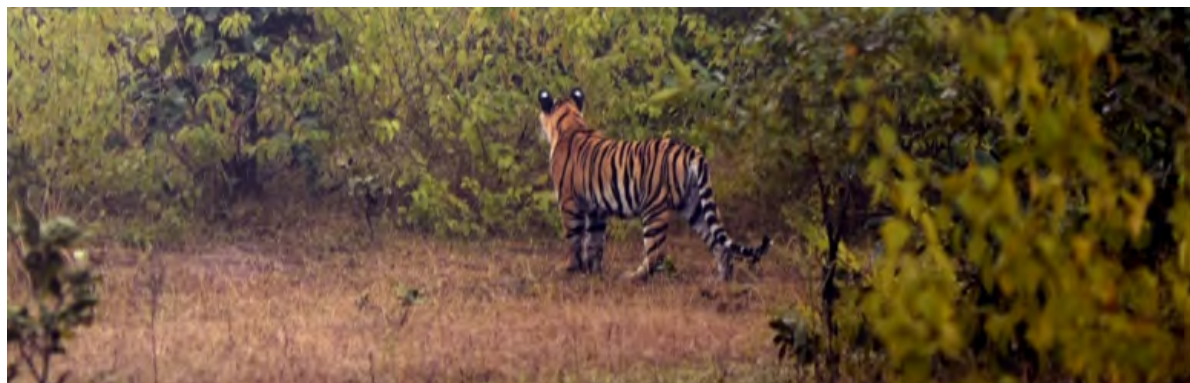
Investigators: Officer-in-Charge & Scientists of the Centre

Period: April 2018 to March 2021

Status: Ongoing

Objective: To study and document the faunal diversity of Sanjay, Panna & Fossil National Parks through the field surveys.

Progress: A total of 218 species were identified and registered which consists of 108 species from Sanjay National Park namely 03 species of scorpions, 19 species of butterflies and 61 species of moths (Lepidoptera), 17 species of Amphibia and 08 species of Reptilia; 89 species from Panna National Park which consists of 32 species of Orthopoda, 39 species of butterflies and 14 species of moths (Lepidoptera) and 04 species of Mollusca; 21 species from Fossil National Park comprising of 01 species of butterflies and 18 species of moths (Lepidoptera) and 02 species of Amphibia.



Tiger habitat at Sanjay National Park

4 Status survey of Critically Endangered Sacred grove bush frog *Raorchestes sanctisilvaticus* (Das and Chanda, 1997)

Investigators: Dr. Pratyush P. Mohapatra & Dr. Saipari Sailo

Period: April 2018 to March 2021

Status: Ongoing

Objectives:

- To study distribution and occupancy of sacred grove bush frog *Raorchestes sanctisilvaticus* (Das and Chanda, 1997) in Madhya Pradesh and Chattisgarh
- To assess the status of other bush frogs occurring in the study area.
- To evaluate habitat requirement of the species
- To identify the potential factors affecting the survival of wild population and assessment of the level of human impact if any.

Progress: The Critically Endangered Sacred grove bush frog *Raorchestes sanctisilvaticus* (Das & Chanda 1997) was rediscovered from its type locality after a period of more than 20 years. During the survey this species was also found to be very common in the Southern Chhattisgarh in Bastar plateau. Furthermore, two more *Raorchestes* spp. (sic. *Philautus* spp.), earlier known from the Peninsular India, are synonymised under the taxon *R. sanctisilvaticus* (Mirza *et al.*, 2019). Hence the area of occurrence of this species also include the distribution of *R. similipalensis* (Dutta, 2002) and *R. terebrans* (Das and Chanda, 1999), extending its present distribution east-ward to Jharkhand and towards south up to north of River Godavari.

4

DESERT REGIONAL CENTRE (DRC), JODHPUR, RAJASTHAN

The Desert Regional Centre (DRC) of the Zoological Survey of India, Jodhpur was established in June, 1960 in the name of Desert and Gangetic Plains Regional Station under Second Five Year Plan to survey the faunal diversity of Desert Biome. Later, in 1965 due to the characteristic changes in its boundaries, it was renamed as present DRC. The Jurisdiction of the Centre is spread over 3,42,239 Sq. km. area of Rajasthan and 1,96,024 sq. km. of Gujarat, covering 33 districts each of Rajasthan and Gujarat State. The area encompasses seven National Parks and 48 Wildlife Sanctuaries, three Tiger Reserve, three Ramsar Sites, 13 Conservation Reserves and 41 Important Bird Areas. The state of Gujarat has a coastline of 1596 kms. as part of the west coast of India. The state of Rajasthan and Gujarat has a long border of 1562 kms. with Pakistan in the Thar part of the Desert. The area under jurisdiction comprises of ecologically important diverse areas such as the Great Indian Desert or the Thar Desert, the Great Rann of Kachchh and the oldest mountain range Aravallis. Besides, it has mighty riverine system of Chambal, Mahi and Narmada. The Centre is engaged in the documentation of the rich and diverse faunal resources of the Rajasthan and Gujarat state by conducting field explorations and scientific studies. So far 3346 species of animals are known from desert biogeographic zone of India. Taxonomic expertise on Lepidoptera, Hymenoptera, Coleoptera, Hemiptera, Arachnida, Pisces, Amphibians, Reptiles, Birds and Mammals are available currently at the Centre. The total holdings of the Centre include 489429 specimens with 79150 Identified specimens and 410279 unidentified specimens. So far, 68 species have been described as new to science by the scientists of this Regional Centre. Other than this, 36 Books and more than 850 research papers have been published in various national/ international journals by the Scientists. The Centre successfully trained 25 students under three courses of Green Skill Development Programme (GSDP) of MoEFCC through ZSI. During the year 2020-21, the Centre was engaged in four research programmes and one externally funded research project was initiated

1

Studies on Faunal Diversity of Narayan Sarovar Wildlife Sanctuary, Gujarat

Investigators: Dr. Sanjeev Kumar, Dr. H. S. Banyal & Scientific staff

Period: April 2017 to March 2020

Status: Ongoing

Objectives:

- i. Inventorization and documenting the faunal diversity associated with Narayan Sarovar WL

Sanctuary.

- ii. Developing Datasets on exotic species and their status in the Narayan Sarovar Sanctuary.
- iii. Digital Inventory of Avifauna and other vertebrates of Narayan Sarovar WL Sanctuary.
- iv. Assessment of the threatened/endangered faunal species of the Narayan Sarovar WL Sanctuary.

Progress: Identification from the sanctuary during the year include 2 species of Lepidoptera, 1 species of Hemiptera, 7 species of Hymenoptera, 7 species of Fishes, 7 species of Amphibians, 20

species of Reptiles, 186 species of Aves and 23 species of Mammals. First records from the sanctuary comprises 7 species of fishes, one species of Reptile and four species of Aves.



Bungarus sindanus Boulenger, 1897

2 Studies on diversity of pollinating bees (Apoidea: Hymenoptera) of Semi-Arid and Desert Ecosystem

Investigators: Dr. R. H. Raina & Dr. Sanjeev Kumar

Period: April 2018 to March 2021

Status: Ongoing

Objectives:

- To collect adult bees (Hymenoptera) through intensive and extensive faunistic surveys from the semi-arid and desert ecosystem of Rajasthan.
- To study the taxonomy based on some important morphological features including genitalic characters with a view to review the pollinating bees of study area.
- To determine the richness and abundance of bee species in different habitats of semi-arid and desert ecosystem of Rajasthan by repeated surveys and consulting the old entomological literature and other sources.
- To record the present distributional status of different bee species from the study area.

Progress: Identified 46 species of bees (Hymenoptera: Apoidea) under 17 genera and 4 families viz., Apidae, Andrenidae, Megachilidae and Halictidae. Morphological characterizations of 46 species of bees were carried out and the present distributional status and the comparative inventory of bee species from the study area have been updated.

3 Studies on Faunal Diversity of Purna Wildlife Sanctuary, Gujarat.

Investigators: Dr. Sanjeev Kumar & Scientific Staff

Period: April 2019 to March 2021

Status: Ongoing

Objectives:

- Inventorization and documentation of faunal diversity of Purna WL Sanctuary, Gujarat.
- Assessment of the threatened/endangered faunal species of the Purna of the sanctuary.

Progress: One faunal survey was undertaken and collected 3251 specimens comprising Insecta, Crustacea, Arachnida, Mollusca, Pisces and Amphibia. Identification include 18 species of Hymenoptera, 15 species of Coleoptera, 4 species of Hemiptera, 51 species of Lepidoptera and 16 species of fishes. Besides, 3 species of Amphibians, 9 species of Reptiles, 74 species of Aves and 9 species of Mammals were identified by direct sighting.

4 Assessment of faunal diversity of some selected Wildlife Sanctuaries of Gujarat - Gaps in Research

Investigators: Dr. Sanjeev Kumar and All Scientists of the Centre

Period: April, 2020 to March, 2023

Status: Initiated

Objectives: Documentation of the faunal diversity of some selected (11) Wildlife Sanctuaries of Gujarat and to work out - Gaps in Research.

Progress: Literature-based information pertaining to different faunal groups reported is being compiled from selected Wildlife Sanctuaries of Gujarat: Shoolpaneshwar WLS (323 species) Bharuch Distt., Ratanmahal WLS (34 species), Barda WLS (376 species), Porbandar Bird Sanctuary (414 species), Girnar WLS (108 species) and Thol Bird Sanctuary (150 species).

5

NORTHERN REGIONAL CENTRE (NRC), DEHRADUN, UTTARAKHAND

Northern Regional Centre was established in August 1960 under the second five-year plan of the Government of India. Over the decades it is working to fulfill its mandate to explore and document the fauna of four north Indian states namely Uttarakhand, Uttar Pradesh, Punjab and Haryana, including Union Territories i.e. Chandigarh and Delhi NCR, covering an area of c.446441 km². The region comprises of ecologically diverse areas ranging from the western Himalaya in north with Shivalik ranges at the base, through Gangetic Plains with Terai in north and Bundelkhand in south, and the part of the Aravallis in southwest with equally diverse biodiversity in its one Natural World Heritage Site (Nanda Devi and Valley of Flowers National park), one Biosphere Reserve (Nanda Devi), four Tiger Reserves (Corbett, Dudhwa, Pilibhit and Rajaji), two Elephant Reserves, nine National Parks, fifty seven Wildlife Sanctuaries, ten Conservation Reserves, fourteen RAMSAR sites and twenty eight Important Bird Areas. During last few years, the centre has adopted the modern approaches in the field of taxonomy and faunal exploration, and well-equipped modern labs and faunal repositories with state-of-art facilities for investigations in taxonomy, systematics and faunal documentation have been established. The centre holds a rich collection of various faunal groups. Total holdings of the centre include 4,11,523 (Identified specimens: 2,20,767; Unidentified specimens: 1,90,756) specimens including 341 type specimens available in the National Zoological Collection of NRC. The centre has published document on Fauna of four states, Fauna of Protected areas, Fauna of Western Himalaya, seven Environmental Impact Assessment studies, four Status surveys of Endangered species, two Green Skill Development Programme courses, thirty-five Programmes and about 859 research papers in various National and International journals. The Centre has executed three programmes during the year 2020-21.

1 Forest Insect diversity of North-Western Himalayas

Investigators: Dr. Sanjay D. Paunekar & other Scientists of NRC,

Period: April 2018 to March 2021

Status: Ongoing

Objectives:

- To identify the forest Insect diversity through surveys and collection in different habitat and zones of study areas.
- To prepare inventory/checklist of forest Insects along with their abundance.

Progress: Chapter on Morphology prepared of

identified 116 species of order Lepidoptera and 18 species of order Odonata.



Junonia iphita (Cramer, 1779)

2 Fauna of three conservation reserves (Rakh Sarai Amanat Khan, Ranjit Sagar and Beas River) of Punjab

Investigators: Dr. Gaurav Sharma, Dr. Vinita Sharma, Dr. Anil Kumar, Dr. Sanjay D. Paunekar, Dr. V.M. Sathish Kumar and Dr. C.K. Mandal

Period: April 2020 to March 2023

Status: Initiated

Objective: To study the faunal diversity of selected three conservation reserves of Punjab.

Progress: The information of 148 faunal species were compiled from these three conservation reserves (Rakh Sarai Amanat Khan, Ranjit Sagar and Beas River) of Punjab from published literature.

3 Status survey of CMS-CITES avian species of India

Investigators: Dr. Anil Kumar and Dr. G. Maheswaran

Period: April 2020 to March 2023

Status: Initiated

Objective: To review and compile the status of CMS and CITES avian species of India.

Progress: A total 683 avian species belonging to 19 orders and 54 families have been prepared as listed in Appendix-I and II of CMS and CITES. Among these, 289 species (42.31 %) were non-passerine and 394 (57.69 %) were passerines (songbirds). The state-wise CMS & CITES status of Avian species of Himachal Pradesh completed and for other states is under progress.



Gyps indicus (Scopoli, 1786)



A View of habitat in Beas River Conservation Reserve, Punjab

6

SOUTHERN REGIONAL CENTRE (SRC), CHENNAI, TAMIL NADU

The Southern Regional Centre was established during the 2nd Five Year Plan on 9th March 1961 to conduct faunal explorations in southern peninsular India. The jurisdiction of the centre cover entire Tamil Nadu, Southern Karnataka, Southern Andhra Pradesh and Union Territory of Puducherry which is about 1,50,000 Km². All protected areas within this jurisdiction is covered by the centre which comprise of three biosphere reserves, nine tiger reserves, 9 National Parks and 43 wildlife sanctuaries. The region under the jurisdiction covers all ecosystems of southern Western Ghats and southern Deccan province. The region is also one of the global biodiversity hotspots with several endemic and endangered species and some of the world renowned protected areas are located here. The most significant contribution of the center is the scientific inputs it provided for the establishment of Silent Valley National Park (Palakkad, Kerala) and Nilgiri Biosphere Reserve (Tamil Nadu, Kerala and Karnataka). These protected areas were established based on the explorations conducted by the scientists of the centre few decades ago. The centre has significantly contributed towards discovery of several new species of amphibians, freshwater fishes, aquatic hemipterans, dipterans, mayflies, dragonflies from peninsular India. Currently the centre is equipped with state of the art light microscopy facility, DNA laboratory, GIS-facility, library and other scientific infrastructure to conduct studies on faunal diversity. Several national projects sponsored by MoEF&CC, DST and Forest Department are operationalized through the Centre. During 2020-21, the centre was selected as a collaborating centre under Long Term Ecological Observatories (LTEO) programme of the Ministry of Environment Forest and Climate Change to monitor Arthropod taxa across six LTEO sites in India. The centre has completed documentation of several protected areas of the region and few are ongoing. During the year 13 new species belonging to Ephemeroptera, Odonata, Blattodea and Psocoptera were discovered and seven species of Ephemeroptera were reported as new to India. In the reporting period, one book, eighteen research papers, 1 monograph and fourteen book chapters were published. During 2020-21, 4 students were registered for Ph. D. programme and currently 12 students are pursuing their Ph. D programme under Madras University. Total holding of the Centre comprises 463,736, of which 198,755 are named specimens, 264,981 unnamed and 2067 are Type specimens.

1

Fauna of Meghamalai Wildlife Sanctuary and adjoining landscapes, Tamil Nadu

Investigators: Officer-in-Charge and Scientific Staff and ZSI, Kolkata

Period: April 2018 to March 2020

Status: Ongoing

Objective: To document the Fauna of Meghamalai Wildlife Sanctuary and adjoining landscapes, Tamil Nadu.

Progress: Identification of fauna during the year include 17 species of Ephemeroptera, 34 species of Odonata, 125 species of Lepidoptera, 5 species of Hemiptera (Cicadellidae), 6 species of Psocoptera, 59 species of Mollusca, 10 species of Reptiles, 78 species of Aves and 15 species of Mammals. Two new species, one each of Odonata and Psocoptera published.

2 Fauna of conservation Area: Fauna of Agasthyamalai Biosphere Reserve

Coordinators: Dr. K.A. Subramanian & Dr. P.M. Sureshan

Investigators: Subject Experts

Period: April 2018 to March 2021

Status: Ongoing

Objective: To study and inventorize the fauna of Agasthyamalai Biosphere Reserve.

Progress: Identification comprises 26 species of Ephemeroptera, 46 species of Odonata, 12 species of Blattodea, 98 species of Lepidoptera, 6 species of Hemiptera (Cicadellidae), 6 species of Psocoptera, 76 species of Mollusca, 16 species of Amphibia, 16 species of Reptiles, 93 species of Aves and 25 species of Mammals. Two new species, one each of Odonata and Psocoptera published, while one species of damselfly *Protosticta rufostigma* Kimmins, 1958 rediscovered after its description in 1958.

3 DNA barcoding of selected faunal groups/species

Investigator: Dr. Ranjana Bhaskar

Period: April 2018 to March 2021

Status: Ongoing

Objective: To create DNA barcode of fauna of India.

Progress: A total 174 DNA Sequences submitted in NCBI, Gen Bank, comprising 5 species of Mammals, 100 species of Pisces, 3 species of Reptiles, 14 species of Odonata, 10 species of Crustacea, 25 species of Ephemeroptera, 7 species of Hemiptera, 1 species of Hymenoptera, 5 species of Lepidoptera and 5 species of Araneae. Besides, new species of snake eel published during the reporting period.

4 Phylogeography of Blackbuck (*Antilope cervicapra*) of India

Investigator: Dr. Ranjana Bhaskar

Period: April 2018 to March 2021

Status: Ongoing

Objective: To understand phylogeography and population structure of Black Bucks in India.

Progress: DNA was isolated for 60 Sequences of Blackbuck (*Antilope cervicapra*), PCR was performed and 40 samples send for sequencing.



Antilope cervicapra Pallas, 1766

7

GANGETIC PLAINS REGIONAL CENTRE (GPRC), PATNA, BIHAR

Gangetic Plains Regional Centre was set up at Patna in March 1965 under Third Five Year Plan to survey, ascertain and augment knowledge on the faunal resources of Gangetic Plains area under its jurisdiction: The jurisdiction of the Centre is spread over two states. Bihar having 38 Districts with one National Park, eleven Wildlife Sanctuaries and one Tiger Reserve and Jharkhand having 24 Districts with one National Park, ten Wildlife Sanctuaries and one Tiger Reserve. During the last 56 years of its existence this centre has shown all round development such as research, field surveys, and development of the National Zoological Collections, Museum, Green Skill Development Program and construction of its own office building. The centre has completed more than 40 projects under Fauna of States, Fauna of Ecosystem, Status Survey, Ecological studies and revisionary studies. Total holding includes 145117 specimens, comprising 54756 named specimens and 90361 unnamed specimens. Apart from these 12 Type specimens are housed in the centre. The Centre carried out three in house research programmes during 2020-21. Apart from this, one research project on Lepidoptera, funded by SERB, New Delhi and another one on Kosi Dolphin Census Survey, Project sponsored by Department of Environment, Forest and Climate Change, Govt. of Bihar are also ongoing.

1

Fauna of Lawalong Wildlife Sanctuary, Chatra, Jharkhand

Investigators: Dr. Gopal Sharma & Dr Navneet Singh

Period: April 2015 to March 2017

Status: Ongoing

Objective: To study and inventorize the fauna of Lawalong Wildlife Sanctuary, Chatra, Jharkhand.

Progress: A total of Amphibia 24 species, Annelida- 6 species, Aquatic Arthropoda 9 species, Aves 88 species, Lepidoptera-Moth 78 species, Butterfly-29 species, Mammalia 19 species, Mollusca 22 species, Pisces-15 species, Reptilia 21 species, Zooplankton 45 species were documented.



Brown-winged Jacana, *Metopidius indicus* Latham, 1790

2 Faunal Diversity of Rajgir (Pant) WLS Rajgir and Budha WLS, Gaya

Investigators: Officer-In-Charge and other Scientific Staff

Period: April 2017 to March 2019

Status: Ongoing

Objectives: To study and inventorize the Faunal Diversity of Rajgir (Pant) WLS Rajgir and Budha WLS, Gaya.

Progress: Identification includes Zooplankton 52 species, Lepidoptera –Moth 101 species, Butterfly 65 species, Mollusca-22 species, Mammalia 23 species, Aves 119 species, Reptilia 13 species, Amphibia 11 species, and Pisces 33 species.

3 Fauna of Gautam Budha Wildlife Sanctuary, Bihar

Investigators: Officer-in-Charge and other Scientists

Period: April 2017 to March 2019

Status: Ongoing

Objective: To collect information on all faunal groups on Gautam Budha Wildlife Sanctuary, Bihar.

Progress: A total of Zooplankton 29 species, Lepidoptera –Moth 113 species., Butterfly 39 species, Mollusca 24 species, Mammalia 18 species, Aves 92 species, Reptilia 12 species, Amphibia 11 species, and Pisces 29 species were documented.



Mangina argus (Kollar, [1847])

8

HIGH ALTITUDE REGIONAL CENTRE (HARC), SOLAN, HIMACHAL PRADESH

High Altitude Regional Centre was established in September 1968, under the fourth Five Year Plan of the Government of India to explore the faunal diversity of north western Himalaya. The Jurisdiction of the Centre is spread over 2, 77, 909 sq.km. comprising of mountainous states of Himachal Pradesh, Union Territories of Jammu & Kashmir and Ladakh under North Western Himalayan ecosystem. Owing to vast altitudinal variation from 350 m to 6,500m ASL (Above Sea Level), it covers all the four physiographical zones of the Himalaya viz. Shiwalik, Lesser, Great and Trans Himalaya. Three important ranges, Karakoram Range is the northern most range, to the south of the Karakoram ranges run the Zaskar range and parallel to Zaskar range towards its southern side lies the Pir Panjal range in the region. The area includes 09 National Parks, 43 Wildlife Sanctuaries, 37 Conservation Reserves, One Biosphere Reserve and 07 Ramsar sites. Total holdings of the Centre include 40,430 identified specimens and 1, 13,394 unidentified specimens. HARC has been recognized as research institute for Ph.D. programme by the University of Jammu, Jammu (UT), Himachal Pradesh University, Shimla and Maharaja Agrasen University, Baddi, Solan (HP).

1

Faunal Diversity of Union Territory Ladakh (Earlier the State fauna of Jammu & Kashmir)

Investigators: Dr. Avtar Kaur Sidhu, Dr. Gaurav Sharma, Dr. Indu Sharma, Dr. T. Kubendran & Dr. Kamal Saini

Period: April 2018 to March 2021

Status: Ongoing

Objective: To study and inventorize the faunal diversity of the State of Jammu and Kashmir.

Progress: A total of 195 species are identified from 12 different groups (Lepidoptera: Papilionoidea: 26 species, Heterocera: 05 species, Hymenoptera: 06 Species, Ephemeroptera: 11 species, Trichoptera: 02 species, Plecoptera: 02 species, Orthoptera: 13 species, Odonata: 08 species, Pisces: 15 species, Herpetofauna: 06 species, Aves: 84 species and Mammals: 17 species).



Landscape of Shyok valley of Ladakh

2

Grassland Ecosystem: Faunal Diversity of Temperate and Alpine Grasslands of the Himalaya: Phase-1: (H.P.)

Investigators: Officer-in-Charge and Scientists

Period: April 2018 to March 2021

Status: Ongoing

Objectives:

- i. To survey and explore the faunal diversity of

temperate and Alpine grasslands of Himachal Pradesh.

- ii. Taxonomic studies of the fauna collected.
- iii. Documentation of the fauna of Temperate and Alpine Grasslands of Himachal Pradesh.

Progress: Local surveys were conducted to Sirmour and Solan districts. A total of 202 species were identified (Papilionoidea: 35 species, Heterocera: 07 species, Hymenoptera: 34 species, Ephemeroptera: 19 species, Trichoptera: 02 species, Plecoptera: 02 species, Orthoptera: 16 species, Odonata: 08 species, Herpetofauna: 05 species, Aves: 63 species and Mammals: 11 species).



Argynnis addipe Denis and Schiffermüller, 1775

3 Entomofauna of North Western Himalaya: Ephemeroptera, Plecoptera and Trichoptera: Phase-1

Coordinator: Dr. Kailash Chandra

Investigators: Dr. T. Kubendran & Dr. Avtar Kaur Sidhu

Period: April 2018 to March 2021

Status: Ongoing

Objectives:

- i. To survey, explore and monitoring of Ephemeroptera, Plecoptera and Trichoptera Diversity of North Western Himalaya.
- ii. Taxonomic studies of the EPT fauna collected.
- iii. Ecological/behavioral studies.
- iv. New species, new record, if any.
- v. Documentation of the EPT fauna of North Western Himalaya.

Progress: A total 860 specimens under 21 species belonging to 12 genera and 6 families of Ephemeroptera, Plecoptera and Trichoptera were identified.



Riverine Ecosystem, Hemis, Leh, Ladakh

9

MARINE BIOLOGY REGIONAL CENTRE (MBRC), CHENNAI, TAMIL NADU

Marine Biology Regional Centre was established in March 1, 1973, in Chennai, from where it was a Marine Survey Unit of Zoological Survey of India, Kolkata, since its inception under the first five-year plan in April 1959. Established with the mandate to studying the marine faunal biodiversity of India, this centre has jurisdiction spanning marine ecosystems over 2.02 million sq km EEZ of India - from reef types such as fringing, barrier and atolls, to seagrasses, mangroves, estuaries, dunes, salt marshes and extensive beaches in addition to the oceanic habitats, submerged reefs and mounts. Since its inception, 113 research programmes have seen completion under the Annual Programmes of Research and a few grant-in-aid projects combined. Currently, the centre has 08 ongoing programmes, of which three are externally funded. Being a recognized centre for PhD studies under the Madras University, 13 students have received their doctoral degrees until now, and ten students are currently pursuing their PhD degree. The centre holds 1,28,215 specimens under the National Zoological Collections, of which 1,16,412 are named, including two holotypes and 11 paratypes, representing 2944 species.

1 Fauna of West Coast - Meiofauna with special reference to free-living marine nematodes

Investigator: Dr. G. Sivaleela

Period: April 2017 to March 2020

Status: Completed

Objective: To study the diversity of marine nematodes of West coast.

Outcome: A total of 108 species of free living marine under 19 families and 54 genera were identified from 1297 specimens.

Significant findings: The genera *Gammanema* and *Draconema*, *Paradraconema* *Calomicrolaimus* and *parahonestus* were identified as new records from the west coast of India.



Muddy coast –collection site

2 Population studies of commercially viable Sea cucumber species in Gulf of Mannar Marine National Park and Palk Bay

Investigators: Dr. Rajkumar Rajan, Dr. P. Padmanaban & Dr. Anand Kumar

Period: April 2017 to March 2019

Status: Ongoing

Objective: Population studies of commercially viable Sea cucumber species in Gulf of Mannar Marine National Park and Palk Bay

Progress: The field study of the project was completed last year. The population density data gathered over the Spatio-temporal scale from 18 stations in the Gulf of Mannar and Palk Bay regions were organised and analysed. The histological studies of specimens of *H. scabra* for gonadal index and determining sexes were completed. The data revealed that the population density varied seasonally and spatially, with the densities ranging from 4.5 - 37.3 n/ha, where the peak density was observed in April and the lowest in October.

3 Fauna of Gulf of Mannar - Reef fishes

Investigator: Dr. Mrinal Kumar Das

Period: April 2018 to March 2021

Status: Ongoing

Objective: To survey and Inventorize the Reef fishes of Gulf of Mannar.

Progress: A total of 277 examples belonging to 116 species of reef fishes were identified.

4 Studies on the morphology and ecology of testate amoebae (Protozoa: Rhizopoda) from three Biotic provinces of the Biogeographic zone, The Himalaya, India

Investigator: Dr. L. Bindu

Period: April 2019 to March 2023

Status: Ongoing

Objectives:

- To explore the testate amoebae fauna from three Biotic provinces of the Biogeographic zone, The Himalaya, India
- To prepare the checklist of the testate amoebae of the study area.
- To study the occurrence of indicator species

in various habitats

Progress: A total of 65 species under 14 genera and 8 families were identified.

5 Morphology and Molecular Taxonomic studies of Marine Sponges of Lakshadweep

Coordinator: Dr. G. Sivaleela

Co-Investigators: Mr. Surendar, C. & Mr. Rajendar Kumar R.

Period: April 2019 to March 2022

Status: Ongoing

Objectives:

- Survey, collection, Identification digitization and cataloguing of marine sponges.
- To study the status and Taxonomy of marine sponges and molecular studies of sponges of some important groups of sponges of Lakshadweep.
- Status of endemic and boring sponges and barcoding of sponges.

Progress: A total of 57 species of marine sponges belonging to 38 genera and 23 families under the class Demospongia were identified from 287 examples. 2 species of marine sponges were identified as new records to Lakshadweep. DNA from species *Leucetta chagosensis* Dendy, 1913 was isolated and the gene ITS -450 basepair was uploaded in the NCBI website.



Sponge habitat

10

ANDAMAN AND NICOBAR RESEARCH CENTRE (ANRC), PORT BLAIR

Andaman and Nicobar Regional Centre of Zoological Survey of India was established at Port Blair on 21st April 1977 with the jurisdiction covering Andaman and Nicobar Islands and its coastal and off-shore waters. About 80 research programmes have been completed on several faunal groups of this archipelago. The major areas of studies at this Centre are on Taxonomy, Ecology and Zoogeography of protozoan to Mammalia from marine and terrestrial ecosystems. Scientists of the ZSI, Port Blair published 75 books, and over 800 research papers in various peer reviewed national and international journals, 60 pamphlets, 50 general articles and 90 posters. At present there are 10 ongoing projects including 09 in-house projects and 01 grant-in-aid projects. Coral reefs and their associated faunal communities are given special attention. Holdings of the Centre comprise 1,54,069 specimens with 61,289 named and 92,780 unnamed specimens. More than 200 visitors from mainland as well as foreigners witnessed regional museum of the Centre during this reporting period, out of which more than 100 students from various colleges, school of this islands. During the period 1 book, 33 research papers, 246 book chapters were published. Six conference, training and workshop have been conducted, such as three day National Webinar on Island Biodiversity, Conservation and Management; one day workshop on the occasion of World Ozone Day; workshop on Coastal and Marine Biodiversity of Island Ecosystem.

1 Faunal diversity of Andaman and Nicobar Islands: Marine and Terrestrial Fauna of Little Nicobar group of Islands

Investigator: Dr. C. Sivaperuman

Period: April 2018 to March 2021

Status: Ongoing

Objectives:

- To assess the present status and distribution of faunal diversity (Terrestrial & Marine) of Little Nicobar Island.
- To study the species richness, abundance, and diversity of selected terrestrial and marine fauna.
- To prepare the distribution maps using ecological and GIS information.
- To suggest management recommendation for the conservation of the fauna of Little Nicobar Island group.

Progress: A total of 230 species including 37 species of birds, 7 species of Reptiles, 13 species of Amphibians, 33 species of Spiders, 55 species of Lepidoptera, 2 species of Hydrozoa, 49 species of Molluscs, 8 species of Crustaceas, 9 species of Echinoderms, 17 species of Fishes were identified. Besides 10 endemic bird species were observed. Marine faunal diversity was found to be high in the little Nicobar group of islands.



Tridacna crocea Lamarck, 1819

2 Faunal diversity of Andaman and Nicobar Islands: Faunal diversity in the agro-ecosystem in Andaman Islands

Investigator: Dr. C. Sivaperuman

Period: April 2018 to March 2021

Status: Ongoing

Objectives:

- To assess the major faunal diversity in the Agro-ecosystem of Andaman Islands.
- To analyze their association with different crops in the agro ecosystem.
- To identify the ecosystem services provided by the insects and bird communities in the agro ecosystem.
- To provide suitable management suggestions to control the bird damage to the agricultural crops.

Progress:

A total of 240 species including 7 species of Mammals, 78 species of Birds, 19 species of Reptiles, 9 species of Amphibian, 51 species of Butterflies, 31 species of Spiders, 37 species of Moths, 8 species of Odonata were identified.



Nephila kuhlii Doleschall, 1859

3 Terrestrial Faunal Diversity of the Little Andaman Island

Investigator: Dr. Anil Kumar Dubey

Period: April 2018 to March 2021

Status: Ongoing

Objectives:

- To study the taxonomy, diversity and distribution of terrestrial fauna of the Little Andaman Island.
- To document habitus and biological information of terrestrial fauna of the Little Andaman.

Progress: A total of 64 species identified from the collection of previous surveys made in the Little Andaman Island. Two new species described, one each belonging to the Order Coleoptera and Hemiptera, while one species, *Aleuromarginatus littoralis* Martin, 1985 is recorded for the first time from the Little Andaman Island.

4 Status of corals and associated macrofauna & Marine fishes of South Reef Island and Interview Island Wildlife Sanctuaries, Middle Andaman

Investigators: Dr. Tamal Mondal & Dr. Bineesh, K.K.

Period: April 2018 to March 2021

Status: Ongoing

Objectives:

- Assessment of the present status of corals and coral associated faunal communities of South Reef Island and Interview Island Wildlife Sanctuaries.
- Estimation of the diversity, density and distribution of coral and coral associated faunal communities in the reef areas.
- Assessments of the reef cover at the study areas.
- Estimation of the physico-chemical parameters of seawater.
- Resilience against impact of natural and anthropogenic activities.
- Preparation Heath Card to evaluate status of coral reefs.

Progress: Identification include 99 species of scleractinian corals, 14 species of octocorals, 12 species of sea anemones, 8 species of hydrozoans, 17 species of sponges, 7 species of

polyclads, 41 species of molluscs, 164 species of fishes were identified. Described one new species of fish. New record of 5 species in Indian waters including 3 species of scleractinian corals and 2 species of fishes were also reported during the period.



Caranx sexfasciatus Quoy & Gaimard, 1824

5 Faunal Expedition to Great Nicobar Biosphere Reserve

Coordinator: Dr. C. Sivaperuman

Period: April 2018 to March 2019

Status: Ongoing

Objectives:

- To assess the present status, distribution and species richness, abundance of terrestrial fauna of Great Nicobar Biosphere Reserve.
- To assess the changes in the species composition in different habitats in the recent times, especially in the context of the tsunami in 2004.
- To recommend suitable conservation measures for the management of faunal communities in the Great Nicobar Biosphere Reserve especially endemic, endangered and threatened species.
- To identify the gap areas in our knowledge on the faunal information pertaining to the Great Nicobar Biosphere Reserve.

Progress: The compilation of the chapters for the publication is under process, more than 25 chapters received from different authors covering various faunal group both terrestrial and marine ecosystem such as Dragonflies and Damselflies, Butterflies, Moths, Coleoptera, Hymenoptera,

Isoptera, Scorpion, Spiders, Land and freshwater Mollusca, Amphibians and Reptiles, Leatherback Turtle, Brackish & Estuarine Fishes, Birds, Mammals, Sponges, Scleractinian Corals, Hydrozoa, Sea Anemones, Polyclads, Crustacea, Molluscs, Opisthobranchs and Echinoderms.

6 Diversity, distribution and taxonomy of the terrestrial fauna of Andaman group of Islands

Investigator: Dr. Anil Kumar Dubey

Period: April 2018 to March 2021

Status: Ongoing

Objective: To document the diversity, distribution and taxonomy of the terrestrial fauna of Andaman group of Islands

Progress: A total of 128 species identified from the collection of previous surveys, which includes, 5 species of Mollusca, 2 species of Blattodea; 9 species of Coleoptera; 19 species of Hemiptera; 5 species of Hymenoptera; 81 species of Lepidoptera; 6 species of Odonata. Two new genera and nine new species were described:



Duttaphrynus melanostictus Schneider, 1799

7 Exploration of Marine fishes of Nicobar group of Islands

Investigator: Dr. Bineesh. K. K.

Period: April 2019 to March 2022

Status: Ongoing

Objectives:

- i. To do taxonomy, species diversity and distribution of marine fishes in the Nicobar group of Islands.
- ii. Identification of venomous and poisonous fishes.
- iii. Identification of marine ornamental fishes
Identification of cryptic species using integrative taxonomic approach.

Progress: A total of 86 species of fishes were identified based on the previous surveys collection/photographs. Four species were recorded for the first time from Indian waters, while eight species of fishes as first records to Andaman and Nicobar Islands. Besides a new species of threadfin bream, *Nemipterus russelli* from the Andaman and Nicobar Islands and Myanmar is described.

8 Faunal diversity of Andaman and Nicobar Islands: Faunal diversity in the Grassland ecosystem in Andaman & Nicobar Islands

Investigator: Dr. C Sivaperuman

Period: April 2018 to March 2021

Status: Ongoing

Objectives:

To assess the present status and distribution of faunal diversity of grassland ecosystem of Nancowry group of Islands.

1. To study the species richness, abundance, and diversity of selected grassland fauna .
2. To prepare the distribution maps using ecological and GIS information.
3. To suggest management recommendation for the conservation of the fauna of Grassland ecosystem.

Progress: A total of 149 species including 26 species of spiders, 35 species of butterflies, 17 species of moths, 3 species of Amphibians, 10 species of Reptiles, 58 species of birds were identified. In grasslands, ground-dwelling spiders were often observed as the most diverse and numerically abundant group of predatory

arthropods. We found significant differences in the spider communities between grass and mixed-grass/shrub habitats and throughout all the five habitat types. Among the 26 spider species most of the representing individuals were found in the Tetragnathidae followed by Psechridae. A total of 35 species of butterflies were observed in the Kamorta, Nicobar.



Ideopsis juvena nicobarica Cramer, 1777

9 Taxonomy, Distribution, Diversity and current status of Chondrichthyans from Andaman and Nicobar Islands

Investigator: Dr. Bineesh. K. K.

Period: April 2019 to March 2022

Status: Ongoing

Objectives:

- i. To study taxonomy, species diversity and distribution of Chondrichthyans from Andaman and Nicobar Islands.
- ii. Identification of cryptic species using integrative taxonomic approach.
- iii. To develop the species specific DNA Barcodes of Chondrichthyans from Andaman and Nicobar Islands.

Progress: Local surveys conducted. A total of 98 species of sharks and rays were identified.

One species of ray as new distributional record to Indian waters and one new record to Andaman and Nicobar Islands were identified. *Paragaleus longicaudatus* (Bessednov, 1966) a rare shark was recorded from Great Nicobar Island. This is first record for Indian waters.

11

SUNDERBAN REGIONAL CENTRE (SBRC), CANNING, WEST BENGAL

The Sunderban Regional Centre was established in the year 1979 at Kakdwip, West Bengal under the Fifth Five Year Plan of the Government of India. This Centre was established with an objective to survey the faunal wealth of Sunderban as it is closely entangled with waterways like rivers, creeks, estuaries and marine. The jurisdiction of the centre includes two districts of West Bengal viz., North 24 Parganas and South 24 Parganas. It includes important protected areas with 1 Biosphere Reserve (Sunderban Biosphere Reserve), 1 National Park (Sunderban National Park), 1 Tiger Reserve (Sunderban Tiger Reserve), 5 Wildlife Sanctuaries (Haliday Island WLS, Lothian Island WLS, Sajnakhal WLS, Chintamani Kar Bird Sanctuary and Bibhutibhushan WLS). In 1984, in order to have a better focus on Sunderban Biosphere Reserve, the centre was shifted from Kakdwip to Canning. The total holdings of this Centre are 48133 specimens which include 13562 identified specimens and 34571 unidentified specimens.

1 Faunal diversity of Sagar Island, West Bengal, India

Coordinator: Officer-in-Charge

Investigators: Dr. K. Valarmathi, Dr. Chitra, J., Mr. S.S. Mishra & Dr. Sreeraj, C.R.

Period: April 2018 to March 2020

Status: Ongoing

Objective: To survey and inventorize the Faunal Diversity of Sagar Island, West Bengal.

Progress: A total of 722 specimens belonging to 18 groups were collected. Apart from this, 20 species of Birds were observed.

2 Taxonomy and ecology of heterobranch slugs (Mollusca, Gastropoda, Heterobranchia) of India

Investigator: Dr. Sreeraj, C. R.

Period: April 2019 to March 2022

Status: Ongoing

Objectives:

- To understand the diversity and distribution of heterobranch slugs in the mangrove ecosystem of India.
- To understand the ecological role of these slugs in the ecosystem.

Progress: A total of 108 specimens of Mollusca collected and 76 species of Mollusca were identified.

12

FRESHWATER BIOLOGY REGIONAL CENTRE (FBRC), HYDERABAD, TELANGANA

Freshwater Biology Regional Centre was established under 5th Five -Year Plan of Govt. of India on 24th February 1979 at Hyderabad, Telangana State in contemplation to study the limnological aspects of the freshwater bodies throughout India focusing on exploration and documentation of physico-chemical, ecological profiles and faunal diversity of all the freshwater ecosystems including wetlands of National and International importance including Ramsar sites of India. Apart from freshwater faunal studies, the faunistic studies on Protected Areas and Smart cities of Andhra Pradesh and Telangana is also being carried out. The NZC holdings of the centre comprises 120371 including 51536 identified and 68835 unidentified specimens. Identification and advisory services of faunal groups particularly fishes, molluscs, aquatic insects and planktons were made for research institutes, colleges, Universities and professional Laboratories across the nation by our scientists. The Centre is well equipped with facilities like modern analytical instruments for carrying out research in limnoecological, hydrobiological, faunistic studies and animal DNA Barcoding. The Centre contributed a total of 521 barcode sequences of 234 species to NCBI and BOLD and also published 24 books and more than 258 research papers in various reputed journals. The Centre is recognised by the Osmania University, Hyderabad for pursuing PhD in Zoology at FBRC. At present two research scholars have registered for doctoral research at FBRC, ZSI, Hyderabad. The centre also has started National Museum of Zoological Collections on 24th March 2021 with all representative faunal groups to educate students and research enthusiasts.

1 Fauna of Eastern Ghats- Riverine and Hill Stream Fishes & Molecular Characterization

Investigator: Dr. Boni Amin Laskar

Period: April 2017 to March 2020

Status: Completed

Objective: To study molecular characterization of riverine and hill stream fishes of Eastern Ghats.

Outcome: The current study recorded 62 species out of 127 previously reported species, and further recorded 41 species as new addition in the freshwater fish diversity of Eastern Ghats. An updated list of 167 native freshwater fish species belonging to 80 genera under 36 families and 12 orders has been prepared for the Eastern Ghats. A total of 105 species of freshwater fishes have been studied through DNA barcoding and 249 NCBI accessions are achieved.



Proeutropiichthys taakree (Sykes, 1839)

2 Faunistic studies on Amrabad and Kawal Tiger Reserve, Telangana

Investigators: Dr. Deepa, J., Dr. S. Shrikanth Jadhav, Dr. M. Karuthapandi & Mrs. Sk. Rehanuma Sulthana

Period: April 2018 to March 2021

Status: Ongoing

Objective: To study the faunal diversity of Amrabad and Kawal Tiger Reserve of Telangana

Progress: One faunistic survey to Amrabad and Kawal Tiger Reserve were conducted. Altogether 4546 samples and 18 lots of planktons have been collected, of which 1617 faunal samples and 7 lot of planktons were collected from Kawal Tiger Reserve and 2929 samples and 11 lot of planktons were collected from Amrabad Tiger Reserve. 217 species from 4213 examples of different faunal groups were identified.



Pembi, Kawal Tiger Reserve, Telangana

3 Diversity, Distributional Pattern and Assemblage of Fishes of Deccan Peninsular, India

Investigator: Dr. S. S. Jadhav

Period: April 2019 to March 2022

Status: Ongoing

Objective: To conduct survey for exploration of fish faunal diversity of Deccan Peninsular India.

Progress: A total of 1196 examples of fishes belonging to 88 species of 59 genera were identified.

4 Fauna of India: Study on the Blattodea fauna of India

Investigator: Dr. S. Prabakaran

Period: April 2019 to March 2022

Status: Ongoing

Objective: To prepare a monograph on fauna of India Blattodea.

Progress: Totally 132 examples under 4 families, 12 genera, 27 species were identified.

5 Faunal inventorisation on Smart Cities of Andhra Pradesh

Investigator: Dr. Deepa Jaiswal

Period: April 2020 to March 2023

Status: Initiated

Objectives: To study and inventorise the fauna of Smart cities of Andhra Pradesh

Progress: One survey conducted and collected 685 examples of 26 faunal groups. Identified 75 species belonging Coleoptera, Lepidoptera, Branchiopoda, Decapoda, Ostracoda, Mollusca and Fishes.



View of Godavari River, Kaleswaram

13

WESTERN GHAT REGIONAL CENTRE (WGRC), KOZHIKODE, KERALA

The Western Ghat Regional Centre at Calicut, Kerala, established in April 1980, under the Sixth Five Year Plan of the Government of India, is one among the sixteen Regional Centres of the Zoological Survey of India. The jurisdictional limit of the Centre encompasses the entire biogeographical zone of the Western Ghats, an extremely important life supporting system of Peninsular India. The Centre is engaged in the documentation of the rich and diverse faunal components/resources of the Western Ghats and Kerala, by conducting field explorations and scientific studies. Behavioral study of non-human primates of Western Ghats, Faunal resources of Eravikulam National Park, Kerala, Faunal resources of Bhadra Tiger Reserve and Kudremukh National Park, Karnataka, Taxonomic revision of Pteromalinae (Pteromalidae: Chalcidoidea: Hymenoptera) of Indian Sub-continent, Faunal Atlas of Odonata (Insecta) of the Western Ghats, Faunal Atlas of Amphibians of the Western Ghats, Systematic studies on Pteromalidae (Hymenoptera: Insecta) of Southern Western Ghats, Faunal resources of Malabar Wildlife Sanctuary, Kerala, Systematic studies on Scelioninae (Hymenoptera: Insecta) of South Western Ghats, Interactive identification and information system of the Indian genera of Diapriinae (Insecta: Hymenoptera: Diapriidae), Fauna of Thattekkad Bird Sanctuary, Kerala, Survey and documentation of faunal resources of Shola grasslands of Western Ghats-Phase-I, Fauna of Tropical Rainforests- Western Ghats, Kerala, Fauna of Freshwater ecosystem: Sasthamkotta Lake, Kerala and Fauna of Kerala are the major research programmes undertaken by the Centre. Fauna of Agasthyamalai Biosphere Reserve (Joint programme with SRC, ZSI, Chennai), Fauna of Lakshadweep Islands (Joint programme with ZSI, Kolkata), Fauna of India: Family Vespidae (Insecta: Hymenoptera), and Fauna of Mookambika Wildlife Sanctuary, Karnataka are the research programmes currently ongoing in the Centre. The National Zoological Collections maintained in the Centre contain more than 46,000, named and about 100000 unnamed specimens. The collection also includes more than 700 holotypes 800 paratypes and other primary type material deposited by the scientists working in various parts of the country. The Centre is a recognized Research Centre for conducting research programmes leading to Ph. D. degree of the University of Calicut., Kerala. The centre maintains a Natural History Museum depicting the rich and diverse faunal wealth of Western Ghats and Kerala. The centre also extends identification and advisory services by delivering lectures, participating in public exhibitions, Identification of confiscated wildlife material, conducting awareness programmes etc for general public, research scholars, students, naturalists, Government and non-governmental Organisations.

1 Rice Ecosystems of Kerala- Phase 1

Investigators: Dr. P.M. Sureshan, Dr. K.G. Emiliyamma, Dr. K. Rajmohana, Dr. B.H.C.K. Murthy, Dr. P. Girish Kumar & Dr. Md. Jafer Palot

Period: April 2015 to March 2018

Status: Completed

Objectives: To study and inventorize the fauna of Rice ecosystems of Kerala.

Outcome: Identification of groups such as Hymenoptera (Insecta) (154 species under 66 genera), Odonata (37 species under 23 genera), Lepidoptera-butterflies) (104 species under 75

genera), Mantodea (10 species under 10 genera), Arachnida – Araneae (65 species), freshwater mollusc (12 species under 10 genera) and freshwater crabs (15 species under 7 genera) identified. 175 species of birds under 120 genera, 14 species of reptiles under 14 genera and 26 species of mammals under 23 genera are also observed and listed from the rice ecosystems of Kerala.

Significant findings: Two new male morphs of spiders (Arachnida: Araneae) recorded for the first time from India, the findings has been published.

2 Fauna of India: Family Vespidae (Insecta: Hymenoptera)

Investigators: Dr. Girish Kumar, P. & Dr. P.M. Sureshan

Period: April 2018 to March 2021

Status: Ongoing

Objective: To prepare Fauna of India volume on Family Vespidae.

Progress: A total of about 3,500 examples from all over India studied under the project. Out of 288 species from India, about 185 species (64% of total Indian fauna) identified and the data of the rest of the species will be taken from published literatures. A total of 16 species are published as new to science and 9 species are published as new record to India during the study.



Collection site

14

ESTUARINE BIOLOGY REGIONAL CENTRE (EBRC), GOPALPUR-ON-SEA, ODISHA

Estuarine Biology Regional Centre, Gopalpur-on-sea, Ganjam, Odisha was established in 1980 during the 6th Five-year plan of Govt of India. The Primary objective of this centre is to conduct investigations on faunal diversity of estuaries, backwaters, lagoons and mangrove ecosystem along the east and west coast of India. Geographical coverage includes estuaries and mangrove ecosystem of India which are extended throughout the country along both east and west coasts and the jurisdiction of the Estuarine Biology Centre is "All India" covering all estuaries and associated mangrove ecosystem of the country. Total holdings of the Centre include 89143 specimens, of which 55740 are named and 33403 are unnamed specimens and 24 Type specimens.

1 Current Status of Faunal Diversity of Rushikulya Estuary, Odisha

Investigators: Dr. Anil Mohapatra & Dr. Aftab Ahmad

Period: April 2016 to March 2019

Status: Ongoing

Objective: To study the current Status of Faunal Diversity of Rushikulya estuary

Progress: A total of 4075 specimens were collected from surveys comprising Crustacea, Insecta, Annelida, Mollusca and Pisces. Identification includes 92 species of Pisces, 50 species of aquatic Insects, 5 Hermit crab, 5-species of fish ectoparasites, 22 species of prawns & crabs and 66 species of Mollusca, 4 reptiles, 140-bird species were identified.

2 Faunal diversity of Tampara Lake, Chhatrapur, Ganjam, Odisha

Investigators: Dr. A. Mohapatra, Dr. Aftab Ahmad, Dr. B. Tripathy & Mr. S.S. Mishra

Period: April 2018 to March 2021

Status: Ongoing

Objective: Comprehensive study of all the faunal groups of Tampara Lake

Progress: A total of 7698 specimens were collected from local surveys belonging to 7 faunal groups. So far identified 5279 specimens comprising Osteichthyes, Amphibia, Arachnida, Crustacea, Gastropoda, Insecta and Reptilia. Observations were made on Birds and Mammals.

3 Faunal diversity of Dhamara Estuary, Odisha

Investigators: Dr. Anil Mohapatra, Dr. Aftab Ahmad, Dr. Basudev Tripathy, Mr. S.S. Mishra & Mr. Prasad Chandra Tudu

Period: April 2018 to March 2021

Status: Ongoing

Objective: To study the faunal diversity of Dhamara Estuary, Odisha

Progress: Totally till date 6748 examples were collected from the surveys. Identified 1089 specimens collected from Dhamara estuary which include eight faunal groups (Crabs, Prawns, Mantis Shrimps, Horse- Shoe crabs, Mollusca, Sea cucumber, Fishes and snakes).

4 Faunal diversity of Lakhari Valley Wildlife Sanctuary, Ganjam, Odisha

Investigators: Dr. Anil Mohapatra, Dr. Aftab Ahmad, Dr. Basudev Tripathy, Mr. S.S. Mishra & Dr. P.G.S. Sethy

Period: April 2019 to March 2022

Status: Ongoing

Objective: To explore and inventorize the faunal diversity of Lakhari Valley Wildlife Sanctuary, Ganjam, Odisha.

Progress: One survey was conducted. A total of 507 specimens were collected belonging to 6 faunal groups (Collembola, Aquatic insects, Crabs, Gastropods, Fishes and Amphibia). Observations were also made on the Birds and Mammals present in the sanctuary. Most of the species collected have been identified.. Identified 302 specimens including Collembola, crabs, molluscs, fishes and frogs)

5 Survey of Phthirapteran Ectoparasites infesting Common Poultry of Odisha

Investigator: Dr. Aftab Ahmad.

Period: April 2020 to March 2023

Status: Initiated

Objectives: To study the Phthirapteran Ectoparasites infesting Common Poultry of Odisha.

Progress: Surveys were conducted covering 3 districts, Ganjam, Khurda and Gajapati district of Odisha. Approximately 970 examples and 13 lots of samples were collected from different places of the districts from the domesticated animals. A total of 371 specimens belonging to 30 species were identified.

6 Pictorial Guide on the Brachyuran Crabs of India

Investigators: Dr. A. Gokul, Dr. K. Valarmathi & Dr. S.K. Pati.

Period: April 2020 to March 2023

Status: Initiated

Objectives: Prepare a pictorial guide of Pictorial Guide on the Brachyuran Crabs of India

Progress: Brachyuran crabs of 354 examples belonging to 17 species were identified. Photography and preparation for the pictorial guide is under progress.

15

ARUNACHAL PRADESH REGIONAL CENTRE (APRC), ITANAGAR

Arunachal Pradesh known as the land of 'dawn - lit mountains' is a thinly populated and mountainous tract on the easternmost part of India. The higher areas, especially the peaks of the Great Himalayas remain snow - capped throughout the year. Owing to great altitudinal variation, from less than 100 m to above 5000 m, five biomes are found in the state. Arunachal Pradesh forms a part of Eastern Himalaya global biodiversity hotspot and is also among the 200 globally important ecoregions. The state displays high degree of endemism and comparatively higher incidence of rare and threatened taxa. Such unparalleled distinction can be attributed primarily to the unique geophysical positioning of the state in the transition zone between the Palearctic and Oriental biogeographic regions. Being in the ecotone of the two regions, due to edge effect, the state possesses biotic elements from both the regions as well as have its exclusive components and thus represents Indo-Chinese, Indo-Malayan, Indo-Burmese and India biotic components. This has earned the state the distinction of one of the main corridor for eastern entrant of the Indian sub-region. That is why it is also referred as an active centre of organic evolution. Recognizing the importance of the state in terms of faunal diversity, Government of India established the Arunachal Pradesh Regional Centre of the Zoological Survey of India on 31st January 1983, at Itanagar under the Seventh Five Plan mainly to augment and explore the knowledge on faunal wealth of Arunachal Pradesh. The Area under Jurisdiction includes, Arunachal Pradesh, with an area of 83,743 sq. kms. having 13 Wildlife Sanctuaries, one Orchid Sanctuary, two National Parks, three Tiger Reserves, eight Community Reserves and one Biosphere Reserve with a cumulative area of approximately 12000 sq. km. Holdings of the Centre include 40994 specimens of which 13837 specimens are named and 27157 are unnamed.

1 Fauna of Dihang-Dibang Biosphere Reserve, Arunachal Pradesh

Investigators: Dr. B. Sinha & Scientists from HQ & Regional Centres

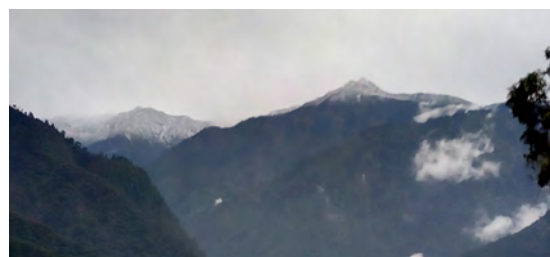
Period: April 2016 to March 2019

Status: Ongoing

Objective: To explore the faunal biodiversity of Dihang-Dibang Biosphere Reserve in Arunachal Pradesh

Progress: A total of 1150 species pertaining to 15 groups recorded so far (Mammal-31 spp, Aves-105 species, Reptiles-44 species, Amphibia-22 species, Pisces-69 species, Lepidoptera-696 species, Trichoptera-30 species, Diptera-25 species, Coleoptera-9 species, Hemiptera-19 species, Ephemeroptera-species, Brachyura-6 species, Isopoda-6 species, Cladocera-3 species, Rotifera-21 species.

Three new species, 5 new reports from India, 23 new reports from State, 240 new reports to DDBR recorded so far.



View of Dihang-Dibang Biosphere Reserve

2 Faunal inventorization of land snails of Arunachal Pradesh, India

Investigators: Dr. S.D. Gurumayum, Dr. B. Sinha, Dr. B. Tripathy & Mr. A. K. Mukhopadhyay

Period: April 2018 to March 2021

Status: Ongoing

Objective: To study the biodiversity of terrestrial snails of Arunachal Pradesh.

Progress: The terrestrial snails were surveyed for 12 days at different areas of Papum Pare district including Itanagar Wildlife Sanctuary and collected representative samples of 484 examples. 25 species and 16 genera from 213 examples were identified from the collection.



Oxytesta oxytes Benson, 1836

3 Study of millipedes (Myriapoda: Diplopoda) distribution in Lower Subansiri & Papum Pare district of Arunachal Pradesh

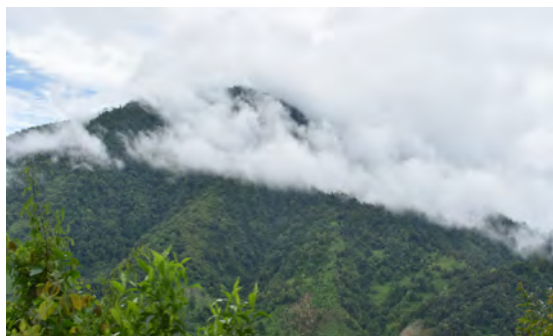
Investigator: Dr. Temjenmongla

Period: April 2018 to March 2021

Status: Ongoing

Objective: To study the distribution of millipedes (Myriapoda: Diplopoda) in Lower Subansiri and Papum Pare district, Arunachal Pradesh.

Progress: Six local surveys were conducted. A total of 41 examples of diplopoda were collected from the local survey tours. 273 examples of Diplopoda under 3 species and 3 genera have been identified and digitized.



Collection site, Yachuli, Arunachal Pradesh

4 Studies on Cladoceran diversity in the Protected Areas of western Arunachal Pradesh

Investigator: Dr. B. Sinha

Period: April 2019 to March 2022

Status: Ongoing

Objective: To study the diversity of Cladocera in the PAs of western Arunachal Pradesh.

Progress: Altogether 13 surveys including 2 extensive surveys conducted spanning over 33 days and collected 62 plankton samples from different lentic and lotic bodies of 7 protected areas of western Arunachal Pradesh. A total of 144 Cladocera specimens were extracted and identified under 17 species belonging to 9 genera and 6 families. Additionally, 245 Rotifera specimens were also extracted and identified under 58 species belonging to 37 genera and 7 families.

5 Revision of Butterfly (Lepidoptera) Fauna of Arunachal Pradesh

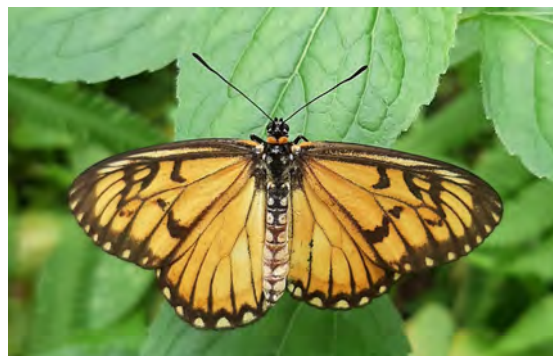
Investigator: Dr. Narender Sharma

Period: April 2020 to March 2023

Status: Initiated

Objectives: To study the Butterfly (Lepidoptera) Fauna of Arunachal Pradesh.

Progress: Total 19 local surveys conducted in Itanagar WLS, Papumpare distt., Lower Subansiri distt. and collected 600 examples. 140 species under 72 genera and 620 examples identified. The species, *Yapthima nareda* (Kollar) reported new record to state Arunachal Pradesh.



Acraea issorea (Huebner)

16

MARINE AQUARIUM & REGIONAL CENTRE (MARC), DIGHA, WEST BENGAL

Marine Aquarium and Regional Centre (MARC) was established on 1st July 1989. The centre has three distinct wings viz. research centre, aquarium and marine museum in addition to facilities for mass education to people. The research wing of the centre started functioning in 1989; however, the aquarium was opened for public since 2003 and the Marine museum with more than five hundred marine species of vertebrates and invertebrates displayed since 2016, and Sundarban walkthrough diorama, 42 feet long Brydes whale skeleton and Instrumentation museum were displayed since 2017. Area under jurisdiction includes all the coastal states of India covering 7517 kilometers. It was set up with the objectives of conducting education and awareness programme through the marine aquarium and marine museum which is an integral part of MARC and providing infrastructure facility for conducting professional training course on coastal and marine ecosystem. More than 10 training programmes were provided to several students, research scholars, and researchers of college and university, and forest officials, coastal police, officials of fishery department, coastal community and State Government Officials of West Bengal. Total holdings of the Centre include 62,227 specimens of which 36,810 specimens of named collection and 25,417 unnamed specimens and 48 Type specimens. This regional centre has completed 11 Annual Research Programmes involving marine faunal exploration in various Protected and non-protected areas of Coringa Wildlife Sanctuary, Visakhapatnam, Andhra Pradesh, Gulf of Mannar, Tamil Nadu, Andaman & Nicobar Islands, Odisha and West Bengal along with studies on diversity, taxonomic and associated fauna from different ecosystems. The Centre has published 01 book and more than 100 research papers in various reputed journals. The Centre was recognized as a Research Centre for conducting research leading to Ph.D. degree of the West Bengal State University, Kolkata. More than three lakhs visitors including foreigners, journalist, senior officers, college and school staff and students, research scholar from different reputed institutions/universities visited the marine aquarium and museum of the Centre.

1 Distribution, Diversity and Taxonomy of the Zooplankton from the Digha Coast, East Coast of India

Investigators: Dr. S. Balakrishnan

Period: April 2017 to March 2020

Status: Completed

Objectives:

- Collection and identification of Zooplankton from the Digha coast.
- Documentation and checklist preparation of Zooplankton.

Progress: Zooplankton species distribution, diversity and taxonomy in the coastal waters of Digha were studied. Altogether 34 species of zooplankton belonging to 3 orders, 16 families representing 26 genera were recorded in the present investigation. Shannon's diversity index (H') varied from 2.478 to 3.062, Simpson's evenness index (D') fluctuated between 0.898 and 0.935 and Margalef's species richness index (J') varied from 0.791 to 0.924. Bray-Curtis similarity cluster was analysed to find out the zooplankton species distribution and species diversity were calculated. A significant taxonomy and diversity variation in zooplankton population distribution was observed from one-way ANOVA. Statistical tool PAST (Ver. 4.03) was employed to find the species diversity, richness and evenness.

2 Diversity and Distribution of Octocorals and associated fauna along the Digha coast of India

Investigator: Dr. J.S. Yogesh Kumar

Period: April 2017 to March 2020

Status: Completed

Objective: To study the diversity and distribution of soft corals and associated fauna along Digha coast.

Progress: Surveys were conducted to explore the softcorals and associated faunal community in and around the Digha and adjacent coast in West Bengal, yielded 19 species of Octocorals with 16 new records (12 Alcyonacea and 4 Pennatulacea) from the study sites. The literature reveals that so far 24 species of octocorals have been recorded from the West Bengal coast.



View of Digha coast

3 Seaweed and seagrass associated marine faunal diversity along the east coast of India

Investigator: Dr. S. Balakrishnan

Period: April 2019-March 2022

Status: Ongoing

Objectives:

- To inventorize the marine faunal species diversity and abundance of along the east coast of India.
- Documentation and checklist preparation of marine faunal species from the east coast of India.

Progress: A total of 89 specimens and 28 species were identified.



Lepas anatifera Linnaeus, 1758

4 Coral Reef Associated Faunal Survey along East Coast of India

Investigator: Dr. J.S. Yogesh Kumar

Period: April 2019 to March 2022

Status: Ongoing

Objective: Survey and Inventorization of coral reef associated fauna along East coast of India

Progress: Three local survey conducted. A total of 80 samples were collected and a total of 772 samples with 181 species were identified.

5 Survey, detection and identification of bioactive molecules from various marine animals available in West Bengal and Odisha Coast

Investigator: Dr. Aditya Kapil Valiveti

Period: April 2019 to March 2022

Status: Ongoing

Objectives:

- Survey and identification of marine faunal species from the intertidal zones along the West Bengal and Odisha coastal belt.
- Categorization of available species for bioactive characteristics and further molecular studies.
- Documentation and review preparation for the identified species.

Progress: Seven local surveys were conducted along West Bengal and Odisha Coast. Altogether 283 specimens have been collected. A total of 166 specimens and 22 species were identified. Three species which belongs to Mollusca (Neritidae & Laternulidae) and one species belong to Cnidaria (Actiniidae) were selected for further exploration of bioactive properties.

6 Taxonomical identification of coral and associated fauna along East coast of India

Investigator: Dr. J.S. Yogesh Kumar

Period: April 2019 - March 2022

Status: Ongoing

Objectives:

- Underwater survey and exploration of coral reef associated fauna along east coast of India.
- Taxonomical identification of reef associated fauna.
- To extract bioactive compounds from the reef associated faunal community.
- Preparation of taxonomic list of reef associated communities in the project sites and its adjoining areas

Progress: Three local surveys conducted. A total of 80 samples belonging to 15 groups were collected from Digha coast.

7 Assessment on Landing of By-Catch Fauna in the Digha Shankarpur Fish Landing Centre of East Coast of India

Investigators: Dr. S. Balakrishnan & Dr. Prasad Chandra Tudu

Period: April 2020 - March 2023

Status: Initiated

Objectives: Assessment on Landing of By-Catch Fauna in the Digha Shankarpur Fish Landing Center of East Coast of India.

Progress: Survey conducted to fish landing centre, Digha Shankarpur. Altogether 699 specimens have been collected and 118 samples belonging to 38 species have been identified.

8 Studies on the Coral and reef associated faunal community along the Andhra and Odisha coast of India

Investigators: Dr. J. S. Yogesh Kumar, Dr. K. Valarmathi, Dr. Tamal Mondal & Dr. C. Sreeraj

Period: April 2020 - March 2023

Status: Initiated

Objectives:

- Explore the Scleractinia corals and associated faunal community along Andhra and Orissa coast.
- To assess the abundance of shallow water coral and reef associated faunal community with SCUBA upto 30-meter depth.
- Taxonomical identification and digitization of collected specimens.
- Literature reviews and update the checklist of reef associated faunal community.

Progress: Survey was conducted in Vishakapatnam, Andhra coast and Talsari, Orissa coast. A total of 345 samples were collected and 196 samples were identified.

9 Study of Mangrove Associated Faunal Diversity of Khadibil Mangroves, Subarnarekha Estuary, Odisha

Investigators: Dr. S. Balakrishnan, Ms. Debashree Dam & Dr. A. Anand Kumar

Period: April 2020 - March 2023

Status: Initiated

Objectives:

- To assess the mangrove associated faunal species such as Mollusca, fishes, crabs, shrimp, Polychaeta, horse shoe crabs, red crabs etc.
- To access the physico-chemical parameters like temperature, pH, salinity, oxygen, carbon dioxide and phosphate from water samples to be collected.
- To assess the effect of tourism by questionnaire survey among fishermen and nearby local people

Progress: Survey was conducted to Khadibil Mangroves, Odisha. A total of 1903 specimens were collected and totally 416 examples and 14 species have been identified.

06

EXTERNALLY FUNDED PROJECTS



Externally funded projects from more than 20 funding agencies were handled by the scientists of both HQ and Regional Centres. These projects dealt with Taxonomy and Biodiversity Documentation, Biosystematics, Management Plans, Impact of forest fires, Population Assessment and Conservation of Threatened animals, Health Assessment and restoration of Coral reefs, Molecular Systematics, Phylogeography, DNA barcoding, Habitat of olive ridley turtle, Human-wildlife conflict management, Long Term Ecological Observatories, Environmental Impact Assessment, Biodiversity corridor-baseline survey, Faunal census, Status, population distribution and habitat modeling, master plan for holistic development, etc. in different ecoregions of our country. Out of 35 projects handled, 7 were completed, 17 ongoing and 11 were newly inducted.

1 Distribution and population assessment of Striped Hyena (*Hyaena hyaena*), Indian Wolf (*Canis lupus pallipes*), Golden Jackal (*Canis aureus*), Leopard Cat (*Prionairulus bengalensis*) and Wild Boar (*Sus scrofa*) in South West Bengal state for conservation and management planning

Funding Agency: Biodiversity project, Department of Forest, Government of West Bengal

Principal Investigator: Dr. Kailash Chandra

Co-investigator: Dr. C. Venkatraman, Dr. Lalit Kumar Sharma, Dr. Mukesh Thakur

Period: January 2018 to December 2021

Sanctioned at: HQ, ZSI-Kolkata

Status: Completed

Objectives:

- To understand the current distribution and status of all four species viz., Striped Hyena, Indian Wolf, Leopard cat, Golden Jackal and Wild boar in South and Central region of West Bengal
- Population estimates of the study species using camera traps and DNA based analysis in the intensive study sites.
- To generate quality data on landscape genetic parameters (gene flow, population connectivity, fragmentation) of the selected species in the study landscape
- Identification of wildlife-human conflict zones in the study area with reference to four species (Striped Hyena, Indian Wolf, Golden Jackal and Wild boar)

Outcome: The West Bengal Forest & Biodiversity Conservation project has sanctioned a two-year project for the population estimation and ecological reconnaissance of the small mammals of South Bengal. The project got completed in March 2021 and a final project report has been submitted to the funding agency. Under the project field surveys have been conducted in all districts of South Bengal region with respect to

data collection on distribution of the selected species covering 11 districts namely Purulia, Bankura, Jhargram, West Midnapore, Birbhum, East Burdwan, West Burdwan, Nadia, Murshidabad, Hoogly and East Midnapore. The population and distribution of all the study species was assessed and further human-wildlife conflict management plan has also been prepared for the region.

2 Diversity of Water-Striders (Hemiptera: Gerridae) from Principal Estuaries of Eastern Coast of India

Funding Agency: AICOPTAX, MoEF&CC

Investigator: Dr Swetapadma Dash

Period: April 2018 to April 2021

Sanctioned at: HQ, ZSI-Kolkata

Status: Completed

Objectives:

- To inventories the species of the water striders (Family: Gerridae) from the Principal Estuaries of Eastern Coast of India
- To prepare revised key of the water striders (Family: Gerridae) from the Principal Estuaries of Eastern Coast of India
- To study diversity and distribution of water striders along the East coast of India

Outcome: All four principal estuaries viz. Mahanadi and Rushikulya Estuary in Odisha; Krishna Estuary in Andhra Pradesh and Kaveri Estuary in Tamil Nadu and various minor estuaries along the eastern coast of India were surveyed. The Chilika Lagoon was also surveyed. A total of 5,145 gerrid specimens were collected and identified six species as per the available keys.

Significant Findings: Novel observations of occurrence of freshwater gerrid *Aquarius adalaidis* (Dohrn, 1860) was made from saline habitats. One new addition to the fauna of India, *Halobates sexualis* Distant, 1903 was reported from the Vellar Estuary, Krishna Estuary and Saptamukhi Estuary. DNA of *H. elephanta* was isolated sequenced and sequences submitted to NCBI.

3 Diversity, distribution and status of freshwater fishes of Jaldhaka River, West Bengal

Funding Agency: West Bengal Biodiversity Board

Investigators: Dr. L. Kosygin Singh and Shri K.C. Gopi

Period: June 2017 to May 2021

Sanctioned at: HQ, ZSI-Kolkata

Status: Completed

Objectives: To study the diversity, distribution and status of freshwater fishes of Jaldhaka River, West Bengal.

Outcome: A checklist of 162 species belonging to 81 genera, 47 families and 13 orders of fishes were prepared.

4 Assessment of population and impacts of feral dogs on wildlife and humans to design a feral dog management strategy in Lahaul-Pangi landscape of Himachal Pradesh

Funding Agency: HP Forest Department, Government of Himachal Pradesh

Principal Investigator: Dr. Lalit Kumar Sharma
Co-Investigator: Dr. Avtar Kaur Sidhu

Period: March 2020 to December 2020

Sanctioned at: HQ, ZSI-Kolkata

Status: Completed

Objectives:

- i. To assess the distribution, population and density of feral/free-ranging dogs in the Lahaul-Pangi landscape of Himachal Pradesh
- ii. To assess interactions and impacts of feral dogs on wildlife, livestock and humans in the Lahaul-Pangi landscape
- iii. To assess main food sources and quantify the availability of main food sources of feral dogs in human-dominated and wilderness areas
- iv. To design a comprehensive strategy for feral dog management.

Outcome: In the present study, we aimed to understand the distribution pattern, population status and feeding resources of feral dogs in the Lahaul and Pangi landscape valley. Camera trapping, trail sampling, non-invasive genetics and questionnaire survey were utilized.

Ensemble species distribution modelling was used to identify the areas prone to high risk with available patches for the feral dog occurrence. Through camera trapping, we got a total of 5 independent captures of feral dogs in both Lahaul and Pangi valley. Whereas in trail sampling, 117 trail walked in Lahaul and Spiti valley of 634.5 km resulted in total 15 direct sightings of feral dogs (a group of 2-4 individuals). Through DNA based techniques, we identified 48 samples of feral dogs from the wildlife habitat in Lahaul and Pangi valley region and the non-invasive genetics analysis of these scats resulted in the identification of 11 individuals of dogs. The food resources of dogs in the form of garbage sites (20 major) have been mapped, and a hot spot analysis has been conducted. Hence based on the findings of the study to address the threats and management the feral dog infestation a logical framework has been developed and also recommended strategies along with the outcomes and responsibilities are provided to control feral dog population in the study landscape.

5 Project on biodiversity assessment and impact management plan for construction of bridge across Ganga between Sultanganj (Bhagalpur District) and Aguwani Ghat (Khagaria District) in Bihar

Funding Agency: Bihar Rajya Pul Nirman Nigam Ltd Khagaria, Bihar

Chief Project Coordinator: Dr. Kailash Chandra

Co-Investigators: Dr. Basudev Tripathy, Dr. Gopal Sharma, Dr. Lalit Kumar Sharma and Dr. Prabhakar Rai

Period: August 2019 to December 2020

Sanctioned at: HQ, ZSI-Kolkata

Status: Completed

Objectives:

- i. Assessment of faunal biodiversity of the landscape
- ii. Assessment of impacts due to construction and maintenance especially the pollution of river water and the associated faunal diversity

- iii. Recommendation of feasible and cost-effective measures to prevent significant impacts to an acceptable level
- iv. Suggestion of work programme and monitoring plan of implementation of the mitigating measures.

Outcome: For achieving the proposed objectives of the project, study area was systematically divided into grids and these grids were stratified based on the habitat type. A 10 km segment of river with 5km on both the sides on proposed bridge was selected for the surveys. Final project report to the funding agency has been submitted along with the conservation and management plan for the study area to minimize the impacts of developmental activities on the aquatic fauna.

6 Seasonal dynamics of Microzooplankton and their trophic role in the pelagic food web of the Northern coastal waters of Bay of Bengal

Funding Agency: DST -SERB, Govt. of India, New Delhi.

Investigator: Dr. Jasmine, P.

Period: October 2017 to September 2020

Sanctioned at: HQ, ZSI-Kolkata

Status: Completed

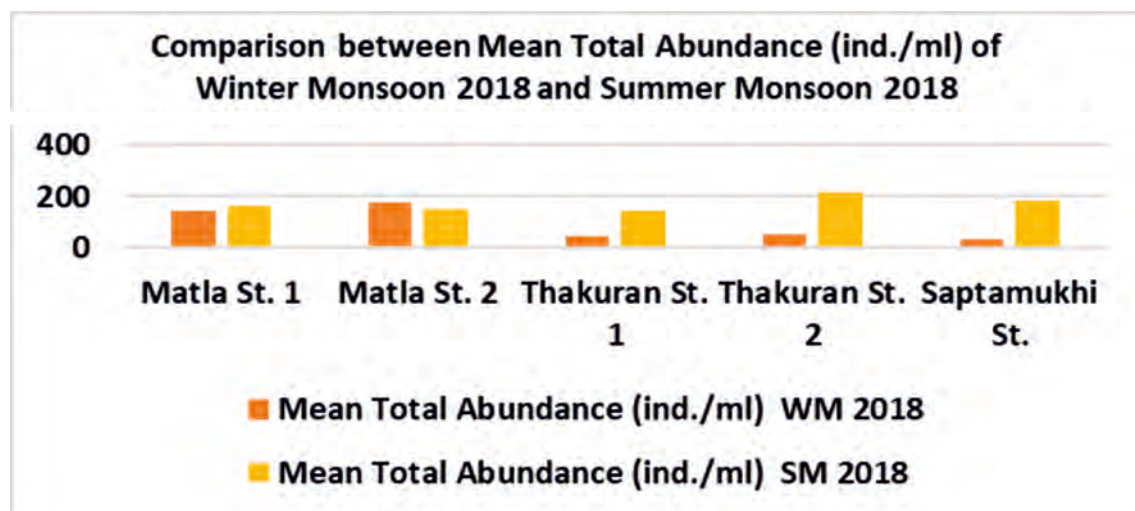
Objectives:

- i. Spatio- temporal variation of microzooplankton diversity along the coastal

waters of northern Bay of Bengal.

- ii. Role of microzooplankton in the pelagic food web and their inter relationship with different trophic levels of the ecosystem.
- iii. To assess the impact of episodic events on the community structure of microzooplankton and the role in the biogeochemistry of coastal waters of Bay of Bengal.
- iv. To compare the temporal dynamics of the ciliate colonizations between different water depths and also to find out the indicator taxa for monitoring water quality in coastal waters of northern Bay of Bengal.
- v. To create a taxonomic database of the coastal ciliate communities of Bay of Bengal

Outcome: Four seasonal coastal surveys were conducted along the coastal waters of Bay of Bengal. The taxonomic groups representing the microzooplankton community in our study area includes Ciliates, Dinoflagellates, Foraminiferans, Radiolarians, Copepod larvae, Gastropod larvae, Veliger larvae, Ostracod larvae, Polychaete larvae, Echinoderm larvae. Among these groups, the majorly diverse and abundant groups are Ciliates and Dinoflagellates. A total of 73 species of Ciliates under 28 genera and 83 species of Dinoflagellates under 21 genera have been identified from the samples. Significant spatio-temporal variation of microzooplankton communities along the coast was recorded. The phenomenon of Epibiosis observed in the coastal waters of Andhra Pradesh, Odisha and West Bengal during the first summer monsoon. There is a marked variation in terms of species abundance as well as species diversity with respect to winter monsoon microzooplankton community and summer monsoon microzooplankton community.



Microzooplankton abundance in the estuarine area of northern BoB (WM: Winter Monsoon, SM: Summer Monsoon).

7 Conservation of Threatened Vertebrate Fauna in Indian Himalayan Region through Long-Term Monitoring and Capacity Building

Funding Agency: NMHS, MoEFCC Govt. of India, New Delhi

Principal Investigator: Dr. Kailash Chandra

Nodal Officer: Dr. Lalit Kumar Sharma

Co-Investigators: Dr. Vikas Kumar, Dr. Mukesh Thakur & Dr. Kaomud Tyagi

Period: January 2018 to March 2021

Sanctioned at: HQ, ZSI-Kolkata

Status: Completed

Objectives:

- To assess and monitor threatened vertebrate fauna in the IHR and developing spatial database
- To study the population viability of selected threatened species in IHR for developing long-term conservation strategies
- To set long-term monitoring protocol for threatened vertebrate faunal groups in different parts of IHR and to develop adaptive management strategies for long-term conservation of those species through community engagement
- To enhance capacities of different stakeholders for monitoring and conserving threatened vertebrate fauna capacity building programs and use of modern science, technological tools and approaches.
- Investigating whether ethno-zoological knowledge and practices can be a conservation measure for threatened vertebrate fauna in IHR

Outcome: The surveys have been conducted in all six districts/sites in IHR. All the six sites were divided into 10X10 km grids and further 5X5 km grids for intensive sampling. The reconnaissance surveys were conducted to know the presence/ absence and abundance of various vertebrate species. Further intensive areas were identified for long term and intensive monitoring of the faunal groups based on considering weather conditions, terrain, and/or availability of logistics into account. A set of different mitochondrial and microsatellite loci were selected for undertaking the

phylogenetics, phylogeography and population genetics analysis. Population genetics analysis of 5 species have been done from the different sites.

623 cameras traps were palced with a total cameras trap night of 18864 in the selected grids of 10×10 km, 5 x 5km and 2 x 2 km grids at three level of stratification in all six landscapes. We observed total of 50 species of mammals (15-25) in all the six sites with the capture rate of 0.48-0.02 individuals. Among different species captured, Sambar, barking deer, Himalayan brown Goral, Himalayan Monal, Red Fox and wild boar were the most abundant species captured in the study landscape. Whereas, rare species such as Snow leopard, brown bear, Musk deer, Red panda and Chinese pangolin were also captures from the different sites. A total of 250 species of bird were observed so far, of which the details climate changes prediction of 16 Galliformes species were conducted in the Indian Himalayan Region. Apart from this, systematic vegetation sampling was also carried out and histological analysis of collected samples is under progress to understand the feeding habits and foraging behavior of the mammalian species in the area. Information on ethno-zoology was collected through questionnaire surveys of n=3804 respondents of n=318 villages from all 6 sites. Human-wildlife conflict data was also collected from all the study sites to understand the pattern and nature of conflict for conservation and management planning. A total of eight (2 day) state level training workshops and one national level stakeholder workshops were conducted. A total of 794 participants were trained during the training programmes representing different stakeholders.

8 Conservation and Management of coral reefs in Lakshadweep - Long-term monitoring programme

Funding Agency: Department of Environment and Forest Administration of the UT of Lakshadweep.

Investigator: Rajkumar Rajan

Period: April 2015 to March 2025

Sanctioned at: MBRC, ZSI-Chennai

Status: Ongoing

Objectives :

- To understand the level of impact of climate change on the reef ecosystem,
- To assess the the impact of persistent stressors
- To understand the recovery and resilient adaptations of reefs
- To understand the connectivity within and between reefs and associated habitats
- To make an assessment of resources, utilisation needs and conservation
- To investigate the feasibility of improving functional capacity through restoration measures

Progress: The disease prevalence records in corals showed that Lakshadweep reefs have the highest recorded prevalence (average 8.9%) among the Indo Pacific and records from reefs in the southern Maldives. Twenty-seven coral genera were found to be affected by 11 diseases as against the previous record of 7 diseases in 2016. *Porites* sp. was the most affected by nine diseases, followed by *Acropora*, which was affected by four diseases. The zooxanthellae densities were significantly higher in the post-monsoon season in the coral tissues of *Pocillopora eydouxi*, *Porites lobata*, and *Montipora digitata*. *Montipora digitata* colonies housing significantly higher zooxanthellae in their tissues than *Pocillopora eydouxi*, *Porites lobata*.

9 Ant diversity as indicator of different habitats in West Bengal

Funding Agency: West Bengal State Biodiversity Board

Investigator: Dr. Sheela, S

Period: December 2017 to November 2020

Sanctioned at: HQ, ZSI-Kolkata

Status: Ongoing

Objectives:

- To explore different habitats for ant communities and diversity in all agro - ecological regions of West Bengal.
- To note the habitat wise association of Ant communities and calculate the diversity indices.
- To find out distribution patterns of ant species.

Progress: A total of 190 species from 56 genera were identified from different districts and protected areas of West Bengal. 3 new species and 10 rare species were identified. A few species were found restricted to particular habitat. One species was reported for the first time from India.

10 Understanding the impact of forest fire on faunal resources of North Eastern States for conservation and management

Funding Agency: NMHS, MoEFCC Govt. of India, New Delhi

Investigator: Dr. Lalit Kumar Sharma

Co-investigator: Dr. G. Maheswaran

Period: January 2018 to December 2021

Sanctioned at: HQ, ZSI-Kolkata

Status: Ongoing

Objectives:

- Baseline knowledge about the faunal resources and Forest fire hotspot identification for long term monitoring in two districts of one states (Mizoram)
- Development of forest fire management site specific calendar at each forest management unit
- Development of network of professional & stakeholders in all 2 districts of state to combat forest fire
- Capacity enhancement of forest departments & others in 2 districts (150 persons)

Progress: During the reporting period data analysis was carried out to understand the community composition of different faunal groups in fire and non-fire forested ranges. The geo-spatial analysis for identification of forest fire hot spot was carried out and the maps pertaining to fire hot spots were prepared. The COVID 19 has greatly impacted the activities of the project because of the lockdown in the study area. Hence, no field surveys were conducted during the reporting period. For the first time ZSI team has used Soundscape ecology concept for understanding the impact of forest fire on bird communities in the study landscape. Several sound related indices were compared in addition to the bird species composition in both the fire and non-fire forest patches.

11 Assessment of moths (Lepidoptera) as significant pollinators in the Himalayan Ecosystem of North-East India

Funding Agency: MoEF&CC, New Delhi through NMHS programme

Investigator: Dr. Navneet Singh

Period: April 2018 to September 2021

Sanctioned at: HQ, ZSI-Kolkata

Status: Ongoing

Objectives:

- To prepare a check list of moth species pollinating different plants and crops in Central and Eastern Himalaya of India.
- To prepare a checklist of plant species and crops of Central and Eastern Himalaya of India which are partially or exclusively pollinated by the moths.

Progress: A Total of 387 moth samples belonging to 212 moth species under six families were found to be the potential pollinators. Six major moth families such as Geometridae, Crambidae, Drepanidae, Erebidae, Noctuidae and Sphingidae were found to interact with several angiospermic plant families.



Flower visitation by *Spoladea recurvalis* (Fabricius, 1775)

12 Ecological modelling for the proactive management of *Aedes albopictus* and *Aedes aegypti* vector mosquitoes

of dengue, chikungunya and zika viruses in different regions of India

Funding Agency: DST-SERB, Govt. of India, New Delhi.

Investigator: Dr. D S Suman

Period: April 2018 to March 2021

Sanctioned at: HQ, ZSI-Kolkata

Status: Ongoing

Objectives:

- Surveillance
- Life table
- Molecular studies

Progress: Surveys were conducted in Jodhpur, Kota and Kolkata regions of India. Based on the field collection of eggs, larva, pupa and adult stages of mosquitoes, 6 species were identified. Collected larvae of *Aedes* species were reared and maintained under standard laboratory conditions. Life table parameters such as: survivability, life expectancy, fecundity, Intrinsic rate of increase, net reproductive rate, mean generation time and doubling time were used for the determination of variations in two different strains of *Aedes* species whereas for susceptibility test, various insecticides such as: Temephos, Pine, Eucalyptus, Pine + Eucalyptus, Azadirachtin, Bti and Pyriproxyfen were used. Sequences of COI and 16s rRNA for *Culex mimetics*, *Culex jacksoni*, *Culex mimuloides* and two new *Culex* species were submitted in GenBank.

13 Studies on the Bryozoans in Indian Reefs

Funding Agency: All India Co-ordinated Project on Taxonomy (AICOPTAX), MoEFCC

Investigator: Dr. C. Venkatraman

Period: August 2018 to September 2021

Sanctioned at: HQ, ZSI-Kolkata

Status: Ongoing

Objectives:

- Taxonomic study of bryozoans of the Indian reefs.
- The influence of environmental condition on distribution and abundance of species, and

- iii. To determine the qualitative and quantitative distribution of bryozoans in Gulf of Mannar Biosphere Reserve

Progress: A total of 184 examples were collected from eight localities under nine phylums. 51 species belonging to 26 families were identified. Physico-chemical parameters in four different sites are being monitored regularly. Nine species of bryozoans are reported for the first time in Indian coastal waters.

14 Assessment of Amphibian Diversity of Central India and Identification of Cryptic Species using Integrative Taxonomic Approach

Funding Agency: DST -SERB, Govt. of India, New Delhi.

Investigator: Dr. Saipari Sailo

Period: September 2018 to September 2021

Sanctioned at: CZRC, ZSI-Jabalpur

Status: Ongoing.

Objectives:

- To study the diversity of amphibians in Central India
- To resolve taxonomic ambiguity of cryptic species by using integrative taxonomic approach
- To develop strategies for conservation of amphibians in these areas.

Progress: A field survey was conducted. 169 specimens of 7 faunal groups were collected. From the survey, a total of 60 examples were identified comprising 5 species in 3 genera and 02 families.

15 Taxonomic studies on family Nolidae (Lepidoptera) from North East India

Funding Agency: DST - SERB, Govt. of India, New Delhi.

Investigator: Dr. Rahul Joshi

Co- Investigator: Dr. Navneet Singh

Period: December 2018 to November 2021

Sanctioned at: GPRC, ZSI-Patna

Status: Ongoing

Objectives:

- To undertake intensive and extensive collection-cum-survey tours to different/unexplored areas of North East India for the collection of adult Nolid moths
- To identify the collected species of family Nolidae and assign them to various taxa by incorporating the species specific characters of male and female genitalia
- To study diversity of family Nolidae from North East India and to describe new taxa, if any
- To provide a comprehensive Checklist of family Nolidae from North East India
- To work out zoogeographical affinities of studied taxa based on data with adjoining areas/ regions

Progress: A total of 47 species of family Nolidae representing 05 subfamilies (Chloephoinae, Eligminae, Nolinae, Westermaniinae and Nolidae incertae sedis) under 27 genera. One new species was described. Two new records of genera were also described from India. Five new records of species to India. One genus and one species were synonymised.

16 Restoration of reefs using Electricity – A suitable technology to enhance and conserve Gulf of Kachchh reef

Funding Agency: Marine National Park Conservation Society, (MNPCS), Gujarat Forest Department, Jamnagar

Investigator: Dr. Ch. Satyanarayana

Period: February 2019 to June 2020

Sanctioned at: MBRC, ZSI-Chennai

Status: Ongoing

Objective : To install Biorocks in MNP which are suitable for Restoration in the highly turbid environment of Gulf of Kachchh.

Progress : Coral growth (Linear extension rate), mineral accretion rate, water quality parameters and sedimentation rate was measured. Coral fragments collected from Laku Point are also tied

to the Dome shaped biorock structure for increasing the biodiversity and to check the feasibility of keeping all the species in one place. Data on the fish assemblage and other faunal augmentation were recorded. The staff undertook a total of 34 surveys including 26 surveys exclusively in the biorock areas and another 8 in the surroundings for strengthening the biorock coral stability and conservation. Observed bleaching in the surrounding waters during July 2020 and quantified the extent of bleaching using standard methods. More resistant species were marked and placed in the appropriate position in the biorock structure.

17 Health Assessment of Indian Corals and Coral Reefs

Funding Agency: Space Application Centre, Ahmedabad, Gujarat

Investigator: Dr. Ch. Satyanarayana

Period: February 2019 to March 2021

Sanctioned at: MBRC, ZSI-Chennai

Status: Ongoing

Objective: To identify and study the diseases prevailing in the Indian reef regions

Progress: A Survey was undertaken at Pirotan and Kalubhar reefs along with senior scientists from Space Application Center (SAC) and GEER foundation to learn the identification of diseased/traumatized corals, the causative agent for the disease and to optically characterizing diseased coral and its counterpart without disease. Altogether 413 example of corals belonging to 21 species 17 genera and six families were identified and their health status was recorded. The following diseases and health compromisers were recorded: pink spot (multifocal) disease, white spot disease, boring sponge infection, Trematodiasis infected, barnacle infested, bleached, blenned bitten, traumatised corals with unknown causative agents like Invertebrate bites, unknown fish bites, erosion in live coral portions, and corals with tumors.

18 Molecular systematics, phylogeny and phylogeography of mayflies (Ephemeroptera) of North Western Himalaya and delineation of the cryptic species complexes with potential implication as indicator taxa in freshwater biomonitoring

Funding Agency: DST -SERB, Govt. of India, New Delhi.

Investigator: Dr. T. Kubendran

Period: April 2019 to March 2022

Sanctioned at: HARC, ZSI-Solan

Status: Ongoing

Objectives:

- To barcode described species of Mayfly of North Western Himalaya and to delineate the species limits from combined morphological and molecular studies.
- To investigate the molecular phylogeny and phylogeography of the genera of Mayfly recorded from North Western Himalaya.
- To delineate the cryptic species complexes that has potential implication as indicator taxa in freshwater biomonitoring.
- To publish the monograph on morphological and molecular identification of Mayfly from North Western Himalaya India.
- To describe new species, new records if any from North Western Himalaya.
- Capacity building among students on Ephemeroptera taxonomy by conducting training workshops

Progress: A total of 20 species of mayflies were dissection, prepared mounting and observed valid characters under microscope for confirming the species for phylogeny and phylogeography work. Preparing a total of 56 morphological characteristics of larvae and adults of 67 Baetidae species which was described previously and presently in India to study the phylogenetic and biogeography distribution with global Baetidae species.

19 Microstructure, individual and sub-species variations of song in Indian Robin *Copsychus fulicata* (Family: Muscicapidae)

Funding Agency: DST-SERB, Govt. of India, New Delhi.

Investigator: Dr. Anil Kumar

Period: April 2019 to March 2022

Sanctioned at: NRC, ZSI- Dehradun

Status: Ongoing

Objectives:

- To study the sub-species variations of song in Indian Robin
- To study the micro-structure of song in Indian Robin

Progress: Bio-acoustic analysis, covering over 40 parameters, of 36 individuals (recorded in Dehradun), 22 individuals (recorded in Chandrapur, Maharashtra) and 5 individuals recorded in Coimbatore has been completed in Guided JRF & Assistant for bi-acoustic analysis and measurement of complexity level in acoustic signals. Discriminate Function Analysis was conducted on the song variables, both at gross level (phonetics) and fine level (microstructure) to examine the individual variations of song in 33 individuals recorded in Dehradun.

20 Taxonomic studies on Pyralidae (Pyraloidea: Lepidoptera) of North East India

Funding Agency: DST- SERB, Govt. of India, New Delhi.

Investigator: Dr. Navneet Singh

Period: April 2019 to March 2022

Sanctioned at: HQ, ZSI-Kolkata

Status: Ongoing

Objectives:

- To collect Pyralid moths through intensive and extensive collection-cum-survey tours to the different/unexplored areas of North East India

- To establish permanent plots at different altitudes for long term monitoring of environmental quality through collection of Pyralid moths
- To identify the collected species of family Pyralidae and assign them to various taxa according to the latest trends in taxonomy
- To study external male and female genital characters and to incorporate these taxonomically important attributes in the revised diagnosis of studied genera and species of family Pyralidae
- To provide a comprehensive checklist of family Pyralidae from North East India

Progress: A total of 89 species under 750 examples were identified. A catalogue of 1576 species of Indian Pyraloidea were compiled. Two new species and one generic synonymy were published.

21 Delimiting Species Boundaries in Pest and Vector thrips (Thysanoptera: Thripidae) from India

Funding Agency: DST-SERB, Govt. of India, New Delhi.

Investigator: Dr. Vikas Kumar

Co-Investigator: Dr. Kaomud Tyagi

Period: April 2019 to March 2021

Sanctioned at: HQ, ZSI-Kolkata

Status: Ongoing

Objectives:

- Exhaustive survey, morphological identification, and morphometric analysis of pest and vector species of thrips (*Frankliniella schultzei*, *Scirtothrips dorsalis*, *Thrips palmi* and *Thrips tabaci*)
- Identification of cryptic species using multiple molecular markers of different populations of these thrips species.
- Delineation of species boundaries using multiple species delimitation methods and description of these cryptic species.

Progress: COI and 28S has been sequenced for *Frankliniella schultzei* specimens from various geographical areas. One Survey of Uttarakhand State of India was conducted. More than 200

specimens collected and are subjected to morphological and molecular Taxonomy. Analysis shows that there are multiple species in one species.

22 Phylogeography and colonization history of Indian Rhesus macaques (*Macaca mulatta*)

Funding Agency: DST -SERB, Govt. of India, New Delhi.

Investigator: Dr. Ranjana

Period: April 2019 to March 2021

Sanctioned at: SRC, ZSI- Chennai

Status: Ongoing

Objectives:

- Distribution and current demography of Indian rhesus macaques.
- Colonization history of Indian rhesus macaques using molecular markers.
- Estimation of gene flow and population structure of Indian rhesus macaque.
- To resolve the morphological ambiguity of Rhesus and Bonnet macaques with respect to possible hybrid individuals in the Southern peninsular region.

Progress: Two surveys were conducted. 2.73 sq. km protected areas were surveyed in Kinnersani Wildlife Sanctuary and 10 sq. km in Kawal Tiger Reserve of Telangana State. 12.73 sq. km area of Tropical dry deciduous forest and 15sq. km area of Desert ecosystem were also covered.

23 Barcoding free living protozoan ciliates from the conserved aquatic ecosystems of Himachal Pradesh

Funding agency: DST -SERB, Govt. of India, New Delhi.

Investigator: Dr. Santosh Kumar

Period: January 2020 to December 2023

Sanctioned at: HQ, ZSI-Kolkata

Status: Ongoing

Objectives:

- To document free-living ciliates diversity from the conserved aquatic ecosystems (wetlands and lakes); description of species new to science/new to Indian fauna/poorly known based on morphology and molecular analyses.
- To generate DNA barcodes (ribosome and mitochondrial genes) and perform molecular analyses of ciliates identified from the proposed area.
- To evaluate the water quality of proposed aquatic ecosystems based on ciliate community structure

Progress: Data are being collected for a poorly known ciliate identified from Himachal Pradesh. A novel phenomenon of dispersal in protozoan ciliates were studied and published.

24 Internesting movement and habitat use of olive ridley sea turtles (*Lepidochelys olivacea*) along Odisha coast, India

Funding Agency: DST (Core Research), Govt. of India, New Delhi

Investigator: Dr. Basudev Tripathy

Period: March 2020 to Feb 2023

Sanctioned at: HQ, ZSI-Kolkata

Status: Ongoing

Objectives:

- To study the Migration and Inter Rookery Movement of Olive Ridley Turtles within and outside the Odisha coast in Bay of Bengal.
- To understand the breeding biology of Olive Ridley Turtles along Odisha coast
- To study the offshore and onshore abundance and spatial distribution of Olive Ridley Turtles sea turtles
- To study the various environmental factors responsible for Olive Ridley sea turtle breeding along Odisha coast.
- To suggest suitable conservation and management strategies for Olive Ridley sea turtle population of Bay of Bengal, India

Progress: Field survey undertaken along the Odisha coast for offshore congregation monitoring of olive ridley sea turtles and tagging

of mating pairs in the nearshore waters was completed. Altogether 1037 turtles have been tagged at Gahirmatha while they were nesting on the beach, along with several recapture of recently tagged. A one-day Training Workshop on Population Estimation of Olive Ridley Turtle was organized on 5th March 2021 at the Estuarine Biology Regional Centre, ZSI, Gopalpur-on-Sea, as part of the DST-SERB-CRG-Scientific Social Responsibility.



Tagging to monitor Interesting movement and habitat use of Olive Ridley sea turtle along Odisha Coast

25 Impact study on avifauna of Pulicat lake with regard to “development of Sri City - phase II expansion project at Chittor District, Andhra Pradesh by M/S Sri City Private Limited

Funding Agency: Sri City Private limited, Andhra Pradesh

Investigator: Dr. G. Maheswaran

Period: January 2021 to March 2021

Sanctioned at: HQ, ZSI-Kolkata

Status: Initiated

Objective: To find out the impact on birds of Pulicat Lake, Andhra Pradesh due to the development of Sri City – Phase II expansion project.

Progress: Total four surveys were conducted in three month to record the bird species present in and around the Pulicat Lake, Andhra Pradesh and Sri City project site. 135 bird species were reported from the study site with some significant records of breeding birds such as Fulvous Whistling Duck, Spot-billed Pelican, Painted Stork, Asian Openbill, black-breasted Weaver. Apart from the breeding bird some raptors were

also sighted such as White-bellied Sea Eagle, Osprey, Marsh Harrier, Oriental Honey Buzzard etc.

26 A pilot project on biodiversity corridor-baseline survey and feasibility assessment under project for Improvement of Himachal Pradesh Forest Ecosystems Management & Livelihoods (PIHPFEM&L)

Funding Agency: HP Forest Department, Government of Himachal Pradesh

Principal Investigator: Dr. Lalit Kumar Sharma

Co-Investigators: Dr. Mukesh Thakur, Dr. G. Maheswaran and Dr. Basudev Tripathy

Period: August 2020 to December 2022

Sanctioned at: HQ, ZSI-Kolkata

Status: Initiated

Objectives:

- To identify potential areas for Biodiversity/ecological corridor designation on the basis of primary surveys and secondary literature reviews
- To assess the biodiversity (Flora and Fauna) and prepare a bio-physical inventory along with identification of focal/target faunal species
- GIS mapping and delineation of the potential corridor network of protected areas with potential corridor designation
- To access the current status of livelihood of local community, biodiversity conservation and human-wildlife conflict for the potential areas for biodiversity/ecological corridor
- To access the impact of biodiversity corridor designation of the potential areas on the livelihood of local communities along with probable option for same, biodiversity conservation and human-wildlife conflict mitigation
- To develop a comprehensive strategy and action plan for implementation of

biodiversity corridor project for effective biodiversity conservation

Progress: The project team has been recruited and the field work has been initiated most recently. Based on the review and preliminary surveys a tentative biological corridor has been identified in Kullu district of Himachal Pradesh.

27 Species/area specific human- wildlife conflict management baseline survey and development of comprehensive strategy for its mitigation in selected districts of Himachal Pradesh

Funding Agency: HP Forest Department, Government of Himachal Pradesh

Principal Investigator: Dr. Lalit Kumar Sharma

Co-Investigators: Dr. Mukesh Thakur, Dr. G. Maeshwaran, Dr. Basudev Tripathy

Period: August 2020 to December 2023

Sanctioned at: HQ, ZSI-Kolkata

Status: Initiated

Objectives:

- i. Assess the nature and extent of human wildlife conflicts in terms of species/area/season/pattern etc in the project landscapes mainly focused on 4 species i.e common leopard, black bear, monkey and wild boar
- ii. Designing a comprehensive conflict management strategy with species specific guidelines. This includes preventing or reducing losses, providing suitable compensatory mechanisms (where needed), exploring options for alternative livelihoods and improving attitudes towards conservation
- iii. Developing Standard Operating Procedures (SOPs) for action related to wildlife attack
- iv. Training need assessment of the stakeholders for effective mitigation of Human-wildlife Conflicts

Progress: The project team has been recruited in February 2021 and the field work has been initiated in March 2021.

28 Faunal diversity assessment of Kaimur Wildlife Sancturay, Bihar

Funding Agency: Institute of Forest Productivity

Principal Investigator: Dr. Kailash Chandra

Co-Investigators: Dr. Lalit Kumar Sharma, Dr. Mukesh Thakur and Dr. Devanshu Gupta

Period: July 2020 to December 2020

Sanctioned at: HQ, ZSI-Kolkata

Status: Initiated

Objectives: To document the faunal diversity of Kaimur Wildlife Sanctuary

Progress: The project team has been recruited and conducting field work in all identified sites of the project as per the funding agency. Entire study area has been divided into grids for systematic sampling. The researchers are using Camera traps along with the conventional sign survey.

29 Documentation, conservation and utilization of indigenous mountain pollinators -with special reference to Himalayan Bumble Bees

Funding Agency: NMHS, MOEF & CC Govt., of India

Investigator: Dr. R.H. Raina and Dr. Devanshu Gupta

Period: July 2020 to June 2023

Sanctioned at: DRC, ZSI-Jodhpur

Status: Initiated

Objectives:

- i. To identify that priority geographic areas and habitats that most need to be conserved to prevent extinctions of rare Himalayan bumblebees.
- ii. To strengthen the network of expertise available for bumblebee conservation in the Himalaya, so that conservation assessments can be kept current and so that expertise can be targeted to address the highest priorities for conservation.
- iii. To documentation of Indigenous mountain

pollinator's viz., bumblebees, mining bees and leafcutter bees (Apoidea) to confirm how their diversity changes along the great expanse of the Indian Himalaya.

- iv. To describe their distribution as stratified by elevation, by region, and by habitat.
- v. To extend an active outreach programme to local farmers for education on the role and value of these pollinators in the farmers' lives.

Progress: Two surveys were conducted and total of 1472 individuals of Himalayan bumble bee specimens were collected. Identified 11 species of Himalayan bumble bees. Distributional maps of the identified species of the region have also been updated. Database of Himalayan bumblebees (identified/unidentified) has been prepared in the database register.

Three awareness programs were conducted at the village level, regarding the importance of indigenous mountain pollinators and their role in the conservation of high altitude floral diversity of Indian Himalayan region.



Xylocopa pubescens Spinola, 1838

30 Long Term Ecological Observatories (LTEO) Arthropod Project

Funding Agency: Ministry of Environment, Forest and Climate Change, Government of India

Coordinator: Dr. K. A. Subramanian

Investigators: Dr. P.M. Sureshan, Dr. Girish Kumar, Dr. Jafer Palot, and Dr. Sameer Kumar Pati

Period: April 2020 to March 2025

Sanctioned at: SRC, ZSI-Chennai

Status: Initiated

Objectives:

- i. Analyze the diversity and distribution (spatial and temporal) of selected arthropods across environmental gradients, habitats, and ecosystems in the LTEO sites.
- ii. Select the key arthropod taxa which can be used as a reliable indicator of climate change for future monitoring.

Progress: Site selection surveys were conducted in Wayanad and Kannur district (Kerala Part of Nilgiri Biosphere Reserve). Different vegetation and habitat types were surveyed in Wayanad wildlife sanctuary, Kottiyoor Wildlife Sanctuary and Periya Reserve forest.

31 Kosi dolphin census survey in Bihar

Funding Agency: Dept of Env. Forest and Climate Change, Govt. of Bihar

Investigator: Dr. Gopal Sharma

Period: February 2021 to July 2021

Sanctioned at: GPRC, ZSI-Patna

Status: Initiated

Objective: To evaluate the status of Gangetic Dolphin in the entire stretch of Kosi River in Bihar

Progress: Total 194 Dolphin were encountered in 260 km stretch of River Kosi in Bihar. 115 species of Birds, Gharial, Turtles *Pangshura tecta* (Gray, 1831) and *Lissemys punctata* (Lacépède, 1788) were also observed.

32 Status, population distribution and habitat modeling of Nicobar Megapode *Megapodius nicobariensis* Blyth, 1846: an impact assessment after fifteen years of the Tsunami 2004

Funding Agency: DST/SERB

Investigator: Dr. C. Sivaperuman

Period: December 2020 to November 2023

Sanctioned at: ANRC, ZSI-Andaman and Nicobar

Status: Initiated

Objectives:

- Assess and monitoring the population of present status and distribution of Nicobar Megapode by establishing permanent monitoring plots.
- Identify the breeding density trends in the light of management practices and environmental variables.
- Study the habitat relationship of megapode during nesting & breeding season.
- DNA barcoding.
- Prepare conservation action plan and monitoring program which are most beneficial to Nicobar.

Progress: Recruitment of one JRF completed and field survey started.

33 Study of marine ecological study for preparation of master plan for holistic development of Great Nicobar Islands at Andaman & Nicobar Islands

Funding Agency: AECOM India Private Limited, Haryana

Principal Investigators: Dr. Kailash Chandra, Dr. C. Raghunathan, Dr. C. Sivaperuman and Dr. Jasmine, P,

Co-Investigators: Dr. N. Marimuthu, Dr. S. Balakrishnan, Dr. J.S. Yogesh Kumar, Dr. Tamal Mandal and Dr. C.R. Sreeraj

Period: January 2021 to February 2021

Sanctioned at: MARC, ZSI- Digha

Status: Initiated

Objectives:

- Assessments of the marine ecological set up of the project area and understand the marine biodiversity of the project area of Great Nicobar Islands.
- Assessment on the designated area of the

ecological significance of project area of Great Nicobar Island and adjoining areas.

- Estimation of the ecological sensitivity of various patches in the study area like turtle nesting grounds, coral mats, areas with special ecological significance like the presence of rare, endangered, and endemic species of Great Nicobar Island.
- Assessment of the interactions among organisms and the surrounding environment including their abiotic (non-living physical and chemical factors that affect the ability of organisms to survive and reproduce) and biotic factors (living things or the materials that directly or indirectly affect an organism in its environment) in Great Nicobar Island.

Progress: One field survey was conducted and collected specimens belonging to fishes, mollusca, Polychaete, Chiton, Nudibranch, Brachiopod, Ctenophora, Sipuncula, Barnacle, Physalia, 20 Hermit crab, Acari (Marine Mites), Cnidaria, Hydrozoa, Crab, Nemertea, Lobster shrimp, Jellyfish, Lepas, softcorals, sponges, Zooanthids, acidian, seaweeds, Bryozoan and Benthos. Altogether 53 species were identified.

34 Parasitic wasps of the Families Encyrtidae and Mymaridae (Hymenoptera: Chalcidoidea) and their utilization in management of sucking insect pests on agricultural and horticultural crops of NorthEast India

Funding Agency: Department of Science and Technology (DST), New Delhi

Principal Investigator: Dr. A. Ramesh kumar

Co-Investigator: Dr. S.I. Kazmi

Period: January 2021 to December 2023

Sanctioned at: HQ, ZSI-Kolkata

Status: Initiated

Objectives:

- To assess the diversity of Encyrtidae and Mymaridae among unexplored northeastern states of India.

- ii. To provide detailed descriptions and illustrations of new/undescribed taxa along with new distributional data for known species
- iii. To identify endemic and threatened species of Encyrtidae and Mymaridae in Northeast India
- iv. To prepare a baseline data of encyrtids and mymarids with host information for Northeast India
- v. To generate distributional maps for species of mymarids and encyrtids
- vi. To identify the plant-pest-parasitoid complexes from said states and to workout implementation possibilities for management of sucking pests

Progress: The project is implemented on March 2021. Recruitment of Junior Research Fellow completed.

35 Diversity of Scorpions (Arachnida: Scorpionida) in Madhya Pradesh with studies on ecology, biology and associated traditional knowledge about medically important species

Funding Agency: Madhya Pradesh State Biodiversity Board, Bhopal

Investigator: Dr. Pratyush P. Mohapatra

Period: December 2020 to January 2023

Sanctioned at: CZRC, ZSI-Jabalpur

Status: Initiated

Objectives:

- i. Study on diversity and distribution of scorpion fauna of Madhya Pradesh based on field surveys to understand the biogeography with respect to their distribution pattern.
- ii. Documentation of spatial distribution of scorpions in various protected and non-protected areas of Madhya Pradesh.
- iii. To study the biology and behavior of various species of scorpions in the laboratory.
- iv. Study on ecology of medically important species in terms of human-scorpion conflicts.
- v. To document the traditional knowledge associated with this group in terms medicinal values, bio-prospective and treatment for scorpion stings.

Progress: One field survey conducted to districts, Betul, Chhindwara, Hoshangabad, and Seoni. A total of 108 specimens collected of 12 faunal groups. 30 live scorpions belonging to 3 species are maintained in captivity to record behavioural and biological data.

At a Glance: Scientific Programmes 2020-21

	Completed	Ongoing	Initiated	Total
Headquarters ZSI	08	39	02	49
Regional Centres	06	54	11	71
Externally Funded	07	17	11	35
Total	21	110	24	155

07

SURVEYS

Field Survey Division manages the overall surveys carried out by the different scientific divisions of Headquarters as well as Regional Centers. During 2020-21, only 34 surveys could be conducted by the scientists of Headquarters and Regional Centres due to Covid restrictions.



Details of Surveys conducted during the year 2020-21

Details of Surveys	Head Quarters	Regional Centre
1. ECOSYSTEMS		
1a. Marine/ Coastal/ Mudflat ecosystem	02	02
1b. Island ecosystem	-	02
1c. Estuarine ecosystem	-	01
1c. Mangrove ecosystem	01	-
1d. Fresh water ecosystem	01	01
1e. Himalayan ecosystem	-	01
1f. Desert ecosystem	-	01
1g. Grassland ecosystem	-	-
1h. Tropical rain forest ecosystem	-	-
2. PROTECTED AREAS	01	11
3. STATE/UNION TERRITORIES SURVEYS	01	03
4. STATUS SURVEY OF ENDANGERED SPECIES	-	-
5. TAXONOMIC STUDIES	04	-
6. GOLDEN QUADRILATERAL HIGHWAY SURVEY	02	-
7. STUDY TOUR	-	-
TOTAL	12	22
GRAND TOTAL	34	

Faunal Identifications: Altogether 1,20,403 specimens belonging to 6,626 species have been identified by the scientists of ZSI Headquarters and Regional Centres ranging from microscopic to the highly evolved organisms.

08

NEW DISCOVERIES

- Discovering new species increases the faunal resource of our country and ZSI had played major role in discovering new species.
- 5145 new species have been described by the scientists of ZSI since its inception.
- This year another 120 new species were described and 86 new records to India have been added.

New Discoveries

During the year 2020, 120 new species including 5 subspecies were described by the scientists of ZSI belonging to different faunal groups and 86 new records to India were published.

One species of Nematoda, 4 species of Annelida, 8 species of Arachnida, 1 species of Amphipoda, 2 species of Isopoda, 4 species of Decapoda, 2 species of Ephemeroptera, 6 species of Odonata, 2 species of Orthoptera, 1 species of Mantodea, 2 species of Isoptera, 1 species of Psocoptera, 1 species of Thysanoptera, 11 species of Hemiptera, 21 species of Hymenoptera, 3 species of Coleoptera, 11 species of Trichoptera, 17 species of Lepidoptera, 1 species of Diptera, 10 species of Pisces, 2 species of Amphibia, 4 species of Reptilia and 5 subspecies of Lepidoptera were described during the year 2020.

Details of the new discoveries by the scientists of ZSI and other institutes //Colleges is published yearly in the Book "Animal Discoveries" and is available on ZSI website (zsi.gov.in).

List of the new species described by ZSI

Nematoda

1. *Polkepsilonema arabicensis* Datta & Rajmohana

Annelida

1. *Theromyzon jaleswarensis* Mandal, Tariyal, Naiwal, Thakur & Ghosh
2. *Haemadipsa champhaiensis* Mandal, Tariyal, Naiwal, & Ghosh
3. *Haemadipsa lolegaonensis* Mandal, Tariyal, Naiwal, Thakur & Ghosh
4. *Haemadipsa satyanarayana* Mandal, Tariyal, Naiwal, Thakur & Ghosh

Arachnida

1. *Vailimia ajmerensis* Basumatary, Caleb, Das, Jangid, Kalita & Brahma
2. *Vailimia jharbari* Basumatary, Caleb, Das, Jangid, Kalita & Brahma
3. *Glenognatha paullula* Sankaran, Caleb & Sebastian
4. *Carrhotus andhra* Caleb, Bera & Acharya
5. *Carrhotus assam* Caleb, Bera & Acharya
6. *Carrhotus silanthi* Caleb, Bera & Acharya
7. *Chinattus prabodhi* Basumatary, Das, Caleb & Brahma
8. *Phintelloides manipur* Caleb & Acharya

Amphipoda

1. *Talorchestia lakshadweepensis* Trivedi, Lowry, Myers & Keloth

Isopoda

1. *Annina hugliensis* Mitra & Tabassum
1. *Renocila bijui* Aneesh, Bruce, Nashad, Bineesh & Hatha

Decapoda

1. *Dotilla fraternalis* Mitra, Trivedi & Mendoza
2. *Badistemon fulvum* Mitra, Monica & Waikhom
3. *Abortelphusa namdaphaensis* Mitra
4. *Potamiscus takedai* Pati, Mitra & Peter

Ephemeroptera

1. *Baetiella subansiri* Vasanth, Selvakumar, Subramanian, Sivaramakrishnan & Sinha
2. *Notacanthurus pange* Vasanth, Selvakumar, Subramanian, Sivaramakrishnan & Sinha

Odonata

1. *Orthetrum andamanicum* Bedjanic, Kalkman & Subramanian
2. *Orthetrum erythronigrum* Subramanian, Babu & Kalkman
3. *Protosticta cyanofemora* Joshi, Subramanian, Babu, Sawant & Kunte
4. *Protosticta myristicaensis* Joshi, Subramanian, Babu, Sawant & Kunte
5. *Protosticta sholai* Joshi, Subramanian, Babu, Sawant & Kunte
6. *Platylestes kirani* Emiliyamma, Palot & Chares

Orthoptera

1. *Anaptygus shishodiai* Kumar, Chandra & Saini
2. *Tagasta mizoramensis* Gupta, Chandra & Yin

Mantodea

1. *Ephestiasula maculata* Chatterjee, Ghorai, Srinivasan & Mukherjee

Isoptera

1. *Dicuspiditermes leghugathrae* Amina, Rajmohana & Aliyas
2. *Ceylonitermes nivedita* Basak, Sengupta, Rajmohana & Baraik

Psocoptera

1. *Soa papanasam* Ramesh, Babu & Subramanian

Thysanoptera

1. *Apelaunothrips moundi* Tyagi, Singha, Chakraborty, Pakrashi & Kumar

Hemiptera

1. *Aleurotrachelus diplocisiae* Sundararaj & Vimala
2. *Aleurotrachelus fici* Sundararaj & Vimala
3. *Aleurotrachelus psydraci* Sundararaj & Vimala
4. *Margaritaplana ovata* Dubey
5. *Minutaleyrodes andamanensis* Dubey
6. *Minutaleyrodes whisper* Dubey
7. *Tenagogonus aruli* Jehamalar and Chandra
8. *Aleuroclava aporosae* Dubey
9. *Aleuroclava jarwai* Dubey
10. *Cockerelliella setosus* Dubey
11. *Regiominutus ventralis* Dubey

Hymenoptera

1. *Aivalykus microaciculatus* Ranjith, Belokobylskij, Sureshan & Nasser
2. *Carinostigmus parliensis* Rajan, Sureshan & Girish Kumar
3. *Myrmecina camellia* Sheela, Kazmi & Roy
4. *Myrmecina narendra* Sheela, Kazmi & Roy
5. *Odontomutilla sairandhriensis* Lelej, Terine, Kumar, Das & Sureshan
6. *Irenangelus acuminatus* Binoy, Wahis & Girish Kumar
7. *Machaerotherix salticidus* Binoy, Anju, Girish Kumar & Thejass
8. *Foenatopus andamanensis* Binoy, Girish Kumar & Dubey
9. *Foenatopus chareshi* Binoy, Achterberg, Girish Kumar, Santosh & Sheela
10. *Foenatopus sureshani* Binoy, Achterberg, Girish Kumar, Santosh & Sheela
11. *Parastephanellus narendrani* Binoy, Achterberg, Girish Kumar, Santosh & Sheela
12. *Parastephanellus reductus* Binoy, Achterberg, Girish Kumar, Santosh & Sheela
13. *Dolichurus chareshi* Anagha, Girish Kumar & Sureshan
14. *Dolichurus sahyadriensis* Anagha, Girish Kumar & Sureshan
15. *Macroteleia kairalii* Peter & Rajmohana
16. *Macroteleia shyama* Peter & Rajmohana
17. *Tzustigmus sahyadriensis* Rajan, Girish Kumar & Sureshan
18. *Megischus ranjithi* Binoy, Achterberg, Girish Kumar, Santhosh & Sheela
19. *Vernevania indica* Kazmi, Rameshkumar & Sheela
20. *Alysson bengalensis* Girish Kumar, Sheela & Sharma
21. *Alysson himachalensis* Girish Kumar, Sheela & Sharma

Coleoptera

1. *Sarmyodus bagh* Majumder, Drumont, Bouyer & Chandra
2. *Bolboceras arunachalensis* Gupta, Chandra, Ghosh & Das

3. *Clyster galatheaensis* Gupta, Chandra, Das & Ghosh

Trichoptera

1. *Hydromanicus betteni* Pandher, Kaur & Parey
2. *Hydromanicus clavatus* Pandher, Kaur & Parey
3. *Hydromanicus digitatus* Pandher, Kaur & Parey
4. *Chimarra gangtokensis* Kaur, Garima & Pandher
5. *Chimarra oliveri* Pandher, Kaur & Garima
6. *Kisaura acuta* Pandher, Kaur & Parey
7. *Kisaura rotunda* Pandher, Kaur & Parey
8. *Kisaura sangtam* Pandher, Kaur & Parey
9. *Kisaura teestaensis* Pandher, Kaur & Parey
10. *Polyplectropus purolaensis* Pandher, Parey & Kaur
11. *Polyplectropus sikkimensis* Pandher, Parey & Kaur

Lepidoptera

1. *Cyana atlanteia* Singh, Volynkin, Kirti, Datta & Ivanova
2. *Cyana britomartis* Singh, Volynkin, Kirti, Datta & Ivanova
3. *Cyana chrysopeleia* Singh, Volynkin, Kirti, Datta & Ivanova
4. *Cyana dryope* Singh, Volynkin, Kirti, Datta & Ivanova
5. *Cyana rudloffii* Singh, Volynkin, Kirti, Datta & Ivanova
6. *Mitochrista adelfika* Volynkin, Singh, Černý, Kirti & Datta
7. *Mitochrista jarawa* Singh, Volynkin, Kirti & Datta
8. *Mitochrista stenoalva* Volynkin, Singh, Černý, Kirti & Datta
9. *Porcellanola sikkima* Joshi, Singh, László & Kuni
10. *Nerice (Nerice) mishmiensis* Mazumder, Raha, Sanyal, Gayen, Mallick, Bandyopadhyay, Chandra & Schintlmeister
11. *Toccolosida ganeshgudiensis* Singh, Kirti, Ranjan & Chandra
12. *Barsine kirata* Volynkin, Singh, Kirti & Datta
13. *Olepa ghatmatha* Kalawate, Dinesh & Shabnam
14. *Olepa suryamal* Kalawate, Dinesh & Shabnam
15. *Olepa zedesi* Kalawate, Dinesh & Shabnam
16. *Sacada dzonguensis* Singh, Kirti, Ranjan, Chandra & Speidel
17. *Sacada umtasorensis* Singh, Kirti, Ranjan, Chandra & Speidel

Diptera

1. *Asphondylia singanallurensis* Vasanthakumar, Palanisamy, Peter & Sharma

Pisces

1. *Ophichthus kailashchandrai* Mohapatra, Ray, Mohanty & Mishra
2. *Ophichthus chennaiensis* Das, Mohapatra, Rajendar & Bhaskar
3. *Osteobrama tikarpadaensis* Shangningam, Rath, Tudu & Kosygin
4. *Parapsilorhynchus alluriensis* Jadhav, Karuthapandi, Chandra, Jaiswal, Dinesh & Narahari
5. *Glyptothorax distichus* Kosygin, Singh & Gurumayum
6. *Pseudecheneis nagalandensis* Shangningam & Kosygin
7. *Gymnothorax aurocephalus* Nahsad, Mohapatra, Varghese, Ramalingam, Bineesh & Mohanty
8. *Exostoma dujangensis* Shangningam & Kosygin
9. *Glyptothorax giudikyensis* Kosygin, Singh & Gurumayum

10. *Glyptothorax kailashi* Kosygin, Singh & Mitra

Amphibia

1. *Sphaerotheca bengaluru* Deepak, Dinesh, Ohler, Shanker, Channakeshavamurthy and Ashadevi
2. *Walkerana muduga* Dinesh, Vijayakumar, Ramesh, Jayarajan, Chandramouli & Shanker

Reptila

1. *Hemiphyllodactylus minimus* Mohapatra, Khandekar, Dutta, Mahapatra & Agarwal
2. *Lycodon deccanensis* Ganesh, Deuti, Punith, Achyuthan, Mallik, Adhikari & Vogel
3. *Cnemaspis chengodumalaensis* Cyriac, Palot, Deuti & Umesh
4. *Cnemaspis zacharyi* Cyriac, Palot, Deuti & Umesh

Lepidoptera

1. *Olepa suryamal rekhae* Kalawate, Dinesh & Shabnam
2. *Olepa schleini chandrai* Kalawate, Dinesh & Shabnam
3. *Cyana arama metis* Singh, Volynkin, Kirti, Datta & Ivanova
4. *Cyana conclusa nicobara* Singh, Volynkin, Kirti, Datta & Ivanova
5. *Cyana dohertyi eirene* Singh, Volynkin, Kirti, Datta & Ivanova

86 New Records published by ZSI Scientists

Sponges

1. *Dragmacidon australe* (Bergquist, 1970)
2. *Siphonodictyon maldiviense* (Calcinai, Cerrano, Sarà & Bavestrello, 2000)
3. *Plakortis bergquistae* Muricy, 2011

Hydrozoa

1. *Aglaophenia cupressina* Lamouroux, 1816
2. *Lytocarpia brevirostris* (Busk, 1852)
3. *Lytocarpia delicatula* (Busk, 1852)

Ctenophores

1. *Beroe gracilis* Künne, 1939

Platyhelminthes

1. *Stenostomum sphagnetorum* Papi in Luther, 1960

Arachnida

1. *Phintelloides versicolor* (C.L. Koch, 1846)
2. *Pagida salticiformis* (O. Pickard-Cambridge, 1883)

Amphipoda

1. *Talorchestia affinis* Maccagno, 1936

Decapoda

1. *Albunea groeningi* Boyko, 2002
2. *Synalpheus carinatus* (de Man, 1888)
3. *Synalpheus comatularum* (Haswell, 1882)
4. *Allogalatea elegans* (Adams & White, 1848)
5. *Palaemonella pottsi* (Borradaile, 1915)
1. *Pontoniopsis comanthi* Borradaile, 1915

Collembola

1. *Cyphoderopsis kemp* Carpenter, 1917 / *Cyphoderopsis nepalensis* (Wilson, 1982)

Ephemeroptera

1. *Baetiella armata* Braasch, 1983
2. *Baetiella ausobskyi* Braasch, 1983
3. *Baetiella imanishii* Braasch, 1983
4. *Baetiella marginata* Braasch, 1983
5. *Baetiella spathae* Shi & Tong, 2015

Orthoptera

1. *Orthelimaea himalayana* (Ingrisch, 1990)

Isoptera

1. *Dicuspiditermes hutsoni* (Kemner, 1926)
2. *Schedorhinotermes makassarensis* Kemner, 1934

Hemiptera

1. *Gerris* (*Gerris*) *lobatus* Andersen & Chen, 1993
2. *Rheumatogonus vietnamensis* Zettel & Chen, 1996
3. *Tenagogonus kuiterti* Hungerford & Matsuda, 1958
4. *Hydrometra jaczewskii* Lundblad, 1933
5. *Hydrometra longicapitis* Torre-Bueno, 1927
6. *Ranatra libera* Zettel, 1999
7. *Strongylovelia balteiformis* Ye, Chen & Bu, 2015
8. *Strongylovelia hainanensis* Ye, Chen & Bu, 2015
9. *Balinta tenebricosa* (Distant, 1888)
10. *Dundubia annandalei* Boulard, 2007
11. *Meimuna duffelsi* Boulard, 2005
12. *Orientopsaltria fangrayae* Boulard, 2001
13. *Halobates sexualis* Distant, 1903

Hymenoptera

1. *Foenatopus weii* Chen, van Achterberg & Xu, 2016
2. *Megalyra fasciipennis* Westwood
3. *Stephanus bidentatus* van Achterberg, 2002

Coleoptera

1. *Calvia sichuanica* Kovar, 2007
2. *Uniparodontata circummaculata* (Pang & Mao, 1977)
3. *Afissa rana* (Kapur, 1958)
4. *Henosepilachna vigintioctomaculata* (Motschulsky, 1857)
5. *Illeis shensiensis* Timberlake, 1943

Neuroptera

1. *Eumantispia pseudoharmandi* Yang & Liu, 2010
2. *Eumantispia tibetana* C.-k. Yang, 1988
3. *Necyla sacra* Navas, 1914

Trichoptera

1. *Cheumatopsyche chryseis* Malicky & Chantaramongkol 1997

2. *Cheumatopsyche globosa* (Ulmer 1910)
3. *Hydropsyche briareus* Malicky & Chantaramongkol 2000
4. *Chimarra fenestrata* Kimmins, 1964
5. *Chimarra nepalensis* Kimmins, 1964
6. *Kisaura cina* Malicky & Chantaramongkol 1993
7. *Kisaura filiformis* Mey 1996
8. *Kisaura intermedia* (Kimmins 1955)
9. *Kisaura laban* Malicky & Chantaramongkol 2009
10. *Kisaura longispina* (Kimmins 1955)
11. *Kisaura pectinata* (Ross 1956)
12. *Kisaura rossi* (Kimmins 1955)
13. *Kisaura surasa* Malicky & Chantaramongkol 1993
14. *Polypsectropus admin* Malicky & Chantaramongkol 1993

Lepidoptera

1. *Periergos genitale* Schintlmeister, 2002
2. *Honveda nepalina* Nakamura, 1976
3. *Syntypistis nigribasalis tropica* (Kiriakoff, 1974)
4. *Olepa schleiini* Witt, Müller, Kravchenko, Miller, Hausmann & Speidel, 2005
5. *Alciphanes clavata* Park, 2001
6. *Torodora macrosigna* Gozmány, 1973
7. *Leucobaeta hemiphea* (Hampson, 1905)
8. *Nola atrocinta* Inoue, 1998
9. *Nola infalpa* Inoue, 1976
10. *Padenia obliquifascia* Rothschild, 1920
11. *Padenia acutifascia* De Joannis, 1928

Diptera

1. *Procontarinia robusta* Li, Bu & Zhang, 2003
2. *Dasysyrphus albostratus* (Fallen, 1817)

Bryozoa

1. *Jellyella tuberculatoidea* (Liu, 1999)

Pisces

1. *Parabathymyrus macrophthalmus* Kamohara, 1938
2. *Pseudorhombus diplospilus* Norman, 1927
3. *Taeniamia ataenia* (Randall & Satapoomin, 1999)
4. *Myersina yangii* (Chen, 1960)
5. *Chelonodontops bengalensis* Habib, Neogi, Oh, Lee & Amp, Kim, 2018

Reptilia

1. *Scincella reevesii* Gray, 1838

Aves

1. *Calliope calliope* (Pallas, 1776)
2. *Zoothera citrina gibsonhilli* Deignan, 1950

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PUBLICATIONS

Books	27
Zoological Survey of India E-News	12
Research Papers in SCI Journals	149
Research Paper in National and International Journals	191
Book Chapters	376
Total	755

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Publications:

Records of the Zoological Survey of India (4 Issues)

1. *Records of the Zoological Survey of India*, Volume 120 (Part 1): 1-98pp.
2. *Records of the Zoological Survey of India*, Volume 120 (Part 2): 99-202pp.
3. *Records of the Zoological Survey of India*, Volume 120 (Part 3): 203-303pp.
4. *Records of the Zoological Survey of India*, Volume 120 (Part 4): 305-521pp.

Zoological Survey of India E-NEWS (12 Issues)

1. Zoological Survey of India, 2020: E-News, 14: 1-14
2. Zoological Survey of India, 2020: E-News, 15: 1-21
3. Zoological Survey of India, 2020: E-News, 16: 1-20
4. Zoological Survey of India, 2020: E-News, 17: 1-15
5. Zoological Survey of India, 2020: E-News, 18: 1-15
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7. Zoological Survey of India, 2020: E-News, 20: 1-14
8. Zoological Survey of India, 2020: E-News, 21: 1-12
9. Zoological Survey of India, 2020: E-News, 22: 1-14
10. Zoological Survey of India, 2021: E-News, 23: 1-17
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5. Chandra, K., Joshi, BD., Singh A., Bharadwaj, M., Thakur, M., Sharma, L.K. 2020. *Current Status and Distribution of Threatened Vertebrates in Indian Himalayan Region: Focus on Conservation and Management Planning*: 1-275 (Published by the Director, Zool. Surv. India, Kolkata).
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9. Chandra, K., Pathania, P.C., Rajmohana, K. and Hundal, S.S. 2021. *Faunal Diversity of Agroecosystems in India*: 1-767 (Published by the Director, Zool. Surv. India, Kolkata).
10. Chandra, K., Raghunathan, C. and Mao, A.A. 2020. *Biodiversity Profile of East Kolkata Wetlands*, 1-326 (Jointly published by the Director, Zool. Surv. India, Kolkata and East Kolkata Wetlands Management Authority, Department of Environment, Govt. of West Bengal).

11. Chandra, K., Raghunathan, C. and Mondal, T. 2020. *Faunal Diversity of Biogeographic Zones: Coasts of India*: 1-807 (Published by the Director, Zool. Surv. India, Kolkata).
12. Chandra, K., Raghunathan, C. and Sheela, S. 2020. *Animal Discoveries 2019 New Species New Records*: 1-182 (Published by the Director, Zool. Surv. India, Kolkata).
13. Chandra, K., Raghunathan, C., Rizvi, A.N., Hassan, M.E. and Gupta, D. 2020. *Annual Report 2018-2019*: 1-244. (Published by the Director, Zoological Survey of India, Kolkata).
14. Chandra, K., Raghunathan, C., Sureshan, P.M., Subramanian, K.A., and Rizvi, A.N. 2020. *Faunal Diversity of Biogeographic Zones of India: Western Ghats*: 1-744 (Published by the Director, Zool. Surv. India, Kolkata).
15. Chandra, K., Sharma, L.K., Maheswaran, G. and Tripathy, B. 2021. *Status of Avifaunal Diversity in Bird Sanctuary of India*: 1–216. (Published by the Director Zoological Survey of India, Kolkata).
16. Deuti K., Raha S., Bag P., Debnath S. Srikanthan A.N. and Chandra K. 2020. *Skinks of India*: 1-398 (Published by Director, Zoological Survey of India, Kolkata).
17. Jaiswal, D., Chandra, K., Kushwaha, S. and Gupta, D., 2020. *Faunal Diversity of Bhoj Wetland, Bhopal, Madhya Pradesh, India (A Ramsar Site). Wetland Ecosystem Series*, 22: 1-284 (Published by the Director, Zool. Surv. India, Kolkata).
18. Joshi BD., Sharma LK and Chandra K., 2020. *Galliforms of Indian Himalaya: Mapping for adaptive spatial conservation planning*: 1-97 (Published by the Director, Zool. Surv. India, Kolkata).
19. Kharkonger, I.J., Saikia, B., Khyndriam, D., Lyngdoh, J. and Deb, R. 2020. Fauna of Majuli Island, Assam *Rec. zool. Surv. India, Occ. Paper No.*, 402: 1-62 including 12 coloured plates, (Published by the Director, Zool. Surv. India, Kolkata).
20. Kosygin, L., Gurumayum, S.D. and Mishra, S.S. 2020. *Pictorial guide to brackish water ornamental fishes of Odisha*. Published by Director, Zoological Survey of India, Kolkata: 1-80.
21. Mishra, S.S. 2020. *Pictorial handbook on the grunts and sweetlips (Family: Haemulidae) of India*. Zoological Survey of India. Kolkata: 1-68.
22. Mukherjee, P., Chandra, K. and Hassan, M.E. 2020. Catalogue of Reduviidae (Hemiptera) of India. *Rec. zool. Surv. India, Occ. Paper No.*, 401: 1-240, (Published by the Director, Zool. Surv. India, Kolkata).
23. Pratyush, P.M., Mukesh, A. and Chandra, K. 2021. *Snakes of Central India*, 1-126 (Published by Zoological Survey of India, Kolkata).
24. Raghunathan, C. 2020. Coral and Associated Fauna in Neil Island, South Andaman. *Rec. zool. Surv. India, Occ. Paper No.*, 404: 1-148. (Published by the Director, Zoological Survey of India, Kolkata)
25. Raghunathan, C. 2020. Corals and Associated Fauna in North Reef, Interview, Latouche, Kwangtung and Shark Islands Sanctuaries, North Andaman. *Rec. zool. Surv. India, Occ. Paper No.*, 405: 1-188. (Published by the Director, Zoological Survey of India, Kolkata)
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27. Thakur M., Joshi BD., Chandra., K 2020. *Wildlife Forensics: A reference guide and standard operating procedure in the investigation of wildlife crime*: 1-35 (Published by the Director, Zool. Surv. India, Kolkata).

Research Papers in SCI Journals (149)

1. Amina, P., Rajmohana, K. and Shilimol A. C. 2020. A new species and a new record of *Dicuspiditermes* Krishna (Blattodea: Isoptera: Termitidae) from the Kerala part of Western Ghats, India, *Oriental Insects*. DOI: 10.1080/00305316.2020.1844815
2. Anagha, S., Girish Kumar, P., Sureshan, P.M. 2020. Additions to the knowledge of the genus *Dolichurus* Latreille (Hymenoptera: Ampulicidae) from India with the description of two new species. *Zootaxa*. 4821(1): 121-134.
3. Aneesh, P.T., Bruce, N.L., Nashad, M., Bineesh, K., Hatha, A.A.M. 2020. A new species of *Renocila* Miers, 1880 (Crustacea: Isopoda: Cymothoidae), a fish parasitic isopod from Andaman Island, India. *Marine Biology Research*. 1-15.
4. Ayisha Mawadda, N.V., Girish Kumar, P. and Sureshan, P.M., 2020. First report of the genus *Kohliella* Brauns, 1910 (Hymenoptera: Crabronidae: Crabroninae) from India with the species *K. anula* Pulawski, 1991 from Kerala. *Zootaxa*, 4890(1): 148-150.
5. Bagaria, P., Thapa, A., Sharma, L. K., Joshi, B. D., Singh, H., Sharma, C. M., Sharma, J., Thakur, M. and Chandra, K., 2020. Distribution modelling and climate change risk assessment strategy for rare Himalayan Galliformes species using archetypal data abundant cohorts for adaptation planning.

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6. Balakrishnan, S., Tudu, P.C. 2020. New host records for *Nerocila depressa* Milne Edwards, 1840 (Crustacea, Isopoda, Cymothoidae) from Digha coast, Bay of Bengal, India. *Indian Journal of Geo-Marine Sciences*. 49(04): 698-702.
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10. Bharti, D., Brusa, F., Kumar, S., Chandra, K. 2020. First record of *Stenostomum sphagnetorum* (Platyhelminthes, Catenulida) from India. *Zootaxa*. 4816 (3): 392-396.
11. Bharti, D., Kumar, S., La Terza, A., Chandra, K. 2020. Dispersal of ciliated protist cysts: mutualism and phoresy on mites. *Ecology*. 101(9), e03075.
12. Bhaskar, R. Kanaparthi, P., Sakthivel, P. 2021. Genetic Diversity and Phylogenetic Analysis of Blackbuck (*Antelope cervicapra*) in Southern India. *Molecular Biology Reports*. <https://doi.org/10.1007/s11033-021-06180-9>
13. Bhattacharjee, R., Mandal, S., Banerjee, S. Saha, K., Sarkar, J., Banerjee, D. and Mandal, N. 2021. Structural genetic insight and optimization of protease production from a novel strain of *Aeromonas veronii* CMF, a gut isolate of *Chrysomya megacephala*. *Archives of Microbiology* <https://doi.org/10.1007/s00203-021-02282-x>
14. Binoy, C., Achterberg, C. Van, Girish Kumar, P., Santhosh, S., Sheela, S. 2020. A review of Stephanidae (Hymenoptera: Stephanoidea) from India, with the description of five new species. *Zootaxa*. 4838(1): 001-051.
15. Binoy, C., Anju, K., Girish Kumar, P., Thejass, P. 2020. Range extension and a new species to Spider Wasp *Machaerothrix Haupt* (Hymenoptera: Pompilidae) from India with reports on its host association and nesting behavior. *Zootaxa*. 4766(1): 192-200.
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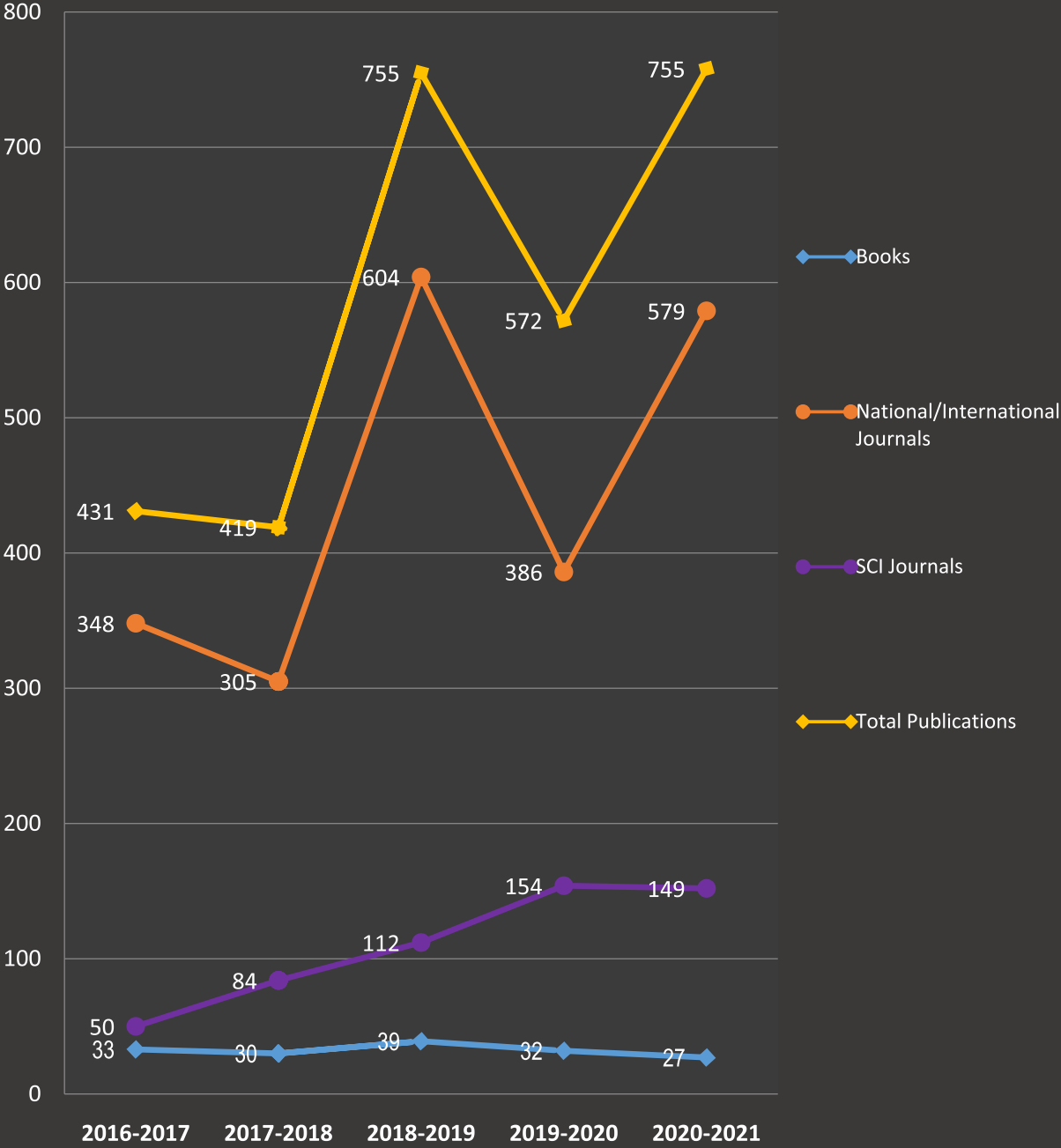
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PUBLICATIONS BY ZSI DURING THE LAST FIVE YEARS



10

DIGITAL SEQUENCE INFORMATION

- ZSI is enriching the information on DNA barcodes and solving many taxonomic queries and generated 7292 barcodes till date including the barcodes submitted during 2020-21.

- During 2020-21: Barcodes submitted: 896

Species Barcoded: 385

Digital Sequence Information (DSI) generated during 2020-21

Faunal Groups	Number of Barcodes	Number of Species
Protozoa	10	8
Porifera	1	1
Cnidaria (soft corals)	17	17
Platyhelminthes	10	5
Nematoda	17	8
Arachnida	5	3
Insecta: Thysanoptera	277	72
Insecta: Ephemeroptera	23	22
Insecta: Odonata	17	3
Insecta: Orthoptera	2	1
Insecta: Hemiptera	19	7
Insecta : Blattodea	48	26
Insecta: Coleoptera	7	5
Insecta: Hymenoptera	3	2
Insecta: Diptera	17	11
Insecta : Lepidoptera	29	12
Myriapoda: Diplopoda	7	1
Crustacea	26	17
Mollusca	1	1
Amphibia	27	10
Pisces	227	110
Aves	1	1
Reptilia	29	19
Mammalia	76	23
Total	896	385

DNA Barcodes Submitted to Bold/NCBI during 2020-21

S.No.	Species	Process ID	IDNCBI/BOLD
PROTOZOA			
1	<i>Hypotrichidium conicum</i> Ilowaisky, 1921	Pt 4801/12	Mw830115
2	<i>Spirostomum ambiguum</i> (Müller, 1786)	-	Mw830043
3	Ehrenberg, 1835		
4	<i>Euplotes woodruffi</i> Gaw, 1939	Pt 4887	Mw830116
		Pt 4657	Mw830118
5	<i>Uroleptopsis citrina</i> Kahl, 1932	Pt 5037	Mw830166
6	<i>Stylonychia ammermanni</i> Gupta et al., 2001	Pt 4657	Mw830154
7	<i>Aponotohymena australis</i> Gupta et al., 2001	Pt 4451	MW835346
		Pt 5148/2	Mw835347
			Mw835345
8	<i>Neokeronopsis</i> sp.	-	
9	<i>Stylonychia ammermanni</i> Gupta et al., 2001	Pt 5147	Mw830154
PORIFERA			
10	<i>Leucetta chagosensis</i> Dendy, 1913	ZSI/MBRC/S-406	Mw811801
CNIDARIA			
11	Soft Coral 1		Mt462109
12	Soft Coral 2		Mt462110
13	Soft Coral 3		Mt462111
14	Soft Coral 4		Mt462112
15	Soft Coral 5		Mt462113
16	Soft Coral 6		Mt462114
17	Soft Coral 7		Mt507773
18	Soft Coral 8		Mt507774
19	Soft Coral 9		Mt507775
20	Soft Coral 10		Mt507776
21	Soft Coral 11		Mt507777
22	Soft Coral 12		Mt507778
23	Soft Coral 13		Mt507779
24	Soft Coral 14		Mt507780
25	Soft Coral 15		Mt507781
26	Soft Coral 16		Mt507782
27	Soft Coral 17		Mt507783
NEMATODA			
28	<i>Aplectana macintoshii</i> (Stewart, 1914)	ZSINRCIV.1146	Mw517548
29	<i>Cosmocerca kalesari</i> Rizvi, Bursey & Bhutia, 2011	ZSINRCIV.1154	Mw517549
		ZSINRCIV.1154	Mw517550
30	<i>Cosmocercoides bufonis</i> Karve, 1944	ZSI/WN.2029	Mw520129
31	<i>Cosmocercoides</i> sp. Wilkie, 1930	ZSI/WN.2029	Mw520130
32	<i>Chabaudus dehradunensis</i> Rizvi,	ZSINRCIV.1134	MW520139

S.No.	Species	Process ID	IDNCBI/BOLD
33	Bursey & Maity, 2016	ZSINRCIV.1134	MW520140
		ZSINRCIV.1134	MW520141
34	<i>Paraphryngodon tuberculata</i> Rizvi, Maity & Bursey, 2017	ZSINRCIV.1134	Mw520142
		ZSINRCIV.1183	MW544015
		ZSINRCIV.1183	Mw544016
35	<i>Thelandros dehradunensis</i> Rizvi, Maity & Bursey, 2017	ZSI/NRC/IV.1120	Mw544017
		ZSI/NRC/IV.1179	Mw524750
36	<i>Thelandros tuberculata</i> Rizvi, Maity & Bursey, 2017	ZSI/NRC/IV.1179	Mw524751
		ZSI/NRC/IV.1122	MW544012
		ZSI/NRC/IV.1124	MW544013
		ZSI/NRC/IV.1124	Mw544014
PLATYHELMINTHES			
37	<i>Rhabdias garhwalensis</i> Maity, Rizvi, Bursey & Basu, 2018	ZSI/WN.2028	Mw522542
		ZSI/WN.2028	Mw522543
38	<i>Rhabdias stomatica</i> Maity, Rizvi, Bursey, 2018	ZSI/WN-1862	Mw522544
		ZSI/WN-1862	Mw522545
39	<i>Diplodiscus mehari</i> Pande, 1937	ZSI/WN-1866	Mw517561
		ZSI/WN-	Mw517562
40	<i>Gorgoderina spinosa</i> Bursey, Rizvi & Maity, 2014	1866ZSI/NRC/IV.1099	Mw521821
		ZSI/NRC/IV.1099ZSI/HQ/P	Mw521822
41	<i>Haematoloechus</i> sp.	latyhelminthes/ W-10793/3	Mw521819
		ZSI/HQ/Platyhelminthes/ W-10793/3	Mw521820
ARTHROPODA: ARACHNIDA			
42	<i>Oxyopes hindostanicus</i> Pocock, 1901	ZSI/SRC I-197	Mw458960
		ZSI/SRC I-206	Mw487895
43	<i>Oxyopes javanus</i> Thorell, 1887	ZSI/SRC I-194	Mw458961
		ZSI/SRC I-195	Mw458962
44	<i>Tetragnatha</i> sp. Latreille, 1804	ZSI/SRC I-192	Mw458959
ARTHROPODA: INSECTA:			
THYSANOPTERA			
45	<i>Aeolothrips collaris</i> Priesner, 1919	THP202-21	T_46
46	<i>Allelothrips brunneus</i> (Faure, 1941)	THP089-20	TH_2637
47	<i>Anaphothrips sudanensis</i> Trybom, 1911	THP207-21	TH_2911
		THP209-21	TH_2930
48	<i>Androthrips ramachandrai</i> Karny, 1926	THP056-20	TH_2572
49	<i>Asprothrips indicus</i> (Bagnall, 1919)	THP007-20	TH_2791
50	<i>Astrothrips tumiceps</i> Karny, 1923	THP149-20	T_22
		THP167-20	TH_2869
		THP013-20	TH_2812
		THP014-20	TH_2813
		THP015-20	TH_2816
		THP016-20	TH_2817
		THP017-20	TH_2818
		THP018-20	TH_2819

S.No.	Species	Process ID	IDNCBI/BOLD
		THP021-20	TH_2822
		THP027-20	TH_2828
		THP029-20	TH_2830
		THP030-20	TH_2831
		THP031-20	TH_2832
		THP032-20	TH_2834
		THP033-20	TH_2835
		THP035-20	TH_2839
		THP036-20	TH_2840
		THP037-20	TH_2841
		THP039-20	TH_2843
		THP040-20	TH_2866
		THP041-20	TH_2867
		THP042-20	TH_2870
		THP043-20	TH_2879
		THP052-20	TH_2568
		THP054-20	TH_2570
		THP055-20	TH_2571
		THP058-20	TH_2588
51	<i>Ayyaria chaetophora</i> Karny, 1926	THP145-20	T_16
		THP169-20	TH_2880
		THP086-20	TH_2634
		THP087-20	TH_2635
52	<i>Bamboosiella bicoloripes</i> Ananthakrishnan, 1957	THP022-20	TH_2823
		THP023-20	TH_2824
		THP024-20	TH_2825
		THP025-20	TH_2826
53	<i>Bamboosiella semiflava</i> Okajima	THP045-20	TH_2479A
		THP102-20	TH_2657
54	<i>Bathrips melanicornis</i> Shumsher, 1946 <i>Biltothrips minutus</i> (Bhatti)	THP181-20	TH_2904
		THP047-20	TH_2563
		THP048-20	TH_2564
		THP049-20	TH_2565
		THP050-20	TH_2566
		THP129-20	TH_2708
55	<i>Bolacothrips striatopennatus</i> Schmutz, 1913	THP088-20	TH_2636
		THP090-20	TH_2638
56	<i>Bregmatothrips brachycephalus</i> Shumsher, 1942	THP082-20	TH_2630
		THP083-20	TH_2631
57	<i>Caliothrips graminicola</i> Bagnall & Cameron, 1932	THP204-21	TH_2905
		THP205-21	TH_2906
		THP206-21	TH_2908
58	<i>Caliothrips impurus</i> Priesner, 1927	THP080-20	TH_2628
		THP081-20	TH_2629
59	<i>Chaetanaphothrips deformans</i> (Karny, 1913)	THP154-20	TH_2695

S.No.	Species	Process ID	IDNCBI/BOLD
60	<i>Dendrothripoides innoxius</i> Karny, 1914	THP147-20	T_20
		THP092-20	TH_2642
		THP093-20	TH_2643
61	<i>Dolichothrips indicus</i> (Hood)	THP072-20	TH_2609
62	<i>Dolichothrips reuteri</i> (Karny)	THP073-20	TH_2610
		THP074-20	TH_2616
		THP079-20	TH_2624
		THP084-20	TH_2632
63	<i>Euphysothrips subramanii</i> (Ramakrishna & Margabandhu, 1939)	THP121-20	TH_2700
		THP122-20	TH_2701
64	<i>Frankliniella intonsa</i> Priesner, 1925	THP046-20	TH_2535
65	<i>Frankliniella occidentalis</i> Pergande, 1895	THP053-20	TH_2569
		THP063-20	TH_2594
		THP064-20	TH_2595
		THP065-20	TH_2598
		THP066-20	TH_2601
66	<i>Frankliniella schultzei</i> (Trybom, 1910)	THP085-20	TH_2633
		THP094-20	TH_2644
		THP095-20	TH_2645
		THP096-20	TH_2647
		THP097-20	TH_2648
		THP244-21	TH_2983
		THP247-21	TH_2988
		THP248-21	TH_2989
		THP249-21	TH_2990
67	<i>Franklinothrips megalops</i> Trybom, 1912	THP250-21	TH_2991
		THP044-20	TH_2327A
68	<i>Franklinothrips vespiformis</i> (Crawford DL, 1909)	THP091-20	TH_2641
69	<i>Gastrothrips acutulus</i> Okajima, 1979	THP111-20	TH_2680
70	<i>Gigantothrips elegans</i> Zimmermann, 1900	THP069-20	TH_2605
		THP070-20	TH_2607
		THP071-20	TH_2608
71	<i>Gynaikothrips uzeli</i> (Zimmermann, 1900)	THP192-20	BAC_L1
		THP193-20	BAC_L2
		THP194-20	BAC_P1
		THP195-20	BAC_P2
		THP196-20	BAC_P3
		THP067-20	TH_2602
		THP068-20	TH_2603
72	<i>Haplothrips ganglbaueri</i> Schmutz, 1913	THP190-20	TH_2885
		THP191-20	TH_2887
		THP261-21	TH_3028
73	<i>Haplothrips gowdeyi</i> (Franklin, 1908)	THP078-20	TH_2622
74	<i>Haplothrips tenuipennis</i> Bagnall, 1918	THP201-21	T_45
75	<i>Helionothrips kadalophilus</i> Ramakrishna &	THP120-20	TH_2699

S.No.	Species	Process ID	IDNCBI/BOLD
	Margabandhu, 1931		
76	<i>Heliothrips haemorrhoidalis</i> (Bouché, 1833)	THP130-20	TH_2710
77	<i>Hoplothrips fungosus</i> Moulton, 1928	THP146-20	T_18
78	<i>Hydatothrips aureus</i> Bhatti, 1973	THP135-20	TH_2717
79	<i>Liothrips takahashii</i> Moulton 1928	THP061-20	TH_2592
		THP062-20	TH_2593
80	<i>Litotetothrips pasaniae</i> Kurosawa, 1937	THP155-20	TH_2779
		THP038-20	TH_2842
81	<i>Megalurothrips usitatus</i> (Bagnall, 1913)	THP170-20	TH_2881
		THP171-20	TH_2882
		THP172-20	TH_2886
		THP173-20	TH_2888
		THP174-20	TH_2889
		THP175-20	TH_2890
		THP176-20	TH_2892
		THP177-20	TH_2896
		THP178-20	TH_2898
		THP185-20	TH_2850
		THP187-20	TH_2854
		THP188-20	TH_2865
		THP189-20	TH_2875
		THP002-20	TH_2781
		THP005-20	TH_2789
		THP008-20	TH_2798
		THP009-20	TH_2799
		THP010-20	TH_2802
		THP012-20	TH_2811
		THP215-21	TH_2947
		THP216-21	TH_2948
		THP218-21	TH_2950
		THP219-21	TH_2951
		THP220-21	TH_2952
82	<i>Mesothrips jordani</i> Zimmermann, 1900	THP059-20;	TH_2590
		THP060-20	TH_2591
83	<i>Microcephalothrips abdominalis</i> (Crawford 1910)	THP148-20	T_21
84	<i>Monilothrips kempii</i> Moulton, 1929	THP198-21	T_38
85	<i>Mycterothrips nilgiriensis</i> (Ananthakrishnan, 1960)	THP160-20;	TH_2848
		THP161-20	TH_2849
86	<i>Mymarothrips garuda</i> Ramakrishna & Margabandhu, 1931	THP134-20	TH_2716
		THP136-20	TH_2718
		THP137-20	TH_2722
		THP138-20	TH_2723
		THP139-20	TH_2724
		THP140-20	TH_2726

S.No.	Species	Process ID	IDNCBI/BOLD
		THP141-20	TH_2727
		THP142-20	TH_2731
		THP143-20	TH_2732
		THP197-21	T_37
		THP200-21	T_40
		THP212-21	TH_2942
		THP213-21	TH_2944
		THP214-21	TH_2946
		THP223-21	TH_2956
		THP224-21	TH_2957
		THP230-21	TH_2963
		THP231-21	TH_2964
		THP232-21	TH_2965
		THP233-21	TH_2967
87	<i>Neohydatothrips gracilipes</i> (Hood, 1924)	THP151-20	T_29
		THP152-20	TH_2588A
		THP153-20	TH_2651
88	<i>Neohydatothrips plynopygus</i> Karny, 1925	THP004-20	TH_2786
89	<i>Nesothrips brevicollis</i> (Bagnall)	THP157-20	TH_2815
90	<i>Paithrips circularis</i> Nonaka & Jangvitaya, 1994	THP186-20	TH_2853
		THP026-20	TH_2827
		THP028-20	TH_2829
91	<i>Phibalothrips peringueyi</i> (Faure, 1925)	THP234-21	TH_2969
92	<i>Podothrips ferrugineus</i> Okajima, 1978	THP106-20	TH_2661
		THP107-20	TH_2662
		THP108-20	TH_2675
		THP109-20	TH_2677
		THP117-20	TH_2687
93	<i>Podothrips lucasseni</i> Kruger, 1890	THP127-20	TH_2706
94	<i>Podothrips sasacola</i> Kurosawa, 1940	THP144-20	T_14
		THP101-20	TH_2656
95	<i>Praepodothrips causiapeltus</i> Reyes, 1994	THP103-20	TH_2658
		THP104-20	TH_2659
		THP105-20	TH_2660
		THP110-20	TH_2678
		THP116-20	TH_2686
96	<i>Priesneriola oneillae</i> Ananthakrishnan, 1964	THP128-20	TH_2707
		THP208-21	TH_2928
97	<i>Ramakrishnaiella nirmalapaksha</i>	THP034-20	TH_2836
	<i>Rhipiphorothrips cruentatus</i> Hood, 1919	THP159-20	TH_2847
98	<i>Scirtothrips dorsalis</i> Hood, 1919	THP098-20	TH_2649
		THP099-20	TH_2650
		THP123-20	TH_2702
		THP124-20	TH_2703
		THP210-21	TH_2932
		THP217-21	TH_2949

S.No.	Species	Process ID	IDNCBI/BOLD
		THP222-21	TH_2955
		THP226-21	TH_2959
		THP236-21	TH_2972
		THP237-21	TH_2974
		THP238-21	TH_2976
		THP239-21	TH_2977
		THP240-21	TH_2978
		THP241-21	TH_2979
		THP243-21	TH_2981
		THP246-21	TH_2986
		THP263-21	TH_3035
		THP275-21	TH_3056
		THP276-21	TH_3057
		THP277-21	TH_3058
99	<i>Scolothrips rhagebianus</i> Priesner, 1950	THP100-20	TH_2653
100	<i>Selenothrips rubrocinctus</i> (Giard, 1901)	THP112-20	TH_2681
		THP113-20	TH_2682
		THP114-20	TH_2684
		THP115-20	TH_2685
		THP118-20	TH_2688
		THP119-20	TH_2698
		THP125-20	TH_2704
		THP126-20	TH_2705
		THP131-20	TH_2711
		THP132-20	TH_2713
		THP133-20	TH_2714
101	<i>Stenchaetothrips bambusicola</i> Mound, 2011	THP150-20	T_27
102	<i>Taeniothrips tigris</i> Bhatti, 1995	THP199-21	T_39
103	<i>Thrips apicatus</i> Priesner, 1934	THP245-21	TH_2985
		THP264-21T	TH_3036
104	<i>Thrips atactus</i> Bhatti, 1967	HP162-20	TH_2855
		THP163-20	TH_2856
		THP164-20	TH_2862
		THP165-20	TH_2863
		THP166-20	TH_2864
		THP168-20	TH_2873
105	<i>Thrips coloratus</i> Schmutz, 1913	THP256-21	TH_3012
106	<i>Thrips florum</i> Schmutz 1913	THP203-21	TH_2884
107	<i>Thrips hawaiiensis</i> (Morgan, 1913)	THP076-20	TH_2619
		THP077-20	TH_2620
		THP211-21	TH_2935
		THP221-21	TH_2953
		THP227-21	TH_2960
		THP228-21	TH_2961
		THP229-21	TH_2962

S.No.	Species	Process ID	IDNCBI/BOLD
108	<i>Thrips palmi</i> Karny, 1925	THP235-21	TH_2971
		THP251-21	TH_2992
		THP252-21	TH_2995
		THP253-21	TH_2996
		THP254-21	TH_3007
		THP255-21	TH_3010
		THP257-21	TH_3013
		THP258-21	TH_3014
		THP259-21	TH_3018
		THP260-21	TH_3022
		THP262-21	TH_3030
		THP270-21	TH_3043
		THP271-21	TH_3045
		THP272-21	TH_3046
		THP273-21	TH_3050
		THP274-21	TH_3052
		THP179-20	TH_2900
		THP180-20	TH_2901
		THP075-20	TH_2617
		THP225-21	TH_2958
109	<i>Trachynotothrips brevispinus</i> Masumoto & Okajima 2005	THP242-21	TH_2980
		THP265-21	TH_3038
110	<i>Trachynotothrips striatus</i> Masumoto & Okajima, 2005	THP266-21	TH_3039
		THP267-21	TH_3040
111	<i>Trichromothrips assamensis</i> Tyagi & Kumar, 2017	THP268-21	TH_3041
		THP269-21	TH_3042
112	<i>Trichromothrips similis</i> (Ananthakrishnan, 1968)	THP183-20	TH_2795
		THP156-20	TH_2797
113	<i>Tryphactothrips rutherfordi</i> Bagnall, 1915	THP182-20	TH_2794
		THP184-20	TH_2796
114	<i>Zaniothrips ricini</i> Bhatti, 1967	THP051-20	TH_2567
		THP057-20	TH_2587
115	<i>Acentrella vera</i> (Müller-Liebenau, 1982)	THP001-20	TH_2780
		THP158-20	TH_2844
116	<i>Choroterpes nambiyarensis</i> Selva Kumar et al., 2013	THP006-20	TH_2790
		THP011-20	TH_2805
		THP019-20	TH_2820
		THP020-20	TH_2821
		THP003-20	TH_2784
ARTHROPODA: INSECTA:			
EPHEMEROPTERA			
115	<i>Acentrella vera</i> (Müller-Liebenau, 1982)	ZSI/SRC My-2	Mw484888
116	<i>Choroterpes nambiyarensis</i> Selva Kumar et al., 2013	ZSI/SRC MI-14	Mw160188

S.No.	Species	Process ID	IDNCBI/BOLD
117	<i>Choroterpes nigella</i> (Kang & Yang 1994)	ZSI/SRC MI-23	Mw161277
118	<i>Choroterpes parvula</i> (Gillies 1951)	ZSI/SRC MI-27	Mw161280
119	<i>Cincticostella insolta</i> (Allen, 1971)	ZSI/SRC MI-11	Mw160186
120	<i>Cincticostella sivamakrishnani</i> Martynov & Palatov, 2019	ZSI/SRC MI-4	Mw160183
121	<i>Cincticostella</i> sp. (Allen, 1980)	ZSI/SRC MI-8	Mw160185
122	<i>Drunella submontane</i> (Brodsky, 1930)	ZSI/SRC MI-1	Mw160182
123	<i>Edmundsula</i> sp.	ZSI/SRC MI-25	Mw161278
124	<i>Epeorus aculeatus</i> Braasch, 1990	ZSI/SRC MI-321	MW161282
		ZSI/SRC MI-325	Mw161283
125	<i>Epeorus bifurcates</i> Braasch & Soldán, 1979	ZSI/SRC MI-320	Mw161281
126	<i>Epeorus petersi</i> (Sivaruban, 2013)	ZSI/SRC I-201	Mw487893
127	<i>Epeorus psi</i> Eaton, 1885	ZSI/SRC My-12	Mw484890
128	<i>Iron kapurkripalanorum</i> Braasch, 1983	ZSI/SRC MI-322	Mw161284
129	<i>Isca purpurea</i> Gillies, 1951	ZSI/SRC MI-22	Mw160191
130	<i>Megaglena</i> sp.	ZSI/SRC MI-26	Mw161279
131	<i>Notophlebia jobi</i> Sivamakrishnan & Peters, 1984	ZSI/SRC MI-17	Mw160190
132	<i>Petersula courtallensis</i> Sivamakrishnan 1984	ZSI/SRC MI-16	Mw160189
133	<i>Serratella</i> sp.	ZSI/SRC MI-12	Mw160187
134	<i>Spinorea gilliesi</i> (Allen & Edmunds, 1963)	ZSI/SRC MI-5	Mw160184
135	<i>Teloganodes kodai</i> Sartori, 2008	ZSI/SRC My-8	Mw484889
136	<i>Torleya coheri</i> (Allen & Edmunds, 1963)	ZSI/SRC MI-7	Mw151270
ARTHROPODA: INSECTA:			
ORTHOPTERA			
137	<i>Acrida exaltata</i> (Walker, 1859)	ZSI_NRC_DNA_Dec20_2	MW392902
		ZSI_NRC_DNA_Jan21_1	Mw504301
ARTHROPODA: INSECTA: ODONATA			
138	<i>Brachythemis contaminata</i> (Fabricius, 1793)	ZSI/SRC BC-13	Mt795779-
		ZSI/SRC BC-15	MT795790,
		ZSI/SRC BC-17	MW487891
		ZSI/SRC BC-18	MW487894
		ZSI/SRC BC-21	
		ZSI/SRC BC-22	
		ZSI/SRC BC-37	
		ZSI/SRC BC-38	
		ZSI/SRC BC-39	
		ZSI/SRC BC-41	
		ZSI/SRC BC-41	
		ZSI/SRC BC-14	
139	<i>Diplacodes trivialis</i> Rambur, 1842	ZSI/SRC DT-33	Mt795797-
		ZSI/SRC DT-34	Mt795800
		ZSI/SRC DT-35	

S.No.	Species	Process ID	IDNCBI/BOLD
140	<i>Orthetrum Chrysis</i> (Selys, 1891)	ZSI/SRC DT-36 ZSI/SRC OC-14	Mt795796
ARTHROPODA: INSECTA: HEMIPTERA			
141	<i>Acrosternum gramineum</i> (Fabricius, 1787)	ZSI/SRC I-188	Mw458958
142	<i>Campylomma</i> sp.	ZSI/SRC I-180	Mw458950
143	<i>Dysdercus koenigii</i> (Fabricius, 1775)	ZSI_NRC_DNA_Mar21_1 6 ZSI_NRC_DNA_Mar21_17 ZSI_NRC_DNA_Mar21_1 8 ZSI_NRC_DNA_Mar21_1 9 ZSI_NRC_DNA_Mar21_2 0 ZSI_NRC_DNA_Mar21_2 1 ZSI_NRC_DNA_Feb21_6 ZSI_NRC_DNA_Feb21_7 ZSI_NRC_DNA_Feb21_8	MW750599 MW750600 MW750601 MW750602 MW750603 MW750604 MW600458 MW600459 Mw600460 MW600460
144	<i>Eocanthecona furcellata</i> (Wolff, 1811)	ZSI/SRC I-186	Mw458956
145	<i>Ledra dorsalis</i>	ZSI/SRC LD-43 ZSI/SRC LD-44 ZSI/SRC LD-45 ZSI/SRC I -205	Mt796132- Mt796134
146	<i>Ledropsis</i> sp.	ZSI/SRC I-46 ZSI/SRC I-47	Mw458963- Mw458964
147	<i>Mukaria splendida</i> Distant 1908	ZSI/SRC I-200	Mw487892
ARTHROPODA: INSECTA : BLATTODEA (COCKROACHES)			
148	<i>Allacta</i> sp.	Mw291031 Mw291037	FBRC_ZSI_DNA707 FBRC_ZSI_DNA719
149	Balta sp.	Mw506955	FBRC_ZSI_DNA721
150	<i>Calolamprodes characterosa</i> (Walker, F., 1868)	Mw291036	FBRC_ZSI_DNA713
151	<i>Hebardina concinna</i> (Haan, 1842)	Mw506951	FBRC_ZSI_DNA735
152	<i>Hemithyrlocera</i> sp.	Mw291039	FBRC_ZSI_DNA727
153	<i>Salganea</i> sp.	ZSI-WRC Ent-12/82 ZSI-WRC Ent-	Mw463933 MW463934FBRC_ZSI_D
154	<i>Periplaneta americana</i> (Linnaeus, 1758)	12/82MW291029 ZSI_NRC_DNA_Mar21_11 ZSI_NRC_DNA_Mar21_1 2 ZSI_NRC_DNA_Mar21_1 3	NA705 MW750578 MW750579 MW750580 MW750581 Mw750582

S.No.	Species	Process ID	IDNCBI/BOLD
		ZSI_NRC_DNA_Mar21_1	
		4	
		ZSI_NRC_DNA_Mar21_1	
		5	
155	<i>Perisphaerus</i> sp.	Mw291034	FBRC_ZSI_DNA710
156	<i>Pelmatosilpha</i> sp.	Mw291033	FBRC_ZSI_DNA709
157	<i>Princisola pulchra</i> (Shelford, 1910)	Mw506953	FBRC_ZSI_DNA728
158	<i>Pseudoglomeris</i> sp.	Mw291030	FBRC_ZSI_DNA706
159	<i>Pycnoscelus surinamensis</i> (Linnaeus, 1758)	ZSI/WRC/Ent-12/81a	MW051034
		ZSI/WRC/Ent-12/81b	Mw051035
160	<i>Pycnoscelus</i> sp.	MW506954	FBRC_ZSI_DNA724
		Mw506952	FBRC_ZSI_DNA731
161	<i>Rhabdoblatta lineaticollis</i> (Bolívar, 1897)	Mw291032	FBRC_ZSI_DNA708
162	<i>Supella longipalpa</i> (Fabricius, 1798)	Mw291038	FBRC_ZSI_DNA726
163	<i>Therea</i> sp. Billberg, 1820	Mw291035	FBRC_ZSI_DNA711
ARTHROPODA: INSECTA: BLATTODEA			
(TERMITES)			
			Mt272760
164	<i>Dicuspiditermes achankovili</i> Verma, 1985	-	Mt272750
165	<i>Dicuspiditermes</i> sp.	-	Mt272755
166	<i>Homalotermes pilosus</i> (Mathur & Thapa, 1962)	-	Mt272758
			MT272753
			Mt272747
167	<i>Homalotermes pilosus pilosus</i> (Mathur & Thapa, 1962)	-	Mt272758
168	<i>Indocapritermes aruni</i> Chhotani, 1997	-	Mt272742
169	<i>Labiocapritermes distortus</i> (Silvestri 1922)	-	MT272752
			MT272744
			MT272756
			Mt272743
170	<i>Pericapritermes topslipensis</i> Thakur, 1976	-	MT272741
			MT272745
			MT272749
			MT272761
			Mt272762
171	<i>Procapritermes keralai</i>	-	MT272757
			Mt272748
172	<i>Pseudocapritermes fletcherii</i>	-	MT272754
			MT272746
			Mt272751
173	<i>Rinacapritermes</i> sp	-	Mt274291
			MT274292
			MT274296
			MT274295
			MT274294

S.No.	Species	Process ID	IDNCBI/BOLD
			Mt274293
	ARTHROPODA: INSECTA:		
	COLEOPTERA		
174	<i>Harmonia dimidiata</i> (Fabricius, 1781)	SI-NRC-DNA2	Mt935586
		ZSI-NRC-DNA5	MT994285
		ZSI_NRC_DNA_Dec20_1	MW392901
		ZSI_NRC_DNA_Jan21_2	Mw504302
175	<i>Rhyzopertha dominica</i> (Fabricius, 1792)	ZSI/SRC I-181	MW458951
		ZSI/SRC I-182	Mw458952
176	<i>Myllocerus viridanus</i> (Fabricius, 1775)	ZSI/SRC I-183	MW458953
		ZSI/SRC I-196	Mw458954
177	Harpalinae sp.	ZSI/SRC I-187	Mw458957
	ARTHROPODA: INSECTA:		
	HYMENOPTERA		
178	<i>Aenictus</i> sp.	ZSI/SRC I-	Mw490571
179	<i>Apis dorsata</i> Fabricius, 1793	204ZSI_NRC_DNA_Feb	MW600451
		21_4	Mw600452
		ZSI_NRC_DNA_Feb21_5	
	ARTHROPODA: INSECTA: DIPTERA		
180	<i>Haematopota javana</i> Wiedemann, 1821	ZSI/SRC I-198	Mw458955
181	<i>Culex</i> sp.	21920/H6	Mt578858
182	<i>Culex mimuloides</i> Barraud, 1924	21922/H6	Mt578859
183	<i>Culex jacksoni</i> Edwards, 1934	21940/H6	Mt578860
184	<i>Culex</i> sp.	21920/H6	Mw064134
185	<i>Culex mimuloides</i> Barraud, 1924	21922/H6	Mw064135
186	<i>Culex jacksoni</i> Edwards, 1934	21940/H6	Mw064136
187	<i>Culex</i> sp.	21927/H6	MW309109
		21927/H6	Mw298532
188	<i>Aedes albopictus</i> (Skuse, 1894)	Jodhpur strain	MW832381
			Mw881497
189	<i>Aedes aegypti</i> (Linnaeus in Hasselquist, 1762)	Jodhpur strain	MW881496
			MW881495
190	<i>Musca domestica</i> Linnaeus, 1758	ZSI_NRC_DNA_Feb21_1	MW881493
		ZSI_NRC_DNA_Feb21_2	Mw881494
		ZSI_NRC_DNA_Feb21_3	MW600432
			MW600433
			Mw600434
	ARTHROPODA: INSECTA :		
	LEPIDOPTERA (MOTH)		
191	<i>Eupterote</i> sp.	ZSI-NRC-DNA3	Ku947973
		ZSI-NRC-DNA16	MW147589
		ZSI-NRC-DNA17	MW147590
		ZSI-NRC-DNA18	MW147591
		ZSI-NRC-DNA19	MW147592

S.No.	Species	Process ID	IDNCBI/BOLD
		ZSI-NRC-DNA20	MW147593
		ZSI-NRC-DNA21	Mw147594
192	<i>Olepa ghatmatha</i> Kalawate in Kalawate, Dinesh & Shabnam, 2020	ZSI-WRC L-2145	MT318099.1
193	<i>Olepa schleini</i> Witt <i>et al.</i> , 2005	ZSI/WRC/L/2028	MN822126.1
194	<i>Olepa schleini chandrai</i> Kalawate, 2020	ZSI/WRC/L/2029	MN822127.1
195	<i>Olepa suryamal</i> Kalawate, 2020	ZSI-WRC L-2148	MT318103.1
196	<i>Olepa suryamal rekhae</i> Kalawate, 2020	ZSI-WRC L-2149	MT318100.1
		ZSI-WRC L-2150	MT318101.1
		ZSI-WRC L-2151	MT318102.1
197	<i>Olepa zedesi</i> Kalawate, 2020	ZSI-WRC L-2152	MT318104.1
		ZSI-WRC L-2155	MT318106.1
		ZSI-WRC L-2154	MT318105.1
198	<i>Pigospila tyres</i> Cramer, 1780	ZSI-WRC L-1583	Mt776312
ARTHROPODA: INSECTA : LEPIDOPTERA (BUTTERFLIES)			
199	<i>Delias eucharis</i> (Drury, 1773)	ZSI_NRC_DNA_Mar21_7	Mw750558
		ZSI_NRC_DNA_Mar21_8	MW750559
		ZSI_NRC_DNA_Mar21_9	MW750560
		ZSI_NRC_DNA_Mar21_1	Mw750561
		0	
200	<i>Pieris canidia</i> (Sparrman, 1768)	ZSI-NRC-DNA1	MT935585
		ZSI_NRC_DNA_Nov20_4	MW288148
		4	MW288149
		ZSI_NRC_DNA_Nov20_6	MW288150
		6	Mw288151
		ZSI_NRC_DNA_Nov20_1	
		ZSI_NRC_DNA_Nov20_2	
201	<i>Pieris indica</i> (Sparrman, 1768)	ZSI_NRC_DNA_Mar21_1	Mw750494
		ZSI_NRC_DNA_Mar21_2	Mw750494
ARTHROPODA: MYRIAPODA : DIPLOPODA			
202	<i>Thyropygus</i> sp.	ZSI_NRC_DNA_Nov20_3	MW292589
		3	MW292590
		ZSI_NRC_DNA_Nov20_4	MW147487
		4	MW147491
		ZSI-NRC-DNA11	MW147489
		ZSI-NRC-DNA12	MW147492
		ZSI-NRC-DNA13	Mw147490
		ZSI-NRC-DNA14	
		ZSI-NRC-DNA15	
ARTHROPODA: CRUSTACEA			
203	<i>Barytelphusa cf. cunicularis</i> (Westwood,	Mw000756	FBRC_ZSI_DNA798_INV

S.No.	Species	Process ID	IDNCBI/BOLD
	1836)	Mw000757	2619 FBRC_ZSI_DNA800_INV 2617
204	<i>Barytelphusa</i> sp.	Mw000755	FBRC_ZSI_DNA797_UN1 0222
205	<i>Barytelphusa guerini</i> (H. Milne Edwards, 1853)	MW000753 Mw000754	FBRC_ZSI_DNA794_INV 2529 FBRC_ZSI_DNA795_INV 2473
206	<i>Barytelphusa</i> sp.	Mt484334	FBRC_ZSI_DNA756_INV _2485
207	<i>Botia lohachata</i> Chaudhuri 1912	Mw002485 Mw002486	FBRC_ZSI_DNA820_F36 21 FBRC_ZSI_DNA821_F36 21
208	<i>Charybdis feriatus</i> (Linnaeus, 1758)	ZSI/SRC C-166 ZSI/SRC C-167	Mw143517- Mw143518
209	<i>Charybdis granulate</i> (De Haan, 1833)	ZSI/SRC C-169	Mw144287
210	<i>Charybdis lucifera</i> (Fabricius, 1798)	ZSI/SRC C-180	Mw143522
211	<i>Charybdis natator</i> (Herbst, 1794)	ZSI/SRC C-168	Mw144286
212	<i>Macrobrachium kempfi</i> (Tiwari, 1949)	Mt484331	FBRC_ZSI_DNA750_INV _2512
213	<i>Macrobrachium kistnense</i> (Tiwari, 1952)	Mt484333	FBRC_ZSI_DNA753_INV _2515
214	<i>Macrobrachium</i> sp.	MT757432 Mw000752	FBRC_ZSI_DNA749_UN _9685 FBRC_ZSI_DNA791_UN9 495
215	<i>Macrobrachium unikarnatacae</i> Jaliha, Shenoy & Sankolli, 1988	MT484332 Mw000751	FBRC_ZSI_DNA751_INV _2514 FBRC_ZSI_DNA790_INV 2618
216	<i>Oziotelphusa bouvieri</i> (Rathbun, 1904)	Mt484330	FBRC_ZSI_DNA558_INV _2481
217	<i>Oziotelphusa wagrakarowensis</i> (Rathbun, 1904)	Mw506950	FBRC_ZSI_DNA892_INV 2787
218	<i>Portunus pelagicus</i> (Linnaeus, 1758)	ZSI/SRC C-164 ZSI/SRC C-165	Mw143515- Mw143516
219	<i>Portunus reticulatus</i> (Herbst, 1799)	ZSI/SRC C-173 ZSI/SRC C-174 ZSI/SRC C-177	Mw143519- Mw143521
MOLLUSCA			
220	<i>Melanochlamys</i> sp.	M12611	Mw838968
CHORDATA: AMPHIBIA			

S.No.	Species	Process ID	IDNCBI/BOLD
221	<i>Amolops</i> sp.	Collaborative studies ZSI/APRC	Mw794278 MW794279 MW794280 MW794281 Mw794282
222	<i>Duttaphrynus scaber</i> (Schneider, 1799)	ZSI/WRC/A/2172	MW052562.1
223	<i>Fejervarya kalinga</i> (Raj, Dinesh, Das, Dutta, Kar & Mohapatra, 2018)	ZSI/WRC/V/A/2267 ZSI/WRC/V/A/2267	MN967170.1 MN967171.1
224	<i>Megophrys periosa</i> Mahony, Kamei, Teeling, and Biju, 2018	NERC_1526 NERC_1527	MT355837 Mt355838
225	<i>Minervarya agricola</i> (Jerdon, 1853)	ZSI/WRC/V/A/2043	MK713347.1
226	<i>Minervarya syhadrensis</i> (Annandale, 1919)	ZSI/WRC/V/A/2044 ZSI/WRC/V/A/2209	MK713343.1 MK713344.1 MK713345.1 MK713346.1 MN784504.1
227	<i>Nanorana</i> sp.	Collaborative studies ZSI/APRC	MW794276 Mw794277
228	<i>Sphaerotheca bengaluru</i> Deepak, Dinesh, Ohler, Shanker, Channakeshavamurthy & Ashadevi, 2020	ZSI/WRS/A/2284 ZSI/WRS/A/2285 ZSI/WRS/A/2286	MW077538.1 MW077539.1 MW077540.1
229	<i>Sphaerotheca pashchima</i> Padhye, Dahanukar, Sulakhe, Dandekar, Limaye, and Jamdade, 2017	ZSI/WRS/A/2237A ZSI/WRS/A/2237B ZSI/WRS/A/2257 Collaborative studies ZSI/WRS/A/2286	MT791924.1 MT791925.1 MT795793.1 MT795794.1 MW077540.1
230	<i>Xanthophryne</i> sp CHORDATA: PISCES	ZSI/WRS/A/2049	Mw433722
231	<i>Acanthocobitis botia</i> (Hamilton, 1822)	Mw002467	FBRC_ZSI_DNA762_F34 48
232	<i>Amblyceps apangi</i> Nath & S. C. Dey, 1989	Mt821301	FBRC_ZSI_DNA342
233	<i>Amblypharyngodon mola</i> (Hamilton, 1822)	MW002471 Mw485069	FBRC_ZSI_DNA769_F33 90 FBRC_ZSI_DNA812_F37 96
234	<i>Anabas testudineus</i> (Bloch, 1792)	Mw506820	FBRC_ZSI_DNA904_F38 78
235	<i>Ariosoma meeki</i> (Jordan & Snyder, 1900)	ZSI/SRC E-27 ZSI/SRC E-28	MW311323- Mw311324
236	<i>Ariosoma shiroanago</i> (Asano 1958)	ZSI/SRC E-25	Mw311321
237	<i>Ariosoma</i>	ZSI/SRC E-22 ZSI/SRC E-23 ZSI/SRC E-24	MW311318- Mw311320 MW311322

S.No.	Species	Process ID	IDNCBI/BOLD
		ZSI/SRC E-26	MW311325-
		ZSI/SRC E-98	MW311327
		ZSI/SRC E-99	MT656563-
		ZSI/SRC E-100	Mt656565
		ZSI/SRC EEF-1	
		ZSI/SRC EEF-2	
		ZSI/SRC EEF-3	
238	<i>Badis badis</i> (F. Hamilton, 1822)	Mw485082	FBRC_ZSI_DNA870_F38 09
239	<i>Bagarius bagarius</i> (Hamilton, 1822)	LKS-39	AAE2095
240	<i>Bangana ariza</i> (F. Hamilton, 1807)	Mw485073	FBRC_ZSI_DNA838_F38 00
241	<i>Caridina gracilipes</i> De Man, 1892	Mt757433	FBRC_ZSI_DNA755_INV _1979
242	<i>Channa gachua</i> (F. Hamilton, 1822)	LKS-31	ACH0185
		MW002473	FBRC_ZSI_DNA771_F34
		MW002474	50
		MW002475	FBRC_ZSI_DNA772_F34
		Mw002494	50
			FBRC_ZSI_DNA773_F34
			50
			FBRC_ZSI_DNA866_F36
			28
243	<i>Channa harcourtbutleri</i> (Annandale, 1918)	MW002468	FBRC_ZSI_DNA763_F33
		MW002470	93
		Mw002479	FBRC_ZSI_DNA766_F36
			30
			FBRC_ZSI_DNA808_F36
			15
244	<i>Channa kelaartii</i> (Günther, 1861)	MT720842	FBRC_ZSI_DNA785_F31
		MT720843	24
		MT720844	FBRC_ZSI_DNA786_F31
		MT720845	24
		MT720846	FBRC_ZSI_DNA787_F31
		Mt720847	24
			FBRC_ZSI_DNA802_F31
			24
			FBRC_ZSI_DNA803_F31
			24
			FBRC_ZSI_DNA804_F31
			24
245	<i>Channa pomanensis</i> Gurumayum & Tamang, 2016	Mw485084	FBRC_ZSI_DNA884
246	<i>Channa punctata</i> (Bloch, 1793)	MT654658	FBRC_ZSI_DNA622_F34

S.No.	Species	Process ID	IDNCBI/BOLD
		Mw002493	21 FBRC_ZSI_DNA865_F36 27
247	<i>Clarias gariepinus</i> Burchell, 1822	Mw506812	FBRC_ZSI_DNA894_F38 69
248	<i>Clupisoma bastari</i> Datta & Karmakar, 1980	Mt821302	FBRC_ZSI_DNA608_F34 61
249	<i>Clupisoma prateri</i> Hora, 1937	LKS-7 LKS-82	ABA9729 ABA9729
250	<i>Conger cinereus</i> Rüppell, 1830	ZSI/SRC E-2 ZSI/SRC E-3 ZSI/SRC E-36	Mw306768- Mw306770
251	<i>Crossorhombus azureus</i> (Alcock, 1889)	ZSI/SRC F-370 ZSI/SRC F-372	Mw649903- Mw649904
252	<i>Danio rerio</i> (Hamilton, 1822)	Mw160181	FBRC_ZSI_DNA801_F37 41
253	<i>Devario aequipinnatus</i> (McClelland, 1839)	Mw506818	FBRC_ZSI_DNA902_F38 76
254	<i>Devario devario</i> (F. Hamilton, 1822)	Mw002478	FBRC_ZSI_DNA777_F36 32
255	<i>Deveximentum insidiator</i> (Bloch, 1787)	ZSI/SRC F-379	Mw649907
256	<i>Epinephelus erythrurus</i> (Valenciennes, 1828)	F12410	Mw810350
257	<i>Erebia meolans</i> (Prunner, 1798)	ZSI/SRC GF-20	Mt656562
258	<i>Etroplus maculatus</i> (Bloch, 1795)	Mw485078	FBRC_ZSI_DNA849_F38 06
259	<i>Etroplus suratensis</i> (Bloch, 1790)	Mw506821	FBRC_ZSI_DNA905_F38 79
260	<i>Eutropiichthys salweenensis</i> Ferraris & Vari, 2007	LKS-75	ABX1828
261	<i>Facciolella oxyrhyncha</i> Bellotti, 1883	ZSI/SRC E-37	Mw306758
262	<i>Facciolella</i> sp.	ZSI/SRC E-8 ZSI/SRC E-32	Mw306756- Mw306757
263	<i>Garra bicornuta</i> Narayan, Rao 1920	Mw002484	FBRC_ZSI_DNA815_F361 9
264	<i>Garra mullya</i> (Sykes, 1839)	MT654659 MT821295 Mw002464	FBRC_ZSI_DNA623_F34 22 FBRC_ZSI_DNA162_F27 45 FBRC_ZSI_DNA758_F34 44
265	<i>Gavialiceps taiwanensis</i> (Chen & Weng, 1967)	ZSI/SRC E-9 ZSI/SRC E-18 ZSI/SRC E-30	MW351778- Mw351780

S.No.	Species	Process ID	IDNCBI/BOLD
266	<i>Glossogobius giurus</i> (Hamilton, 1822)	Mw002472	FBRC_ZSI_DNA770_F33 91
267	<i>Gnathophis musteliceps</i> (Alcock, 1894)	ZSI/SRC E-10 ZSI/SRC E-29	Mw306762- Mw306763
268	<i>Gnathophis</i> sp.	ZSI/SRC E-28 ZSI/SRC E-34	Mw306760- Mw306761
269	<i>Gymnothorax punctatus</i> Bioch & J. G. Schneider, 1801	ZSI/SRC E-324	Mw306754
270	<i>Gymnothorax reticularis</i> Bloch, 1795	ZSI/SRC E-15 ZSI/SRC E-16 ZSI/SRC E-326	MW306750- MW306751 Mw306753
271	<i>Gymnothorax</i> sp.	ZSI/SRC E-322	Mw306752
272	<i>Gymnothorax undulatus</i> (Lacépède 1803)	ZSI/SRC E-325	Mw306755
273	<i>Haludaria fasciata</i> (Jerdon, 1849)	Mw160178	FBRC_ZSI_DNA598_325 2
274	<i>Halichoeres zeylonicus</i> (Bennett, 1833)	ZSI/SRC F-471	Mw649922
275	<i>Heteropneustes fossilis</i> (Bloch, 1794)	Mw002491	FBRC_ZSI_DNA840_F36 25
276	<i>Hypselobarbus jerdoni</i> (Day, 1870)	Mw506813	FBRC_ZSI_DNA895_F38 70
277	<i>Hypselobarbus kolus</i> (Sykes, 1839)	Mt654647	FBRC_ZSI_DNA610_F34 11
278	<i>Indoreonectes evezardi</i> (F. Day, 1872)	Mw002462 Mw002463	FBRC_ZSI_DNA737_F34 43 FBRC_ZSI_DNA738_F34 43
279	<i>Labeo bata</i> Hamilton, 1822	LKS-59 MT654652 MW002480 MW002490 Mw506816	ADR7445 FBRC_ZSI_DNA615_F341 5 FBRC_ZSI_DNA809_F36 16 FBRC_ZSI_DNA837_F36 24 FBRC_ZSI_DNA898_F38 73
280	<i>Labeo boggut</i> (Sykes, 1839)	LKS-34 LKS-35 Mw002466	AA23554 FBRC_ZSI_DNA761_F34 47
281	<i>Labeo calbasu</i> (Hamilton, 1822)	Mw002481	FBRC_ZSI_DNA810_F361
282	<i>Labeo fisheri</i> Jordan & Starks, 1917	MW485070 Mw485074	7 FBRC_ZSI_DNA817_F37 97FBRC_ZSI_DNA839_F 3801
283	<i>Lagocephalus guentheri</i> Miranda Ribeiro,	ZSI/SRC F-380	Mw64998

S.No.	Species	Process ID	IDNCBI/BOLD
	1915		
284	<i>Leiognathus ruconius</i> (Hamilton, 1922)	ZSI/SRC F-377	Mw649906
285	<i>Lepidocephalichthys guntea</i> (Hamilton, 1822)	MT654660 Mt821297	FBRC_ZSI_DNA624_F34 23 FBRC_ZSI_DNA246_F27 06
286	<i>Lutjanus Lutjanus</i> (Bloch, 1790)	ZSI/SRC F-472	Mw649923
287	<i>Mastacembelus armatus</i> (Lacepede, 1800)	Mt654656	FBRC_ZSI_DN619_F3419
288	<i>Macrogathus pancalus</i> Hamilton, 1822	Mw506824	FBRC_ZSI_DNA909_F38 82
289	<i>Minous monodactylus</i> (Bloch & Schneider, 1801)	ZSI/SRC F-475	Mw649924
290	<i>Mulloidichthys vanicolensis</i> (Valenciennes, 1831)	ZSI/SRC GF-1 ZSI/SRC GF-4 ZSI/SRC GF-15	Mt656542- Mt656544
291	<i>Muraenesox bagio</i> (Hamilton, 1822)	ZSI/SRC E-19	Mw306767
292	<i>Muraenesox cinereus</i> (Forsskal, 1775)	ZSI/SRC EL-13 ZSI/SRC E-35 ZSI/SRC E-17	MW306764- Mw306766
293	<i>Mystus bleekeri</i> (Day, 1877)	MW160177 Mw485075	FBRC_ZSI_DNA566_F3 740 FBRC_ZSI_DNA843_F38 02
294	<i>Mystus cavasius</i> (Hamilton, 1822)	MT654646 MT654657 Mw485072	FBRC_ZSI_DNA609_F34 10 FBRC_ZSI_DNA620_F34 20 FBRC_ZSI_DNA824_F37 99
295	<i>Mystus vittatus</i> (Bloch, 1794)	LKS-30 MW485071 Mw485076	AAX3611 FBRC_ZSI_DNA818_F37 98 FBRC_ZSI_DNA844_F38 03
296	<i>Nemipterus peronii</i> (Valenciennes, 1830)	ZSI/SRC F-494	Mw649927
297	<i>otopterus synurus</i> (Bloch & Schneider, 1801)	Mw506814	FBRC_ZSI_DNA896_F38 71
298	<i>Ompok bimaculatus</i> (Bloch, 1794)	MT654650 Mt654651	FBRC_ZSI_DNA613A_F3 414 FBRC_ZSI_DNA613_F341 4
299	<i>Ophichthus sp.</i>	ZSI/SRC EL-11	Mw366902
]300	a. <i>Osteobrama chandrai</i> sp. nov.	Mt896380	FBRC_ZSI_DNA861_F35

S.No.	Species	Process ID	IDNCBI/BOLD
	holotype		50
301	b. <i>Osteobrama chandrai</i> sp. nov.	Mt896381	FBRC_ZSI_DNA814_F35
	paratype	MT896382	51
		Mt896383	FBRC_ZSI_DNA862_F35
		MT896384	52
		Mw506815	FBRC_ZSI_DNA863_F35
			52
			FBRC_ZSI_DNA836_F35
			52
			FBRC_ZSI_DNA897_F38
			72
302	<i>Osteobrama cotio</i> (Hamilton, 1822)	LKS-53	AAX2623
		Mw506822	FBRC_ZSI_DNA907_F38
			80
303	<i>Osteobrama neilli</i> (Day, 1873)	Mt896378	FBRC_ZSI_DNA833_F35
			48
304	<i>Osteobrama peninsularis</i> Silas, 1952	Mt896379	FBRC_ZSI_DNA864_F35
			49
305	<i>Osteobrama vigorsii</i> (Sykes, 1839)	Mt654653	FBRC_ZSI_DNA616_
			F3416
306	<i>Pachypterus khavalchor</i> (Kulkarni, 1952)	MW002482	FBRC_ZSI_DNA811_F361
		MW002483	8
		Mw002487	FBRC_ZSI_DNA813_F361
		Mw002488	8
			FBRC_ZSI_DNA825_F36
			22
			FBRC_ZSI_DNA829_F36
			22
307	<i>Parambassis lala</i> (F. Hamilton, 1822)	MT821298	FBRC_ZSI_DNA262_F26
		Mw485079	64
			FBRC_ZSI_DNA850_F38
			07
308	<i>Parapsilorhynchus alluriensis</i> Jadhav et. al, 2020)	Mt821300	FBRC_ZSI_DNA327_F34
			65
309	<i>Parupeneus indicus</i> (Shaw, 1803)	ZSI/SRC GF-2	MT656561
310	<i>Pelates quadrilineatus</i> (Bloch, 1790)	ZSI/SRC F-365	Mw649898-
		ZSI/SRC F-366	Mw649902
		ZSI/SRC F-367	
		ZSI/SRC F-368	
		ZSI/SRC F-369	
311	<i>Pethia conchoni</i> (F. Hamilton, 1822)	MW002476	FBRC_ZSI_DNA774_F36
		MW002477	31
		MW160179	FBRC_ZSI_DNA775_F36
		Mw160180	31

S.No.	Species	Process ID	IDNCBI/BOLD
			FBRC_ZSI_DNA643_F37 39
			FBRC_ZSI_DNA647_F37 36
312	<i>Puntius bimaculatus</i> Bleeker (1844)	Mw160176	FBRC_ZSI_DNA565_F32 49
313	<i>Puntius cauveriensis</i> (Hora, 1937)	MT654661 Mt720848	FBRC_ZSI_DNA506_F34 40
			FBRC_ZSI_DNA546_F34 41
314	<i>Puntius chola</i> (Hamilton, 1822)	Mw002492	FBRC_ZSI_DNA845_F36 26
315	<i>Puntius sophore</i> (Hamilton, 1822)	Mw485077	FBRC_ZSI_DNA848_F38 05
316	<i>Pisodonophis cancrivorus</i> (Richardson, 1848)	ZSI/SRC E-14	Mw306759
317	<i>Plotosus lineatus</i> (Thunberg, 1787)	ZSI/SRC F-385 ZSI/SRC F-387	Mw649911- Mw649912
318	<i>Proeutropiichthys taakree</i> (Sykes, 1839)	MW002495 MW002496 Mw002497	FBRC_ZSI_DNA873_F36 29 FBRC_ZSI_DNA874_F36 29 FBRC_ZSI_DNA875_F36 29
319	<i>Rasbora daniconius</i> (Hamilton, 1822)	Mw002469	FBRC_ZSI_DNA765_F33 92
320	<i>Rhinomugil corsula</i> (Hamilton 1822)	MT654649 Mw506823	FBRC_ZSI_DNA612_F341 3 FBRC_ZSI_DNA908_F38 81
321	<i>Rita kuturnee</i> (Sykes, 1839)	MT654655 Mw002489	FBRC_ZSI_DNA618_F341 8 FBRC_ZSI_DNA832_F36 23
322	<i>Salmostoma bacaila</i> (Hamilton, 1822)	Mt821296	FBRC_ZSI_DNA231_F25 81
323	<i>Salmostoma phulo</i> (Hamilton 1822)	Mw506819	FBRC_ZSI_DNA903_F38 77
324	<i>Schistura savona</i> (Hamilton, 1822)	Mw002465	FBRC_ZSI_DNA760_F34 46
325	<i>Securicula gora</i> (Hamilton, 1822)	LKS-5 LKS-6	ACX7514
326	<i>Sfelaroides leptolepis</i> (G. Cuvier, 1833)	ZSI/SRC F-465 ZSI/SRC F-466	Mw649917- Mw649920

S.No.	Species	Process ID	IDNCBI/BOLD
		ZSI/SRC F-467	
		ZSI/SRC F-468	
327	<i>Silonia children</i> (Sykes, 1839)	Mt654654	FBRC_ZSI_DNA617_F341 7
328	<i>Sorsogona tuberculata</i> (G. Cuvier, 1829)	ZSI/SRC F-375	MW649905
		ZSI/SRC F-381	Mw649909-
		ZSI/SRC F-382	Mw649910
329	<i>Sperata seenghala</i> (Sykes, 1839)	Mw506817	FBRC_ZSI_DNA899_F38 74
330	<i>Systomus sarana</i> (Hamilton, 1822)	MT654648	FBRC_ZSI_DNA611_F341
		Mt821299	2
			FBRC_ZSI_DNA306_F27 23
331	<i>Synaptura albomaculata</i> (Hamilton, 1822)	ZSI/SRC F-482	Mw649925
332	<i>Trachinocephalus myops</i> (Forster, 1801)	ZSI/SRC F-469	MW649921
		ZSI/SRC F-488	Mw649926
333	<i>Trichogaster lalius</i> (F. Hamilton, 1822)	MW485080	FBRC_ZSI_DNA868_F38
		Mw485081	08
			FBRC_ZSI_DNA869_F38 08A
334	<i>Trypauchen vagina</i> (Bloch & Schneider, 1801)	ZSI/SRC EEF-4	Mt656566-
		ZSI/SRC EEF-5	Mt656569
		ZSI/SRC EEF-6	
		ZSI/SRC EEF-10	
335	<i>Tor tor</i> (Hamilton, 1822)	Mw002461	FBRC_ZSI_DNA736_F34 42
336	<i>Upeneus margarethae</i> Uiblein & Heemstra, 2010	ZSI/SRC F-461	Mw649913-
		ZSI/SRC F-462	MW649916,
		ZSI/SRC F-463	Mt656545-
		ZSI/SRC F-464	Mt656553
		ZSI/SRC GF-5	
		ZSI/SRC GF-6	
		ZSI/SRC GF-7	
		ZSI/SRC GF-8	
		ZSI/SRC GF-12	
		ZSI/SRC GF-17	
		ZSI/SRC GF-18	
		ZSI/SRC GF-21	
		ZSI/SRC GF-22	
337	<i>Upeneus pori</i> Ben-Tuvia & Golani, 1989.	ZSI/SRC GF-11	Mt656560
338	<i>Upeneus sulphureus</i> Cuvier, 1829	ZSI/SRC GF-9	Mt656558-
		ZSI/SRC GF-23	MT656559
339	<i>Upeneus tragula</i> Richardson, 1846	ZSI/SRC GF-13	Mt656554-
		ZSI/SRC GF-14	Mt656556

S.No.	Species	Process ID	IDNCBI/BOLD
		ZSI/SRC GF-3	
340	<i>Upeneus vittatus</i> (Forsskål, 1775)	ZSI/SRC GF-24	Mt656557
341	<i>Uroconger lepturus</i> (Richardson, 1845)	ZSI/SRC E-278	MW387622
		ZSI/SRC E-329	Mw310970-
		ZSI/SRC E-331	MW310977
		ZSI/SRC E-333	Mw767033
		ZSI/SRC E-334	
		ZSI/SRC E-278	
		F12570	
342	Cypriniformes	LKS-50	ABV2864
		LKS-56	ACI0239
		LKS-66	AAF2047
		LKS-73	AAH9561
		LKS-9	ACX7514
CHORDATA: REPTILIA			
343	<i>Boiga</i> sp. Fitzinger, 1826	ZSITR007-21	ZSI_MZ-53
		ZSITR008-21	ZSI_MZ-54
344	<i>Bungarus</i> sp.	ZSITR034-21	ZSI_MZ-24
		ZSITR036-21	ZSI_MZ-26
		ZSITR037-21	ZSI_MZ-27
		ZSITR040-21	ZSI_MZ-30
345	<i>Calamaria</i> sp	ZSITR009-21	ZSI_MZ-55
346	<i>Dendrelaphis</i> sp.	ZSITR033-21	ZSI_MZ-23
		ZSITR043-21	ZSI_MZ-33
347	<i>Eryx johnii</i> (Russell, 1801)	ZSI/SRC RSB5	MW496346
348	<i>Herpetoreas</i> sp.	ZSITR031-21	ZSI_MZ-21
		ZSITR056-21	ZSI_MZ-46
349	<i>Hoplobatrachus</i> sp.	ZSITR015-21	ZSI_MZ-5
350	<i>Hylarana</i> sp.	ZSITR018-21	ZSI_MZ-8
351	<i>Malayopython reticulatus</i> (Schneider, 1801)	ZSI/SRC R-2	Mw144275
352	<i>Microhyla</i> sp.	ZSITR013-21	ZSI_MZ-3
353	<i>Naja</i> sp.	ZSITR004-21	ZSI_MZ-50
		ZSITR005-21	ZSI_MZ-51
		ZSITR047-21	ZSI_MZ-37
354	<i>Pareas</i> sp.	ZSITR032-21	ZSI_MZ-22
355	<i>Python</i> sp.	ZSITR001-21	ZSI_MZ-47
356	<i>Ptyas mucosa</i> (Linnaeus, 1758)	ZSI/SRC R-1	Mw144274
357	<i>Sibynophis</i> sp.	ZSITR017-21	ZSI_MZ-7
358	<i>Sinomicrurus</i> sp.	ZSITR002-21	ZSI_MZ-48
		ZSITR038-21	ZSI_MZ-28
		ZSITR045-21	ZSI_MZ-35
359	<i>Takydromus</i> sp.	ZSITR016-21	ZSI_MZ-6
360	<i>Xenochrophis</i> sp.	ZSITR041-21	ZSI_MZ-31

S.No.	Species	Process ID	IDNCBI/BOLD
361	<i>Pangshura</i> sp.	LKS-45	AAX2622
	AVES		
362	Brown-headed Gull <i>Chroicocephalus brunnicephalus</i> (Jerdon, 1840)	43001	NC_018548/ Jx155863)
	CHORDATA: MAMMALIA		
363	<i>Bubalus bubalis</i> Linnaeus, 1758	MT-3701	ZSIWF057-21
364	<i>Capricornis sumatraensis</i> (Bechstein, 1799)	MT-2660	ZSILG216-21
365	<i>Elephas maximus</i> Linnaeus, 1758	MT-3703	ZSIWF058-21
366	<i>Hemitragus jemlahicus</i> (Smith, 1826)	MT-2994	ZSILG125-21
		MT-3066	BankIt2413977
		MT-3275	
		MT-3073	
		MT-3080	
367	<i>Lepus</i> sp. Linnaeus, 1758	MT-2500	ZSIVP211-21
368	<i>Macaca leucogenys</i> Li, Zhao, Fan (2015)	MT2380	MT755630
		Mt2276	Mt949692
369	<i>Macaca munzala</i> Sinha et al., 2005	MM-5	ZSIV044-18/MW650968
		MM-4	ZSIV043-18/MW650967
		MM-3	ZSIV042-18/MW650966
		MM-2	ZSIV041-18/MW650965
		MM-1	ZSIV040-18/MW650964
		MM-16	ZSIV050-18/MW650974
		MM-14	ZSIV049-18/MW650973
		MM-9	ZSIV048-18/MW650972
		MM-8	ZSIV047-18/MW650971
		MM-7	ZSIV046-18/MW650970
		MM-6	ZSIV045-18/MW650969
		MT-2178	ZSIV079-20/MW650998
		MT-2181	ZSIV080-20/MW651000
		MT-2180	ZSIV081-20/MW650999
		MT-2171	ZSIV082-20/MW650991
		MT-2177	ZSIV083-20/MW650997
		MT-1073	ZSIV084-20/MW650986
		MT-1080	ZSIV085-20; ZSIV086-
		MT-2173	20/ZSIV087-
		MT-1065	20/MW650982
370	<i>Macaca mullata</i> (Zimmermann, 1780)	ZSI/SRC Rh-1	Mw392296-
		ZSI/SRC Rh-4	Mw392300
		ZSI/SRC Rh-5	
		ZSI/SRC Rh-6	
		ZSI/SRC Rh-7	
371	<i>Martes flavigula</i> (Boddaert, 1785)	UKB-1	ZSIVP104-19
		UKB-2	ZSIVP105-19

S.No.	Species	Process ID	IDNCBI/BOLD
372	<i>Manis pentadactyla</i> Linnaeus, 1758	MT_710	MK962242
		MT_702	MK962243
		MT_698	Mk962244
373	<i>Muntiacus muntjac</i> (Zimmermann, 1780)	MT-2831	BankIt2414008
		MT-2822	
		MT_2774	
		MT_2834	
		MT_2923	
		MT_2922	
		MT_2864	
		MT_2837	
		MT_2819	
		MT_3204	
		MT_3198	
		MT_2783	
		MT_2782	
		2816	
		3400	
		2867	
374	<i>Oryctolagus cuniculus</i> (Linnaeus, 1758)	Mw485083	FBRC_ZSI_DNA876
375	<i>Paguma larvata</i> (Smith, 1827)	FI-21	ZSIWF021-18
376	<i>Panthera pardus</i> (Linnaeus, 1758)	MT_1874	BankIt2413994
		MT_3197	
377	<i>Pseudois nayaur</i> (Hodgson, 1833)	ZS-171	BankIt2413466
		MT-2412	
378	<i>Panthera uncia</i> (Schreber, 1775)	MT-2040	BankIt2413933
379	<i>Rhinoceros unicornis</i> (Linnaeus, 1758)	FI-28	ZSIWF034-19
380	<i>Rusa unicolor</i> (Kerr, 1792)	MT-2760	BankIt2413965
		MT-2814	
		MT-2744	
381	<i>Semnopithecus entellus</i> Dufresne, 1797	MT-860	ZSIV155-21
	<i>Ursus thibetanus</i> (G. Cuvier, 1823)	ABB12	BankIt2413969
		ABB13	
		ABB14	
382	<i>Ursus arctos</i> (Linnaeus, 1758)	MT2125	BankIt2413972
		Mt1139	
383	Sciuridae	ZS-545	ZSILG214-21
384	Leporidae	HARE-1	ZSIVP212-21

11

CAPACITY BUILDING

ZSI is regularly organising Training programmes, Symposia, Seminars etc. on different topics for researchers, students, forest personnels, and faculties of in-house as well as other Institutes.

Under the capacity building programme, ZSI is organizing a series of training programmes, workshops, symposia, seminars etc. on different thematic areas for the benefit of students, researchers, academicians, policy makers etc. However, this year due to Covid-19 pandemic all the programmes were converted to webinars.

This year 56 webinars and short term trainings were organized for capacity building and outreach activities by ZSI Hq and all its 16 Regional Centres. More than 11,000 participants were benefited by these outreach activities.

Webinars and Trainings organized during the year

Sl. No.	Title	Date	Organized by	Number of Participant
1.	National Webinar on Beetle (Insecta: Coleoptera) Diversity of India	1 st October, 2020	HQ, Kolkata	200
2.	Soil Fauna of India - Exploring the Unexplored	11 th November, 2020	HQ, Kolkata	100
3.	National Webinar on Ornamental Fishes of India Diversity & Prospects	1 st December, 2020	HQ, Kolkata	100
4.	National Webinar on Herpetology	20 th January, 2021	HQ, Kolkata	100
5.	National Conference on Deep Sea Bio-resources in Indian Ocean	25 th February 2021 26 th February, 2021	HQ, Kolkata	100
6.	National Webinar on World Sparrow Day	20 th March, 2021	HQ, Kolkata	100
7.	Bats: Biases, Prejudices and Conservation Research	25 th August, 2020	NERC, Shillong	93
8.	In perpetual Darkness: The Amazing World of cave Animals	23 rd September, 2020	NERC, Shillong	91
9.	Island Biodiversity, Conservation and Management	18 th August 2020 21 st August 2020 25 th August 2020	ANRC, Port Blair	90
10.	On the occasion of World Ozone Day	16 th September, 2020	ANRC, Port Blair	125
11.	Biodiversity of Andaman & Nicobar Islands	5 th October, 2020	ANRC, Port Blair	60
12.	Online workshop on Coastal and Marine Biodiversity of Island ecosystem	7 th January, 2021 8 th January, 2021	ANRC, Port Blair	70
13.	Faunal Diversity of India	19 th August, 2020	WRC, Pune	538
14.	Taxonomy and its Applications: Learn from the Experts	9 th September, 2020	WRC, Pune	604
15.	A National Webinar on Role of women scientists in combating COVID-19	8 th March, 2021	WRC, Pune	30
16.	Faunal Diversity of Higher vertebrates of Arunachal Pradesh	17 th September, 2020	APRC, Itanagar	129
17.	Aquatic Faunal Diversity of Arunachal Pradesh-An wobbly appraisal	20 th August, 2020	APRC, Itanagar	142
18.	Faunal Diversity of Central India	27 th August, 2020	CZRC, Jabalpur	163
19.	A virtual study tour and lecture series was organized for the students and faculty members of SCS College, Puri	18 th December, 2020	CZRC, Jabalpur	117

Sl. No.	Title	Date	Organized by	Number of Participant
	and other three Government colleges of Odisha (Sailabala Women's College, Rajdhani College and KKS College).			
20.	Webinar Series on 'Taxonomy and Biodiversity': Principles and practices of animal taxonomy: Classical & Molecular approach	24 th August, 2020	WGRC, Kozhikode	102
21.	Webinar Series on 'Taxonomy and Biodiversity': Fauna of Western Ghats: Spiders & Vespids wasps	24 th September, 2020	WGRC, Kozhikode	108
22.	Faunal Resources of the Great Indian Desert	6 th August, 2020	DRC, Jodhpur	73
23.	Grassland Ecosystem of Arid Zone of India - A Faunal Diversity Perspective	18 th September, 2020	DRC, Jodhpur	112
24.	Freshwater Fish Diversity in India	13 th August, 2020	FBRC, Hyderabad	1250
25.	Aquatic Entomofaunal Diversity in India	3 rd September, 2020	FBRC, Hyderabad	1475
26.	Unique Marine Fauna webinar series No.1: Renaissance of Mother Earth	4 th June 2020	MARC, Digha	130
27.	Unique Marine Fauna webinar series No.2: The Mysteries of the Living Fossil- Horseshoe Crab	20 th June, 2020	MARC, Digha	166
28.	Unique Marine Fauna webinar series No.3: The Wonders of the Toothless Sea Giants-Baleen whales	24 th July, 2020	MARC, Digha	1500
29.	Unique Marine Fauna webinar series No.4: Marine Ornamental Aquaculture: Measure towards Conservation of Biodiversity	24 th August, 2020	MARC, Digha	100
30.	Unique Marine Fauna Webinar Series No. 05: Underwater Treasures - The Corals	24 th September, 2020	MARC, Digha	210
31.	Unique Marine Fauna Webinar Series No. 05: The mistaken Mermaid of the Sea-Dugong the Sea cow	15 th October, 2020	MARC, Digha	270
32.	COVID-19 and its link with Environment and its Biodiversity	28 th July, 2020	HARC, Solan	100

Sl. No.	Title	Date	Organized by	Number of Participant
33.	Impact of Climate Change on Pollinators of High Altitudes of North-West Himalaya	16 th September, 2020	HARC, Solan	350
34.	Meet The Expert Series: Let Us Discuss Biodiversity: Fauna Of India: An Overview	21 st July, 2020	EBRC, Goplapur-on-sea	100
35.	Meet The Expert Series: Let Us Discuss Biodiversity: Marine Faunal Diversity Of India	31 st July, 2020	EBRC, Goplapur-on-sea	100
36.	Meet The Expert Series: Let Us Discuss Biodiversity: Conservation Of Coastal, Marine And Wetland Birds Of India	7 th August, 2020	EBRC, Goplapur-on-sea	100
37.	Meet The Expert Series: Let Us Discuss Biodiversity: Aquatic Insect Diversity of India	10 th August, 2020	EBRC, Goplapur-on-sea	100
38.	Meet The Expert Series: Let Us Discuss Biodiversity: Understanding Insect Diversity: Praying Mantids	18 th August, 2020	EBRC, Goplapur-on-sea	100
39.	Meet The Expert Series: Let Us Discuss Biodiversity: Using GIS and Remote Sensing in Faunal Studies	27 th August, 2020	EBRC, Goplapur-on-sea	100
40.	Meet The Expert Series: Let Us Discuss Biodiversity: Amazing World of Coastal Marine Fishes: Diversity and Distribution in India	4 th September, 2020	EBRC, Goplapur-on-sea	100
41.	Meet The Expert Series: Let Us Discuss Biodiversity: Mammalian Diversity & their Conservation in India	11 th September, 2020	EBRC, Goplapur-on-sea	100
42.	Meet The Expert Series: Let Us Discuss Biodiversity: Parasitic Hymenoptera of India- An Overview	18 th September, 2020	EBRC, Goplapur-on-sea	100
43.	Meet The Expert Series: Let Us Discuss Biodiversity: A Journey to the top of the Globe: Arctic Fauna	25 th September, 2020	EBRC, Goplapur-on-sea	100
44.	Meet The Expert Series: Let Us Discuss Biodiversity: Scorpions: the Incredible Arachnids	1 st October, 2020	EBRC, Goplapur-on-sea	100

Sl. No.	Title	Date	Organized by	Number of Participant
45.	Meet The Expert Series: Let Us Discuss Biodiversity: Wildlife Conservation: Contributions from Odisha to National Projects	9 th October, 2020	EBRC, Goplapur-on-sea	100
46.	Meet The Expert Series: Let Us Discuss Biodiversity: Taxidermy as a science towards preservation of our Animal Wealth	16 th October, 2020	EBRC, Goplapur-on-sea	100
47.	Identification of marine ornamental fishes	14 th October, 2020	EBRC, Gopalpur-on-sea	100
48.	Training workshop on Population Estimation of Olive Ridley Turtle	5 th March, 2021	EBRC, Gopalpur-on-sea	50
49.	Different Dimensions of House Sparrow Conservation	19 th July, 2020	GPRC, Patna	100
50.	Conservation of Cetacean Fauna in India	26 th August, 2020	GPRC, Patna	100
51.	Wetlands of Gangetic Plains: Status and Conservation Challenges	21 st September, 2020	GPRC, Patna	279
52.	Training program on rescue and rehabilitation of birds, reptiles and dolphin in nature	6 th March, 2021	GPRC, Patna	50
53.	Faunal Diversity of India	23 rd September, 2020	NRC, Dehradun	374
54.	Snakes and their importance	16 th July, 2020	SBRC, Canning	16
55.	Impact of Invasive Alien Species on Biodiversity Conservation	4 th November, 2020	SRC, Chennai	115
56.	Hands-on training on identification of marine fauna to the final year Postgraduate students of Queen Mary's College, New College and Ethiraj Women's College Chennai	19 th January – 28 th January, 2021 22 nd February – 12 th March, 2021 4 th March – 12 th March, 2021	MBRC, Chennai	10 12 12

12

MEMORANDUM OF UNDERSTANDINGS (MoUs) WITH INTERNATIONAL / NATIONAL BODIES

During the period, One International and three
National MoUs have been signed.

ZSI entered MOU with one International and different National bodies to enhance collaborative research for zoological studies

International

The Union Cabinet has approved a Memorandum of Understanding between ZSI and Canada's International Barcode of Life (iBOL) for strengthening of Biodiversity Digital Sequence Information as per CBD.

National

Sl. No.	Institute	Purpose	Date
1.	Vellore Institute of Technology [VIT]	Collaboration for Research, Doctoral and Post-Doctoral Programmes.	May 2020
2.	Entomology Research Institute, Loyola College, Chennai	To establish programme of exchange and collaboration in areas of interest and for the benefit of both the organizations.	Jul 2020
3.	Himachal Pradesh University, Summer Hill, Shimla	To promote academic and research co-operation between the two Institutes	Sept 2020
4.	Patna University, Patna, Bihar	Collaboration for Research, Doctoral and Post-Doctoral Programmes	December 2020
5.	Khallikote University, Odisha	To promote academic and research co-operation between the two Institutes	March 2021

13

LIBRARY & PUBLICATION DIVISION

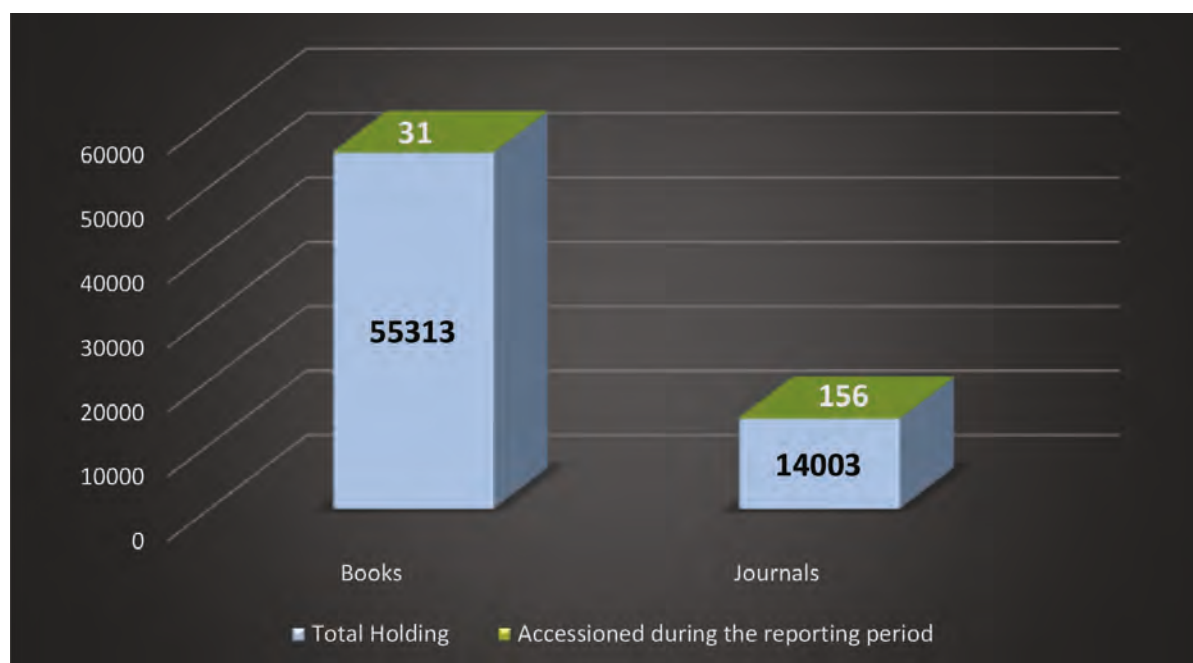
The Library of Zoological Survey of India is one of the Asia's largest library dealing books on Zoology and allied subjects.

LIBRARY DIVISION

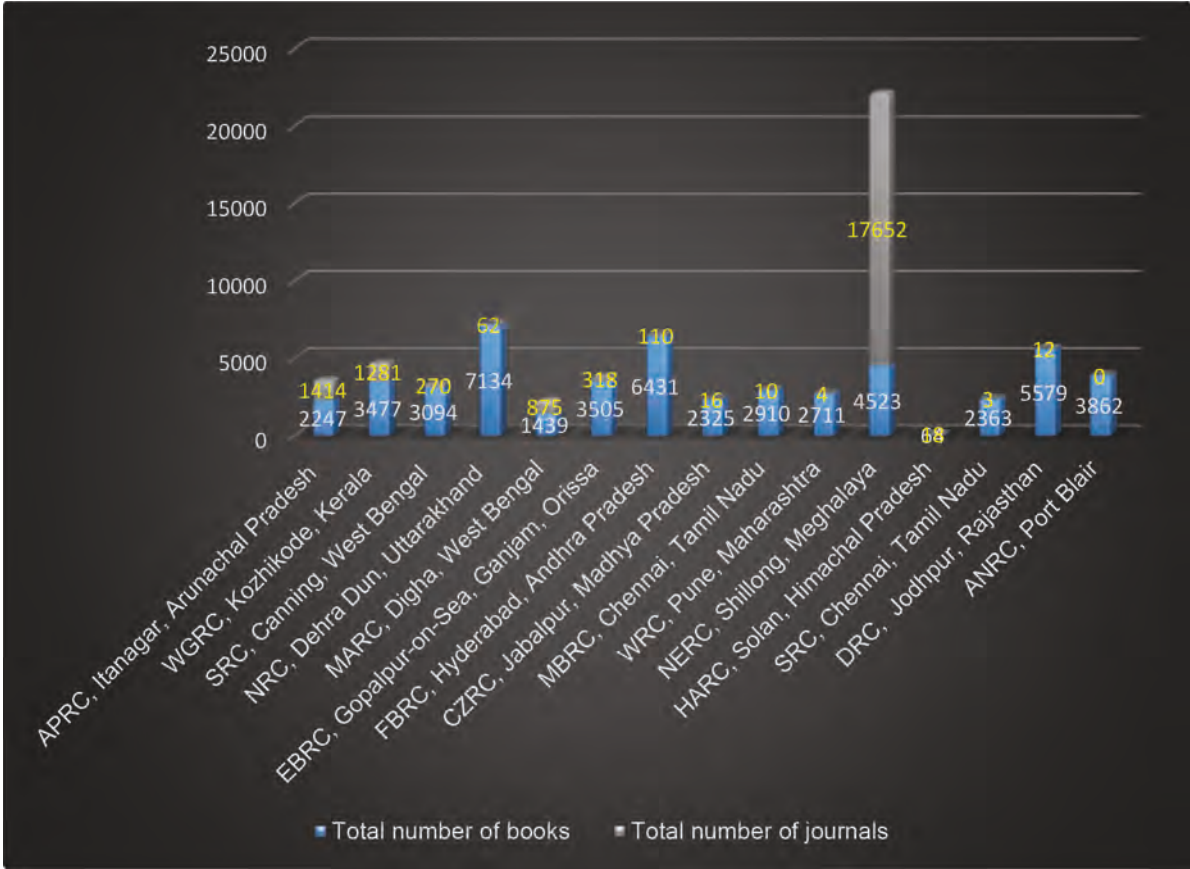
The library plays a significant role for the students, readers, research scholars and also to the scientists not only from ZSI but also from other institutions who pursue studies/research on zoology and its allied subjects. The library of Zoological Survey of India started its journey on 1st July, 1916 as an integral part of the parent organization. Though, the library started with 12000 transferred documents from the former museum of the Asiatic Society of Bengal and also Zoological section of the Indian Museum in Kolkata, now, the collection has reached to Books: 55313 and Journals: 13847 (bound vols.). The collection of the library is enriched with more than 400 rare books and journals.

As per the recommendations of task force constituted by MOEFCC, for conservation of faunal diversity of India, the work of digitization of all rare and old books and journals (beyond 60 years) phase II is in progress. The present status of the digitization carried out by M/S Informatics Publishing Limited, Bangalore-560004 is as follows:

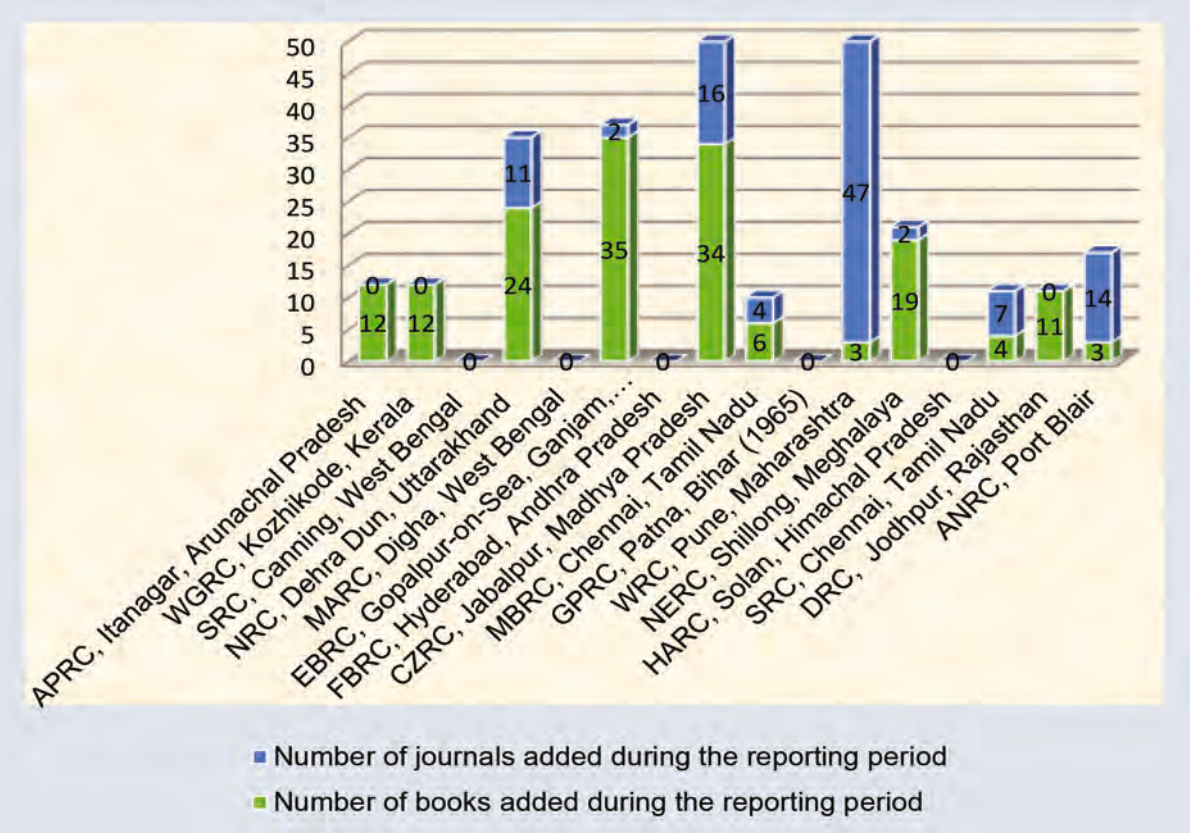
- Digitization of survey tour reports - 55000 pages (Approx.)
- Digitization of rare journals - 200000 pages (Approx.)



Total Holdings of Library of ZSI HQ, Kolkata



Total Holdings of Libraries of Regional Centres of ZSI



Books and Journals added at Regional Centre Libraries during 2019-2020

PUBLICATION DIVISION

About the Publications of ZSI

The Research contributions of scientists and researchers from ZSI and other institutes are being published regularly by the Publication Division of ZSI.

Records of the Zoological Survey of India

The *Records of the Zoological Survey of India* provides media opportunity for zoological communications dealing with taxonomy, faunistics, biology, ecology and population of any taxon, and acts as a journal of Indian Zoology. This is a quarterly publication. It was started in the year 1907 from the Zoological Section of Indian Museum as *Records of the Indian Museum* in order to publish result of faunistic surveys conducted by the scientists.

Following books were published during the 2020-21

Priced Publications

1. Catalogue of Reduviidae (Hemiptera) of India. Occ. Paper No., 401.
2. Fauna of Majuli Island, Assam, Rec. zool. Surv. India, Occasional Paper No. 402
3. True Bugs of Central India, (Chhattisgarh and Madhya Pradesh). Occ. Paper No., 403
4. Coral and Associated Fauna in Neil Island, South Andaman. Occasional Paper No. 404.
5. Corals and Associated Fauna in North Reef, Interview, Latouche, Kwangtung and Shark Islands Sanctuaries, North Andaman. Occasional Paper No. 405.
6. Taxonomy and diversity of zooplankton in Lower Arunachal Pradesh in the Eastern Himalayas of India. Occasional Paper No. 406.
7. Fauna of Kerala (Part-1) Vertebrata, State Fauna Series, 25
8. Pictorial handbook on the grunts and sweetlips (Family: Haemulidae) of India.
9. Pictorial guide to brackish water ornamental fishes of Odisha.
10. Skinks of India.
11. Birds of the Sundarban Biosphere Reserve.
12. Snakes of Central India

13. Faunal Diversity of Bhoj Wetland, Bhopal, Madhya Pradesh, India (A Ramsar Site), Wetland Ecosystem Series, 22.
14. Faunal Diversity of Biogeographic Zones: Coasts of India
15. Faunal Diversity of Agroecosystems in India
16. Faunal Diversity of Biogeographic Zones of India: Western Ghats.
17. Current status of faunal diversity in Telangana
18. Biodiversity Profile of East Kolkata Wetlands
19. *Assemblages of Lepidoptera in Indian Himalaya through Long Term Monitoring Plots*
20. Current status and distribution of Threatened Vertebrates in Indian Himalayan Region.
21. Status of Avifaunal diversity in bird sanctuaries of India.

Non-priced Publications:

22. Annual Report 2019-2020.
23. Animal Discoveries, 2019.
24. *Records of the Zoological Survey of India*, Volume 120 (Issue -1)
25. *Records of the Zoological Survey of India*, Volume 120 (Issue 2)
26. *Records of the Zoological Survey of India*, Volume 120 (Issue 3)
27. *Records of the Zoological Survey of India*, Volume 120 (Issue 4)

Book released by the dignitaries:

1. Skinks of India. Editors: Deuti K., Raha S., Bag P., Debnath S. Srikanthan A.N. and Chandra K. 2020.
2. Birds of the Sundarban Biosphere Reserve. Editors: Chandra, K. Majumder, A. & Maheswaran, G.
3. Faunal Diversity of Bhoj Wetland, Bhopal, Madhya Pradesh, India (A Ramsar Site), Editors: Jaiswal, D., Chandra, K., Kushwaha, S. and Gupta, D.
4. Faunal Diversity of Biogeographic Zones: Coasts of India. Editors: Chandra, K., Raghunathan, C. and Mondal, T.
5. Faunal Diversity of Agroecosystems in India, Editors: Chandra, K., Pathania, P.C., Rajmohana, K. and Hundal, S.S.
6. Faunal Diversity of Biogeographic Zones of India: Western Ghats. Editors: Kailash Chandra, Raghunathan, C., Sureshan, P.M., Subramanian, K.A., and Rizvi, A.N. 2020.
7. Current status of faunal diversity in Telangana: Editors: Chandra, K., Deepa, J., Raghunathan, C., Jadhav, S.S. and Karuthapandi, M.
8. Deep Sea Faunal Diversity of India
9. Biodiversity Profile of East Kolkata Wetlands, Editors: Chandra, K., Raghunathan, C. and Mao, A.A.
10. *Assemblages of Lepidoptera in Indian Himalaya through Long Term Monitoring Plots*, Editors: Chandra, K., Kumar, V., Singh, N., Raha, A. and Sanyal, A K.

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MUSEUM & TAXIDERM DIVISION

Museum and Taxidermy Division is supervising and maintaining the Insetcs, Fishes, Amphibia, Reptilia, Mammals and Ecological Gallery of Zoological Survey of India at Indian Museum.



The Division maintains the seven Zoological galleries in Indian Museum Kolkata. For creating awareness on environmental and its faunal resources, this Section participates in various Science Exhibitions and Melas with Ecological, Environmental and Conservational themes.

Sectional Holdings: 2830 Exhibits (Gallery exhibits, Reserve Collections and Loan Unit)

Gallery exhibits: 1696 (Mammal gallery: 314, Bird, Amphibia and Reptile gallery: 604, Fish gallery: 128, Ecology gallery: 153, Invertebrate: 497).

Reserve Collections: 1010 exhibits

Loan Unit: 124 exhibits

Type Specimen: One Minke Whale (*Balaenoptera acutorostrata*) complete mounted skeleton, displayed in the Mammal gallery.

Exhibits of Zoological Galleries of Indian Museum, Kolkata are:

Invertebrate Gallery: 16 showcases with 497 models/ Exhibits (Protozoa, Porifera, Cnidaria, Platyhelminthes, Nematoda, Annelida, Mollusca, Arthropoda, Echinodermata, Coral reefs, Insect invasion in Water, Interesting insects in Land, Wonders in deep hydrothermal vent, Arthropod & Minor Phyla).



Fish Gallery: 17 showcases (Elasmobranch, Hill-stream Fish, Pond Ecosystem, Marine Reefcod, Marine Ecosystem, Shark & Ray, Indo-Pacific Marine Fish, Air breathing fish, Living Fossil fish) 128 exhibits.

Amphibia and Reptiles: Six showcases [Amphibians & Reptiles, Reptiles, Marine, Reptilia (Crocodilia), Aquatic Reptiles] with 41 reptiles and 20 Amphibians.

Bird Gallery: 20 showcases [Hoatzin, Wetland, Migratory Birds, Mangrove, Scavenger Birds, Evergreen Forest, National & State Birds, Deciduous forest, Birds of China & South-east Asia, Alpine, Birds of South America, Birds of Desert (Africa), Birds of Australia & New Zealand, Island birds (Andaman & Nicobar Islands), Birds of North America, Europe & Africa, Birds of Antarctica] with 543 Birds (Indian Birds: 156 species, foreign birds: 60 species)].

Mammal Gallery: Total 314 exhibits under 143 species. Of which 63 are foreign species and 80 Indian species.



Ecosystem Gallery: 11 ecosystems (Marine, Coniferous, High Altitude, Mangrove, Scrubland, Desert, Terai Grassland, Riparian, Wetland, Deciduous and Tropical rain Forest) with 153 exhibits.



Visitors: More than 30 thousand visitors visited the Zoological galleries of Indian Museum during this period.

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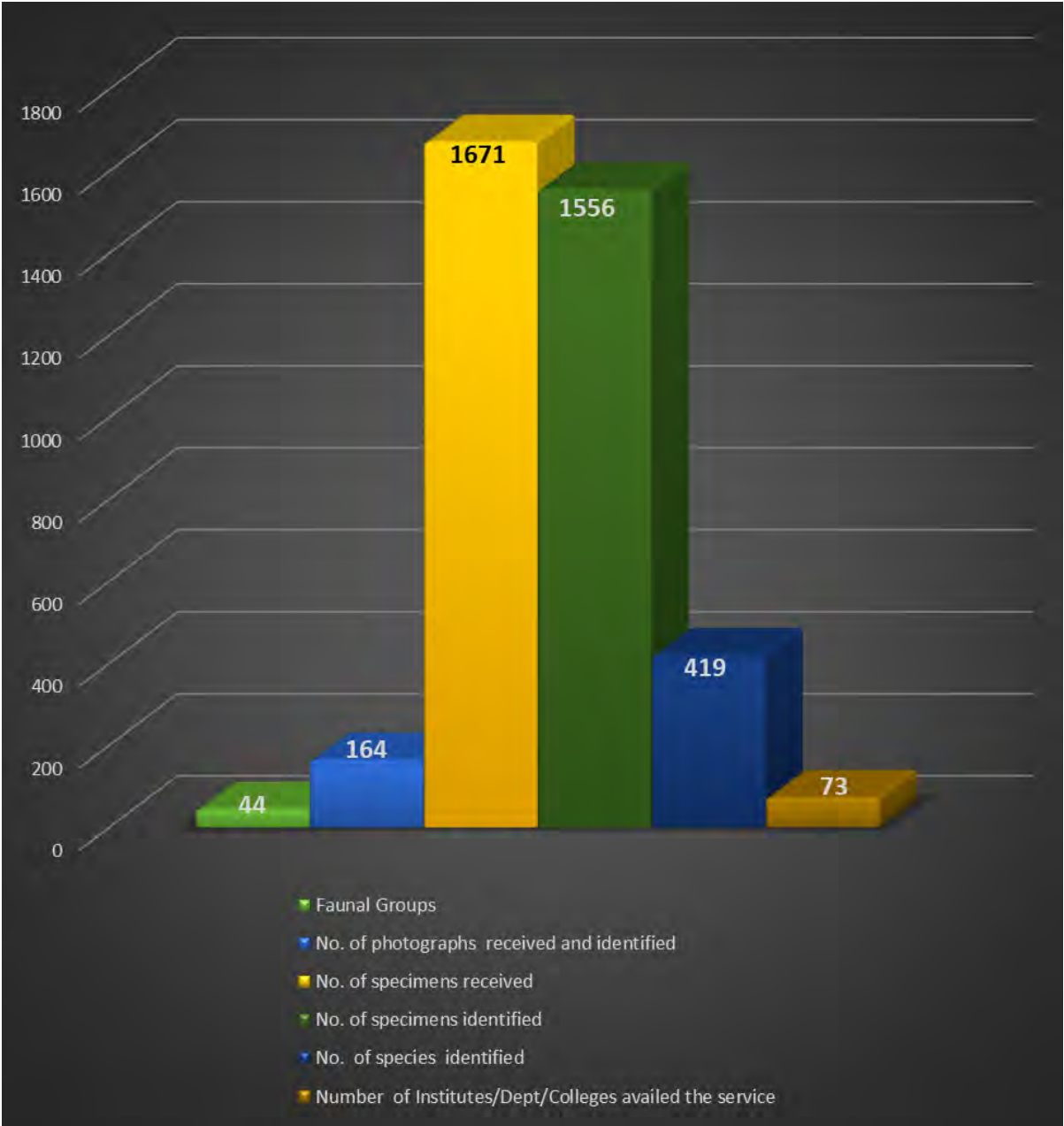
IDENTIFICATION & ADVISORY SERVICES

The ZSI continued its task of rendering Identification and Advisory services to research and teaching institutions in India, Central and State Government/Agencies, NGO's, Industries and also to individuals on zoological specimens and related matters.



During the reporting year 1671 specimens were received from 73 Institute/dept/colleges for identification and advisory services by the sceintists of ZSI HQ and Regional Centres, of which 1556 specimens were, identified belongimng to 419 species and the report was sent to respective institutes.

Summary: Identification and Advisory Services rendered by the Scientists during 2020-21



Details of Identification and Advisory Services rendered by the Scientists during 2020-21

Faunal Groups	No. of specimens received	No. of specimens identified	Institutes species	Institutes/ Universities availed the service
Amphibia	Photo (1)	Photo (1)	<i>Duttaphrynus Melanostictus</i> (Scneider, 1799)	Punjab University, Chandigarh
Annelida	114	114	<i>Eudrilus eugeniae</i> (Kinberg, 1867) <i>Eisenia fetida</i> (Savigny, 1826) <i>Perionyx sansibaricus</i> Michaelsen, 1891 <i>Perionyx excavatus</i> Perrier, 1872	Bidhan Chandra Krishi Viswavidyalaya, Nadia, West Bengal Green Patel Nursey, Raipur Maa Sharda Associates, Raipur, Chattisgarh
Araneae	31	31	<i>Pholcus</i> sp. <i>Plexippus paykulli</i> (Audouin, 1826) <i>Rhenesp.</i> <i>Neoscona mukerjei</i> Tikader, 1980 <i>Telamonia dimidiata</i> (Simon, 1899) <i>Neosconasp.</i> <i>Lycosasp.</i> <i>Araneus mitificus</i> (Simon, 1866) <i>Hyllus semicupreus</i> (Simon, 1885) <i>Cyrtophora citricola</i> (Forskal, 1775) <i>Leucaugedecorata</i> (Blackwall, 1864) <i>Cyclosa</i> sp. <i>Hersilia savignyi</i> Lucas, 1836 <i>Hyllus semicupreus</i> (Simon, 1885) <i>Argiope anasuja</i> Thorell, 1887 <i>Cyrtophora cicatrosa</i> (Stoliczka, 1869) <i>Thyene imperialis</i> (Rossi, 1846) <i>Araneussp.</i> <i>Lycosa</i> sp. <i>Plexippus paykulli</i> (Audouin, 1826) <i>Neoscona mukerjei</i> Tikader,	Dept. of Zoology, Ahmednagar College, Ahmednagar-414001, Maharashtra

Faunal Groups	No. of specimens received	No. of specimens identified	Institutes species	Institutes/ Universities availed the service
			1980 <i>Thomisus</i> sp. <i>Oxytate</i> sp. <i>Araneus mitificus</i> (Simon, 1866) <i>Araneus</i> sp. <i>Araneus</i> sp. <i>Oxyopes</i> sp. <i>Neoscona mukerjei</i> Tikader, 1980 <i>Telamonia dimidiata</i> (Simon, 1899) <i>Heteropoda</i> sp.	
Aves	7 specimen images	6 specimen images	<i>Phylloscopus collybita</i> (Vieillot, 1817) <i>Cyanoderma pyrrhops</i> (Blyth, 1844) <i>Anthus roseatus</i> Blyth, 1857 <i>Cuculus micropterus</i> (Gould, 1837) <i>Anthus campestris</i> (Linnaeus, 1758)	Garhwal University, Srinigar
Aves	1	1	<i>Psittacula eupatria</i> (Linnaeus, 1766)	Science Reporter Ms. Sahana Ghosh
Bird	2	2	<i>Fregata minor</i> (Gmelin, 1789) <i>Onychoprion fuscatus</i> (Linnaeus, 1766)	Kerala Forests & Wildlife Department
Bird (Feather sample)	1	1	<i>Pavo cristatus</i> Linnaeus, 1758	Forest Range Officer, Uran, Raigarh district, Maharashtra
Chiroptera	1	1	<i>Pipistrellus ceylonicus</i> (Kelaart, 1852)	Manoharbai Patel College of Arts, Commerce and Science, Deori, Gondia District, Maharashtra.
Decapoda: Brachyura	14	14	<i>Spiralothelphusa wuellerstorfi</i> (Heller, 1862)	Dr. Ambedkar Government Arts

Faunal Groups	No. of specimens received	No. of specimens identified	Institutes species	Institutes/ Universities availed the service
			<i>Oziotelphusa cf. bouvieri</i> (Rathbun, 1904)	College (Autonomous), Chennai-600 039, Tamil Nadu.
Decapoda: Brachyura	6	6	<i>Oziotelphusa bouvieri</i> (Rathbun, 1904) <i>Oziotelphusa aurantia</i> (Herbst, 1799)	Thiru Kolanjiappar Government Arts College, Vriddhachalam-606 001, Tamil Nadu.
Decapods and Fishes	12	12	Decapods <i>Ranina ranina</i> (Linnaeus, 1758) <i>Calappa exanthematos</i> Alcock & Anderson, 1894 <i>Odontodactylus japonicus</i> (de Haan, 1844) <i>Lysiosquilla tredecimdentata</i> Holthuis, 1941 Fishes <i>Cymolutes praetextatus</i> (Quoy & Gaimard, 1834) <i>Odonus niger</i> Rüppell, 1836 <i>Pseudotriacanthus strigilifer</i> (Cantor, 1849) <i>Arothron immaculatus</i> (Bloch & J. G. Schneider, 1801) <i>Gymnothorax randalli</i> Smith & Böhlke, 1997 <i>Torquigener brevipinnis</i> (Regan, 1903) <i>Hippocampus kuda</i> Bleeker, 1852 <i>Hippocampus kelloggi</i> Jordan & Snyder, 1901	Annamalai University, Parangipettai.
Decapods and Fishes	7	7	Decapods <i>Lysmata vittata</i> (Stimpson, 1860) <i>Biarctus sordidus</i> (Stimpson, 1860) Fishes	Satyabama University, Chennai.

Faunal Groups	No. of specimens received	No. of specimens identified	Institutes species	Institutes/ Universities availed the service
			<i>Himantura tutul</i> Borsa et al., 2013	
Echinoderms (Photograph)	12	10	<i>Comanthus wahlbergii</i> (Muller, 1843) <i>Asterina Lorioli</i> Kehler, 1910 <i>Echinaster purpureus</i> (Gray, 1840) <i>Ophioplocus impricatus</i> (Muller and Troschel, 1842) <i>Stephanometra indica</i> (Smith, 1876) <i>Holothuria (Holothuria) atra</i> Jaeger, 1833 <i>Actinocucumis typica</i> Ludwig, 1875 <i>Astropecten polycanthus</i> Muller and Troschel, 1842	MNP, Jamnagar, Gujarat.
Fishes	77	77	<i>Cynoglossus arel</i> (Bloch & Schneider, 1801) <i>Cynoglossus bilineatus</i> (Lacepede, 1802) <i>Cynoglossus lingua</i> (Hamilton, 1822) <i>Cynoglossus lida</i> (Bleeker, 1851) <i>Cynoglossus punticeps</i> (Richardson, 1846) <i>Cynoglossus macrostomus</i> (Norman, 1928) <i>Paraplagusia blochii</i> (Bleeker, 1851) <i>Dagetichthys commersonii</i> (Lacepede, 1802) <i>Solea ovata</i> (Richardson, 1846) <i>Zebrias quagga</i> (Kaup, 1858) <i>Heteromycteris oculus</i> (Alcock, 1889) <i>Pseudorhombus elevates</i> (Ogilby, 1912)	University, Balasore, Odisha

Faunal Groups	No. of specimens received	No. of specimens identified	Institutes species	Institutes/ Universities availed the service
			<i>Pseudorhombus arsius</i> (Hamilton, 1822)	
Fishes	1	2	<i>Pangasianodon hypophthalmus</i> (Sauvage, 1878)	Eucare Pharmaceuticals (P) Ltd, SIDCO Industrial Estate, Thirumudivakkam, Chennai- 600 044
Fishes (Marine)	7	7	<i>Caranx herberi</i> (Bennett 1830) <i>Lutjanus indicus</i> Allen, White and Erdmann 2013 <i>Acanthurus xanthopterus</i> Valenciennes 1835 <i>Johnius borneensis</i> (Bleeker 1851) <i>Siganus vermiculatus</i> (Valenciennes 1835)	ICAR- CIFRI
Fishes	4	4	<i>Tor putitora</i> (Hamilton, 1822) <i>Tor tor</i> (Hamilton, 1822) <i>Tor</i> sp.	Department of Biodiversity and Conservation of Natural Resource, University of Orissa.
Fresh water mollusca (Gastropoda + Bivalvia)	7 specimen photographs	7 specimen photographs	<i>Spharium indicum</i> Deshayes 1854 <i>Parraysia rajahensis</i> (Lea, 1841) <i>Radiatula andersoniana</i> (Nevill, 1877) <i>Lamellidens consobrinus</i> (Lea,1860) <i>Thiaria rudis</i> (Lea,1850) <i>Bithynia pulchella</i> Benson, 1836 <i>Gyraulus labiatus</i> Leonard, 1948	Govt. Science College Jabalpur
Freshwater mollusca	22	22	<i>Lamellidens marginalis</i> (Lamarck, 1819)	Dept. of Zoology Ravenshaw University,

Faunal Groups	No. of specimens received	No. of specimens identified	Institutes species	Institutes/ Universities availed the service
(Bivalvia)			<i>L. corrianus</i> (Lea, 1834) <i>Indonaia caerulea</i> (Lea, 1831)	Cuttack, Odisha
Insecta : Diptera	52	52	<i>Mycodiplosis coimbatorensis</i> (Agarwal)	Vasantdada Sugar Institute, Manjari (BK.), Haveli Taluka, Pune district, Maharashtra
Insecta Coleoptera	1	1	<i>Chlaenius bioculatus</i> Chaudoir, 1856	Ahmednagar College, Ahmednagar.
Insecta Coleoptera: Scarabaeidae	1	1	<i>Gametis versicolor</i> (Fabricius, 1775)	Dapoli Education Society, Dapoli
Insecta Diptera	7	7	<i>Procontarinia</i> sp.,	Department of Agricultural Entomology, Research Student, University of Agricultural Sciences, Dharwad, Karnataka.
Insecta Lepidoptera (Butterfly)	16	16	<i>Antheua servula</i> (Drury, 1773) <i>Perina nuda</i> (Fabricius, 1787) <i>Lymantria incerta</i> Walker, 1855 <i>Eupterote</i> sp. <i>Achaea serva</i> (Fabricius, 1775) <i>Ophiura tirhaca</i> (Cramer, 1777) <i>Maruca vitrata</i> (Fabricius, 1787) <i>Chrysopera combinans</i> (Walker, 1858) <i>Mocis</i> sp. <i>Biston suppressaria</i> (Guenee, 1857) <i>Hippotion celerio</i> (Linnaeus, 1758) <i>Hyposidra talaca</i> (Walker, 1860) <i>Acherontia styx styx</i> (Westwood, 1848)	Tuljaram Chaturchand College of Arts, Science and Commerce, Baramati.

Faunal Groups	No. of specimens received	No. of specimens identified	Institutes species	Institutes/ Universities availed the service
			<i>Daphnis nerii</i> (Linnaeus, 1758) <i>Cleora</i> sp. <i>Parnara</i> sp.	
Insecta Lepidoptera (Butterfly)	1	1	<i>Theretra gnoma</i> (Fabricius, 1775)	Ahmednagar College, Ahmednagar.
Insecta: Coleoptera	1	1	<i>Odontolobis siva</i> (Hope & Westwood., 1845)	Dept. Entomology, College of Agriculture, Indira Gandhi Krishi Vishwavidyalay, Raipur.
Insecta: Coleoptera	32	32	<i>Popillia cupricollis</i> Hope, 1831; <i>Gymnopleurus</i> (<i>Metagymnopleurus</i>) <i>miliaris</i> (Fabricius, 1775); <i>Campsiura</i> (<i>Campsiura</i>) <i>xanthorrhina</i> Hope, 1831; <i>Gametis jucunda</i> (Faldermann, 1835); <i>Clinteria spilota</i> (Hope, 1831); <i>Aulacophora foveicollis</i> Lucas, 1849; <i>Altica cyanea</i> Weber, 1801; <i>Hoplasoma unicolor</i> (Illiger, 1800); <i>Hippodamia variegata</i> (Goeze, 1777); <i>Oenopia sexareata</i> (Mulsant, 1853); <i>Exochomus</i> sp.; <i>Anegleis cardoni</i> (Weise); <i>Coccinella septempunctata</i> (Linnaeus, 1758); <i>Oenopia sauzeti</i> Mulsant, 1866; <i>Oenopia billieti</i> (Mulsant, 1853); <i>Chilocorus infernalis</i> Mulsant, 1853	
Insecta:	7	7	<i>Illeis indica</i> Timberlak, 1943;	Dr YS Parma

Faunal Groups	No. of specimens received	No. of specimens identified	Institutes species	Institutes/ Universities availed the service
Coleoptera			<i>Henosepilachna viginiotopunctata</i> (Redtenbacher, 1844); <i>Henosepilachna ocellata</i> (Redtenbacher, 1844); <i>Harmonia dimidiata</i> (Fabricius, 1781) <i>Aulacophora foveicollis</i> (Lucas, 1849)	University, Soolani, Himachal Pradesh
Insecta: Collembola	37	37	<i>Sminthurides parvulus</i> (Krausbauer, 1898) <i>Homidia cingula</i> (Borner, C., 1906) Yosii, 1959 <i>Sinella curviseta</i> Brook, 1882 <i>Sinella (C.) montana</i> Imms, 1912 <i>Lepidocyrtus (A.) malayanus</i> Yosii, 1959 <i>Entomobrya indica</i> (Baijal, 1955) <i>Dicranocentrus indicus</i> Bonet, 1930 <i>Isotomiella minor</i> (Schaeffer, 1896) Yosii, 1939 <i>Lobella (P.) assamensis</i> Yosii, 1966 <i>Hypogastrura prabhoi</i> Bhattacharjee, 1985 <i>Calvatomina pagoda</i> (Yosii, 1966)	IARI, New Delhi. Dept. Of Ecology & Emt. Science, Assam Univ., Assam
Insecta: Dermaptera	51 + 4 images	51+4 images	<i>Forficula graveleyi</i> Burr, 1914 <i>Euborellia annulata</i> (Lucas) <i>E.compressa</i> (Borelli, 1907) <i>Forcipula</i> sp. <i>F. trispinosa</i> (Dohrn, 1863) <i>Labidura riparia</i> (Pallas, 1773) <i>Elaunon bipartitus</i> (Kirby, 1891) <i>Nala lividipes</i> (Dufour, 1820)	FBS/ZSI, Hyderabad; University of Agricultural & Horticultural Studies, Karnataka
Insecta:	1	1	Family Sarcophagidae	Dept. of Zoology, Scott

Faunal Groups	No. of specimens received	No. of specimens identified	Institutes species	Institutes/ Universities availed the service
Diptera			<i>Sarcophaga (Seniorwhitea) princeps</i> (Wiedemann, 1830)	Christian College, Nagarcoli
Insecta: Diptera	20	20	Family Syrphidae <i>Syrphus</i> sp Family Tabanidae <i>Tabanus</i> sp	Dept. of Zoology, Sarojini Naidu College for Women
Insecta: Diptera	4	4	Family Tachinidae <i>Tachina</i> sp. (specimen damaged)	AICRP, Raipur, Chattisgarh
Insecta: Diptera	1	1	Family Sarcophagidae <i>Sarcophaga (Parasarcophaga) albiceps</i> Meigen, 1826	Dept. of Zoology, Sammilani Mahavidyalaya, Kolkata
Insecta: Diptera	4	4	Family Sciaridae <i>Sciara</i> sp (head of the specimen damaged)	Deptt. of Entomology, College of Horticulture & Forestry, Neri, Hamirpur, H.P.
Insecta: Diptera	6	6	Family Phoridae <i>Megaselia (Megaselia) scalaris</i> (Loew, 1866)	Dept. of Agri Entomology, College of Agriculture, Shimoga
Insecta: Formicidae	12	12	<i>Crematogaster</i> sp. <i>Solenopsis geminata</i> (Fabricius, 1804) <i>Paratrechina longicornis</i> (Latreille, 1802) <i>Tapinoma</i> sp. <i>Pheidole</i> sp.	Vidyasagar College
Insecta: Formicidae	5	5	<i>Camponotus compressus</i> (Fabricius, 1787) <i>Pseudoneoponera rufipes</i> (Jerdon, 1851)	Sammilani Mahavidyalaya
Insecta:	150	100	<i>Campsomeris thoracica</i>	Andaman Nicobar

Faunal Groups	No. of specimens received	No. of specimens identified	Institutes species	Institutes/ Universities availed the service
hymenopter a			Fabricius, 1787	Tribal Research Institute (ANTRI), Port Blair
Insecta: Isoptera	47	47	<i>Odontotermes obesus</i> (Rambur, 1842), <i>Microtermes obesi</i> Holmgren, 1912	Entomology Department, Tocklai Tea Research Institute, Tea Research Association Tocklai, Jorhat Assam
Insecta: Isoptera	7	7	<i>Odontotermes brunneus</i> (Hagen, 1858), <i>Odontotermes obesus</i> (Rambur, 1842), <i>Odontotermes feae</i> (Wasmann, 1896), <i>Odontotermes parvidens</i> Holmgren and Holmgren, 1917	Sambalpur University, Odisha- 768019
Insecta: Isoptera	83	83	<i>Coptotermes ceylonicus</i> Holmgren, 1911, <i>Anacanthotermes viarum</i> (Konig, 1779)	Department of Agricultural Entomology, Coimbatore- 641 003, Tamil Nadu
Insecta: Isoptera	43	43	<i>Odontotermes feae</i> (Wasmann, 1896), <i>Ancistrotermes pakistanicus</i> (Ahmad, 1955), <i>Microtermes obesi</i> Holmgren, 1912	Tocklai Tea Research Institutes, Tea Research Association, Jorhat, Assam for Lot No. 51/2020
Insecta: Isoptera	84	84	<i>Microtermes obesi</i> Holmgren, 1912, <i>Ancistrotermes pakistanicus</i> (Ahmad, 1955), <i>Odontotermes parvidens</i> Holmgren and Holmgren, 1917	Tocklai Tea Research Institutes, Tea Research Association, Jorhat, Assam
Insecta: Isoptera	102	102	<i>Microtermes obesi</i> Holmgren, 1912, <i>Odontotermes parvidens</i> Holmgren and Holmgren, 1917	Tea Research Association, Nagrakata, Jalpaiguri, West Bengal

Faunal Groups	No. of specimens received	No. of specimens identified	Institutes species	Institutes/ Universities availed the service
Insecta: Lepidoptera	1	1	<i>Thysanoplusia orichalcea</i> Fabricius, 1775	Division of Entomology Sher - e- Kashmir University, Kashmir
Insecta: Lepidoptera	15	15	<i>Vanessa cardui</i> (Linnaeus 1758) <i>Heliophorus sena</i> (Kollar, 1844) <i>Neptis hylas</i> (Linnaeus, 1758) <i>Zizeeria karsandra</i> (Moore, 1865) <i>Pieris canidia</i> (Sparrman, 1768) <i>Vanessa indica</i> (Herbst, 1794) <i>Symbrenthia hippoclus</i> (Cramer, 1779) <i>Colias fieldii</i> Menetries, 1855 <i>Aglaia cashmirensis</i> (Kollar, 1844)	Department of Zoology, H.N.B. Garhwal University, Uttarakhand
Insecta: Lepidoptera	65	65	<i>Danaus chrysippus</i> Linnaeus, 1758 <i>Tirumala limniace</i> (Cramer, 1775) <i>Danaus genutia</i> (Cramer, 1779) <i>Euploea core</i> Cramer, 1780 <i>Hypolimnas bolina</i> (Linnaeus, 1758) <i>Hypolimnas missipus</i> (Linnaeus, 1764) <i>Euthalia aconthia</i> Cramer, 1779 <i>Cupha erymanthis</i> Drury 177 <i>Vagrans egista</i> Cramer, 1782 <i>Symbrenthia lilaea</i> Hewitson, 1864 <i>Ypthima Asterope</i> (Klug, 1832) <i>Melanitis leda</i> (Linnaeus, 1758) <i>Mycalus mineus</i> (Linnaeus, 1758) <i>Lethe rohria</i> Fabricius, 1787 <i>Cyrestis thyodamas</i> Boisduval, 1836	Guru Granth Sahib, World University, Fatehgarh Sahib, Punjab

Faunal Groups	No. of specimens received	No. of specimens identified	Institutes species	Institutes/ Universities availed the service
			<i>Phalanta phalantha</i> Drury, 1773 <i>Ariadne merione</i> Cramer, 1779 <i>Ariadne Ariadne</i> (Linnaeus, 1763) <i>Junonia lemonias</i> (Linnaeus, 1758) <i>Junonia alamana</i> (Linnaeus, 1758) <i>Junonia iphita</i> Cramer, 1782 <i>Junonia orithya</i> (Linnaeus, 1764) <i>Junonia hierta</i> (Fabricius, 1798) <i>Neptis hylas</i> (Linnaeus, 1758) <i>Vanessa cardui</i> (Linnaeus 1758) <i>Vanessa indica</i> (Herbst, 1794) <i>Libythea lepita</i> Moore, 1857 <i>Charaxes agrarius</i> Swinhoe, 1887 <i>Phalanta phalantha</i> Drury, 1773 <i>Neptis hylas</i> (Linnaeus, 1758) <i>Athyma perius</i> (Linnaeus, 1758) <i>Pseudergolis wedah</i> Kollar 1848 <i>Talicauda nyseus</i> (Guérin-Méneville, 1843) <i>Castalius rosimon</i> (Fabricius, 1775) <i>Jamides celano</i> (Cramer, 1775) <i>Lampides boeticus</i> (Linnaeus, 1767) <i>Chilades pandava</i> (Horsfield, [1829]) <i>Chilades parrhasius parrhasius</i> (Fabricius, 1793) <i>Leptotes plinius</i> (Fabricius, 1793) <i>Virachola isocrates</i> (Fabricius, 1793) <i>Acytolepis puspa</i> (Horsfield, 1828)	

Faunal Groups	No. of specimens received	No. of specimens identified	Institutes species	Institutes/ Universities availed the service
			<i>Euchrysops cnejus</i> (Fabricius, 1798) <i>Surendra quercetorum</i> (Moore, 1857) <i>Freyeria trochylus</i> (Freyer, 1845) <i>Heliophorus sena</i> (Kollar, 1844) <i>Delias eucharis</i> (Drury, 1773) <i>Pontia daplidice</i> (Linnaeus, 1758) <i>Belenois aurota</i> (Fabricius, 1793) <i>Cepora nerissa</i> (Fabricius, 1775) <i>Eurema hecabe</i> (Linnaeus, 1758) <i>Colias erate</i> (Esper (1805) <i>Colias fieldii</i> Ménétriés, 1855 <i>Catopsila crocale</i> Cramer, 1775 <i>Catopsilia pomona pomona</i> (Fabricius, 1775) <i>Ixias pyrene</i> (Linnaeus, 1764) <i>Ixias marianne</i> (Cramer, 1779) <i>Pieris canidia</i> (Linnaeus, 1768) <i>Pieris brassicae</i> (Linnaeus, 1758) <i>Papilio polytes</i> Linnaeus, 1758 <i>Papilio demoleus</i> Linnaeus, 1758 <i>Graphium doson</i> (Felder & Felder, 1864) <i>Pelopidas mathias</i> (Fabricius, 1798) <i>Hasora chromus</i> (Cramer, 1780) <i>Borbo cinnara</i> (Wallace, 1866) <i>Dodona durga</i> (Kollar, 1844)	
Insecta:	25	20		
Lepidoptera			<i>Papilio polyctor</i> Boisduval, 1836 <i>Pieris canidia</i> (Linnaeus, 1768) <i>Acraea issoria</i> (Hübner, 1819)	Eternal University Baru Sahib District Sirmour (HP)

Faunal Groups	No. of specimens received	No. of specimens identified	Institutes species	Institutes/ Universities availed the service
			<i>Vanessa cashmirensis</i> Kollar, 1844 <i>Pieris canidia</i> (Linnaeus, 1768) <i>Eurema laeta</i> (Boisduval, 1836) <i>Ariadne merione</i> (Cramer, (1777) <i>Pieris canidia</i> (Linnaeus, 1768) <i>Junonia iphita</i> (Cramer, (1779) <i>Phalanta phalantha</i> (Drury, (1773) <i>Papilio polyctor</i> Boisduval, 1836 <i>Vanessa indica</i> (Herbst, 1794) <i>Libythea myrrha</i> Godart, 1819 <i>Celastrina gigas</i> (Hemming, 1928) <i>Lethe rohria</i> (Fabricius, 1787) <i>Pieris melete</i> Ménétrières, 1857 <i>Euploea core</i> Cramer, 1780 <i>Deudorix epijarbus</i> Moore, 1858 <i>Aulocera saraswati</i> (Kollar, (1844) <i>Callerebia nirmala</i> (Moore, 1865)	
Insecta: Lepidoptera	13	13	<i>Maruca vitrata</i> (Fabricius, 1787) <i>Chrysopera combinans</i> (Walker, 1858) <i>Mocis</i> sp. <i>Biston suppressaria</i> (Guenee, 1857) <i>Hippotion celerio</i> (Linnaeus, 1758) <i>Hyposidra talaca</i> (Walker, 1860)	Punjabi University, Patiala.
Insecta: Lepidoptera	02	02	<i>Pieris canidia</i> (Linnaeus, 1768) <i>Eurema laeta</i> (Boisduval, 1836)	Department of Zoology, Panjab University, Chandigarh.

Faunal Groups	No. of specimens received	No. of specimens identified	Institutes species	Institutes/ Universities availed the service
Insecta: Lepidoptera	18	18	<i>Ixias marianne</i> (Cramer, (1779) <i>Pieris canidia</i> (Linnaeus, 1768) <i>Pieris brassicae</i> (Linnaeus, 1758) <i>Papilio polytes</i> Linnaeus, 1758	Punjabi University, Patiala.
Insecta: Orthoptera	1	1	<i>Modicogryllus</i> sp.	Sambalpur University
Insecta: Orthoptera	01	01	2 nd Instar nymph of <i>Patanga</i> sp.	HPU, Shimla
Insecta:Lepi doptera	3	3	<i>Bombyx mori</i> (Linnaeus, 1758) <i>Samia cynthia</i> (Drury, 1773)	Department of Entomology UBKV, Pundibari, Cooch Behar- 736165 West Bengal
Insec	15	15	<i>Musca domestica</i> Linnaeus, 1758 <i>Monomorium</i> sp. <i>Eristalis tenax</i> (Linnaeus, 1758) <i>Sarcophagi nodosa</i> Engel, 1925 <i>Amata nigriceps</i> (Butler, 1876) <i>Apis florae</i> Linnaeus, 1758 <i>Xylocopa aestuans</i> (Linnaeus, 1758) <i>Austroscolia soror</i> (Smith, 1855) <i>Dysdercus cingulatus</i> (Fabricius, 1775) <i>Augochlor</i> sp. <i>Phimenes flavopictum</i> (Blanchard, 1845) <i>Chrysocoris stollii</i> (Wolff, 1801) <i>Camponotus</i> sp. <i>Oecophylla</i> sp.	JOIL, Coimbatore
tsLand Mollusca	04	04	<i>Rachis bengalensis</i> (Lamarck, 1822) <i>Macrochlamys atricolor</i>	Dept. of Entomology Raipur, Chattisgarh

Faunal Groups	No. of specimens received	No. of specimens identified	Institutes species	Institutes/ Universities availed the service
(Godwin-Austen, 1875)				
Mammalia	1	1	<i>Bandicota bengalensis</i> (Gray, 1835)	College of Horticulture, Kerala Agricultural University, Thrissur, Kerala.
Mammalia	123	123	<i>Golunda ellioti</i> Gray, 1837 <i>Millardia meltada</i> (Gray, 1837) <i>Mus booduga</i> (Gray, 1837) <i>Mus saxicola</i> (Elliot, 1839) <i>Rattus rattus</i> (Linnaeus, 1758) <i>Suncus etruscus</i> (Savi, 1822) <i>Suncus murinus</i> (Linnaeus, 1766)	Wildlife & Environment Conservation Society, Amrawati, Maharashtra.
Mantodea	2	2		Sacred Heart college, Thevara, Ernakulam
Marine Mollusca	19	19	<i>Nerita balteata</i> Reeve, 1855 <i>Telescopium telescopium</i> Reeve, 1855 <i>Cerithidea obtusa</i> (Lamarck, 1822)	Baruipur Range 24 Parganus South
Marine Mollusca	6	6	<i>Indothais lacera</i> (Born, 1778) <i>Meretrix meretrix</i> (Linnaeus, 1758) <i>Marcia opima</i> (Gmelin, 1791) <i>Mactra grandis</i> Gmelin, 1791	Calcutta University Dept. of Zoology
Mollusca (Gastropod a)	3	3	<i>Lamellidens marginalis</i> (Lamarck 1819)	Calcutta University Dept. of Zoology
Mollusca (Gastropod a) Fresh Water Mollusca	3	3	<i>Pila globosa</i> Swainson, 1822	Calcutta University Dept. of Zoology

Faunal Groups	No. of specimens received	No. of specimens identified	Institutes species	Institutes/ Universities availed the service
Mollusca	64	64	<i>Corbicula assamensis</i> Prashad, 1928 <i>Corbicula striatella</i> Deshayes, 1855 <i>Parreysia favidens</i> (Benson, 1862) <i>Parreysia corrugata</i> (O. F. Müller, 1774) <i>Indonaia andersoniana</i> (Nevill, 1877) <i>Radiatula bonneaudii</i> (Eydoux, 1838) <i>Lamellidens marginalis</i> (Lamarck, 1819) <i>Lamellidens corrianus</i> (Lea, 1834) <i>Pila globosa</i> (Swainson, 1822) <i>Pila virens</i> (Lamarck, 1822) <i>Pomacea lineata</i> (Spix in J. A. Wagner, 1827) <i>Filopaludina bengalensis</i> (Lamarck, 1822) <i>Idiopoma dissimilis</i> (O. F. Müller, 1774) <i>Brotia costula</i> (Rafinesque, 1833)	Department of Life Sciences, Dibrugarh University, Assam
Mollusca	02 photographs	02 photographs	<i>Pleurobranchia</i> sp.& <i>Armina</i> sp.	National Centre for Sustainable Coastal Management, Chennai, Tamil Nadu
Mollusca Bivalves	18	03	<i>Donax variabilis</i> Say, 1822 <i>Perna viridis</i> (Linnaeus, 1758) <i>Sunetta scripta</i> (Linnaeus, 1758)	University of Madras, Chennai
Mollusca Bivalves	2	2	<i>Donax siliqua</i> Romer, 1870 and <i>Macra aequisulcata</i> G. B. Sowery III, 1894	Sagolband Meino Leirak, Imphal, Manipur

Faunal Groups	No. of specimens received	No. of specimens identified	Institutes species	Institutes/ Universities availed the service
Mollusca Bivalves	2	2	<i>Donax variabilis</i> Say, 1822 and <i>Donax incarnates</i> Gmelin, 1791	University of Madras, Chennai
Mollusca Gastropod	1	1	<i>Counus lividus</i> Hwass in Bruguiere, 1792	Satyabama University, Chennai
Molluscs	6	1	<i>Geloina expansa</i> (Mousson, 1849)	Andaman Nicobar Tribal Research Institute (ANTRI), Port Blair
Molluscs	93	90	<i>Siliqua radiata</i> (Linnaeus, 1758) <i>Oronia subnodulosa</i> Melvill, 1893 <i>Littorina undulosa</i> (Linnaeus, 1758) <i>Planaxis sulcatus</i> (Born, 1778) <i>Littorina intermedia</i> (Philippi, 1846) <i>Littorina scabra</i> (Linnaeus, 1758) <i>Thais blanfordi</i> (Melvill, 1893) <i>Gyraneum natator</i> (Röding, 1798) <i>Purpura panama</i> (Röding, 1798) <i>Anomia</i> sp. <i>Donax (Dentilaton) incarnatus</i> Gmelin, 1791 <i>Donax faba</i> Gmelin, 1791 <i>Claremontiella nodulosa</i> (Adams, 1845) <i>Sunetta scripta</i> (Linnaeus, 1758) <i>Purpura bufa</i> Lamarck, 182 <i>Trochus radiatus</i> Gmelin, 1791 <i>Turbo brunneua</i> (Röding, 1798) <i>Sunetta scripta</i> (Linnaeus, 1758) <i>Babylonia spirata</i> (Linnaeus, 1758)	Department of Applied Zoology Mangalore University KARNATAKA 574199.

Faunal Groups	No. of specimens received	No. of specimens identified	Institutes species	Institutes/ Universities availed the service
			<i>Donax scortum</i> (Linnaeus, 1758) <i>Cypraea lynx</i> Linnaeus, 1758 <i>Perna viridis</i> (Linnaeus, 1758) <i>Sunetta meroe</i> (Linnaeus, 1758) <i>Agronia gibbose</i> (Born, 1778) <i>Nerita textilis</i> Gmelin, 1791 <i>Nerita oryzorum</i> (Linnaeus, 1758) <i>Morula nodicostata</i> (Pease, 1868) <i>Clypidina notata</i> (Linnaeus, 1758) Land shells <i>Cyclophorus indicus</i> (Deshayes 1832) <i>Cyclophorus jerdoni</i> (Benson 1851) <i>Cyclophorus nelagericus</i> (Müller, 1774) <i>Pterocyclus nanus</i> (Benson 1851) <i>Gulella bicolor</i> (Hutton, 1834) <i>Sinoennea beddomei</i> (Blanford, 1881) <i>Mariella beddomei</i> Godwin-Austen 1888 <i>Chamalycaeus expatriatus</i> Godwin-Austen, 1914 <i>Subulina octana</i> (Bruguière 1798) <i>Lissaachatina fulica</i> (Férussac, 1821) <i>Glessula simoni</i> Jousseaume, 1894 <i>Rachistia praetermissus</i> (Blanford & Blanford, 1861) <i>Euplecta acuduccta</i> (Blanford 1901) <i>Glessula simoni</i> Jousseaume, 1894	

Faunal Groups	No. of specimens received	No. of specimens identified	Institutes species	Institutes/ Universities availed the service
			<i>Allopeas gracile</i> (Hutton, 1834) <i>Macrochlamys prava</i> (Pfeiffer 1851) <i>Succinea beconi</i> Jousseume, 1894 <i>Glessula botellus</i> (Benson 1870) <i>Micraulax coeclonus</i> (Benson 1870) <i>Glessula canarica</i> (Beddome, 1906) <i>Microcystina shevaroyana</i> Blanford, 1905 <i>Kaliella barrackporensis</i> (Pfeiffer, 1852) <i>Macrochlamys</i> sp. <i>Lamellidens marginalis</i> (Lamarck 1819) <i>Pila virens</i> Lamarck, 1822 <i>Corbicula striatella</i> Deshayes 1854 <i>Pila virens</i> Lamarck, 1822 <i>Idiopoma dissimilis</i> (Mueller, 1774) <i>Melanoides tuberculata</i> (Müller, 1774) <i>Bellamya bengalensis</i> (Lamarck, 1822) <i>Sulcospira huegeli</i> (Lea, 1856) <i>Corbicula striatella</i> Deshayes 1854 <i>Bellamya</i> sp. <i>Sphaerium indicum</i> Deshayes, 1854 <i>Lymnaea Luteola</i> f. <i>typical</i> Lamarck, 1822 <i>Gabbia stenothyroides</i> Dohrn, 1857 <i>Thiara scabra</i> (Müller, 1774) <i>Sulcospira huegeli</i> (Lea, 1856) <i>Melanoides tuberculata</i> (Müller,	

Faunal Groups	No. of specimens received	No. of specimens identified	Institutes species	Institutes/ Universities availed the service
			1774) <i>Perreysia favidens</i> (Benson 1862) <i>Nerita violacea</i> (Gmelin, 1791) <i>Lymnaea acuminata</i> Lamarck, 1822 <i>Melanoides tuberculata</i> (Müller, 1774) <i>Indoplanorbis exustus</i> (Deshayes, 1834) <i>Physa acuta</i> (Draparnaud, 1805) <i>Perreysia corrugate</i> (Mullar, 1774) <i>Crotia costula</i> (Gmelin, 1791)	
Molluscs	7	7	<i>Cryptozona bistralis</i> (Beck, 1837) <i>Euplecta subdecussata</i> (Pfeiffer, 1857) <i>Euplecta</i> sp.	Southern Regional Research Centre, Central Sheep & Wool Research Institute, ICAR Mannavanur, Kodaikanal -624 103Tamil Nadu
Molluscs Marine Shell	16	16	<i>Harpulina lapponica</i> (Linnaeus,1767)	Department of Zoology Holy Cross College Nagercoil – 629004 Tamil Nadu
Nemertea	3	3	<i>Halimananertes slacksmithae</i> (Marrow, 2013) <i>Trerestemma</i> Sp. <i>Nemertopsis</i> Sp.	Satyabama University, Chennai.
Nemertea	2	2	<i>Halimananertes slacksmithae</i> (Marrow, 2013) <i>Trerestemma</i> Sp.	Satyabama University, Chennai.
Porifera	20	20	<i>Cliothosa quadrata</i> (Hancock,1849)	Dept. of Biology,Patkar College,Goregaon(w),

Faunal Groups	No. of specimens received	No. of specimens identified	Institutes species	Institutes/ Universities availed the service
				Mumbai
Reptileia	2	2	<i>Gekko gecko</i> (Linnaeus, 1758) <i>Lissemys punctata</i> (Bonnaterre, 1789)	West Bengal Forest Department & Kaliachak Police Station.
Reptilia	2 photographs	2 photographs	<i>Xenochrophis piscator</i> (Schneider 1799) and <i>Lycodon aulicus</i> (Linnaeus 1758).	RPF Inspector Mr. Santimoy Ghosh, Canning
Scleratinian corals (Field Photographs)	48	12	<i>Dendrophyllia</i> sp. <i>Turbinaria</i> sp. <i>Turbinaria mesenterina</i> (Lamarck 1816) <i>Dipsastraea favus</i> (Forsk., 1775) <i>Dipsastraea</i> sp. <i>Goniastrea pectinata</i> (Ehernberg, 1834) <i>Favites</i> sp. <i>Mycedium elephantotus</i> (Pallas, 1766) <i>Coscinaraea monile</i> (Forsk., 1775) <i>Pavona explanulata</i> (Lamarck 1816) <i>Goniopora</i> sp. <i>Porites</i> sp.	MNP, Jamnagar, Gujarat.
Sponges (Marine)	25	25	<i>Callyspongia fibrosa</i> (Ridley & Dendy, 1886) <i>Topsentiahalichondroides</i> (Dendy, 1905) <i>Dysidea herbacea</i> (Keller, 1889) <i>Haliclona (Gellius) fibulata</i> (Schmidt, 1862) <i>Callyspongia clathrata</i> (Dendy, 1905) <i>Suberites carnosus</i> (Johnston,	National Institute of Research in Tuberculosis, Chetpet Chennai

Faunal Groups	No. of specimens received	No. of specimens identified	Institutes species	Institutes/ Universities availed the service
			1842) <i>Tedaniaanhelans</i> (Vio In Olivi, 1792) Halichondriapanicea (Pallas, 1766) <i>Callyspongiadiffusa</i> (Ridley, 1884) <i>Polymastia</i> sp.	
Suspected dead-coral like materials	01	01	Suspected as Limestone	Advanced Institute for Wildlife Conservation, Vandalur, Chennai
Zooplankton	05	05	Protozoa: Rhizopoda <i>Arcella discoides</i> Ehrenberg, 1843 Rotifera <i>Brachionus caudatus personatus</i> (Ahlstrom, 1940) <i>Brachionus calyciflorus</i> Pallas, 1766 <i>Brachionus falcatus</i> Zacharias, 1898 <i>Keratella tropica</i> (Apstein, 1907)	Department of Life Sciences, Smriti P.G. College, Jhansi, U.P.
44	1671 + 167 photographs	2803 + 164 photographs	419	73

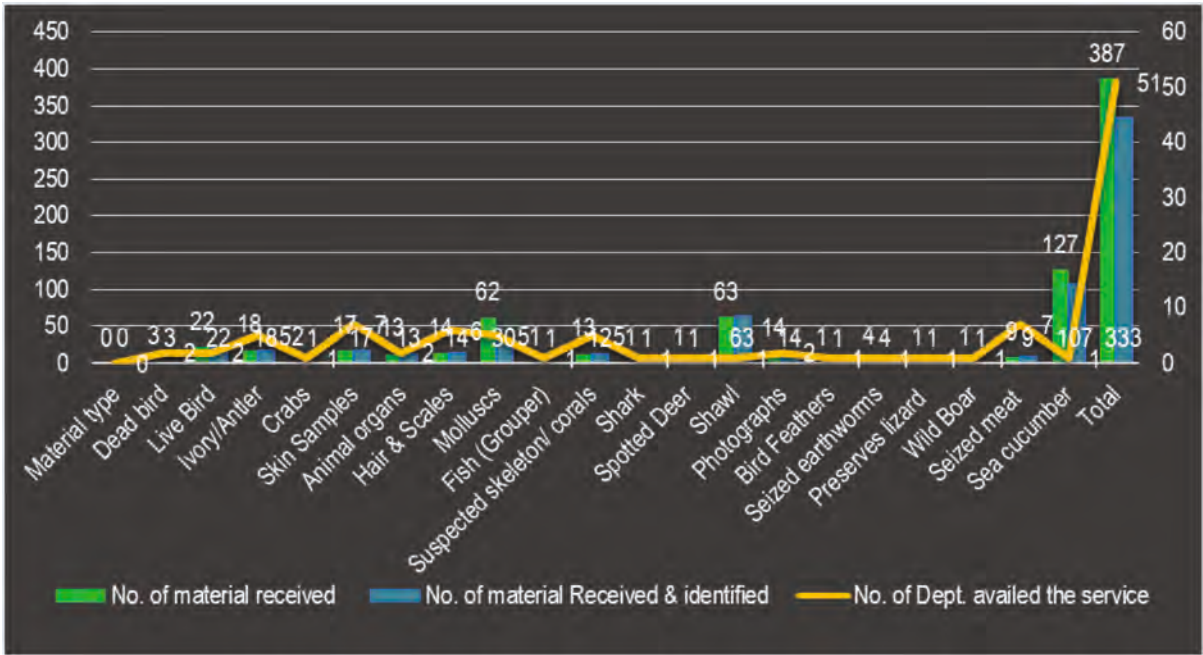
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IDENTIFICATION OF CONFISCATED WILDLIFE MATERIALS

Identification of Confiscated Wildlife Materials of different animals or body parts are being regularly provided to different law enforcement agencies and thus contributing in the control of wildlife crime

During the reporting period, 387 queries were received by ZSI HQ and Regional Centres from 51 Departments for providing identification.

Summary: Confiscated Wildlife Materials Identified by the Scientists during 2019-20



Details of Identification of Confiscated Wildlife Materials by the Scientist during 2020-21

S. No	Material type	No. of material received	No. of material identified	Species involved along with their Schedule in IWPA, 1972	Name of the department availed service
1.	Whole bird (Dead)	1	1	Lesser Frigatebird <i>Fregata ariel</i> (G.R. Gray, 1845) Schedule- IV	Deputy Conservator of Forest, Wildlife, West Bengal
2.	Live Birds (Kept in Zoological Garden, Alipore)	21	21	1. Pesquet's Parrot <i>Psitttrichas fulgidus</i> Lesson, 1830 Distribution: Mountains of New Guinea. IUCN: Vulnerable. CITES: Appendix II 2. Red-shouldered Macaw or Hahn's Macaw <i>Diopsittaca nobilis</i> Linnaeus, 1758 Distribution: East Venezuela, the Guianas and North Brazil. IUCN: Least Concern CITES: Appendix II 3. Blue-winged Macaw or Illiger Macaw <i>Primolius maracana</i> (Vieillot, 1816) Distribution: Northeast, Central	Directorate of Revenue Intelligence (DRI), Zonal Unit, Kolkata

S. No	Material type	No. of material received	No. of material identified	Species involved along with their Schedule in IWPA, 1972	Name of the department availed service
				and southeast Brazil, Paraguay and Northeast Argentina. IUCN: Near Threatened. CITES: Appendix I 4. Yellow-collared Macaw or Golden-collared Macaw <i>Primolius auricollis</i> (Cassin, 1853) Distribution: Northeast Bolivia and north Paraguay to east central and southwest Brazil and north Argentina. IUCN: Least Concern. CITES: Appendix II 5. Chestnut-fronted Macaw or Severe Macaw <i>Ara severa</i> (Linnaeus, 1758) Distribution: East Panama and Colombia south and east through Ecuador, East Peru and north Bolivia to central and northeast Brazil, Venezuela and the Guianas. IUCN: Least Concern. CITES: Appendix II	
3.	Live Bird	01	01	Alexandrine Parakeet <i>Psittacula eupatria</i> (Linnaeus, 1766) IUCN: NT Schedule- IV	Forest range officer, Howrah II, Range, Wildlife Crime Control Cell and Data Management Unit, Wildlife, Kolkata 700046, West Bengal, on 19 th February, 2021 .
4.	Detached bill of a bird	01	01	Toco Toucan <i>Ramphastos toco</i> (Statius Muller, 1776)	The Officer-in-charge, Wildlife & Environment Offences, Detective Department, Lalbazar, Kolkata.
5.	Photographs	09	09	Cannot be identified	SI of Police, Kalyani PD, RPD, Nadia, and West Bengal.
6.	Dead bird	02	02	1. Spotted Dove <i>Streptopelia chinensis</i> (Scopoli, 1768) Schedule- IV 2. Common Pigeon <i>Columba livia</i> (Gmelin, 1789) Schedule- IV	Forest Range Officer, Tehatta Range, Directorate of Forest, Govt. of West Bengal

S. No	Material type	No. of material received	No. of material identified	Species involved along with their Schedule in IWPA, 1972	Name of the department availed service
7.	Bird Feathers	01	01	Cannot be identified	Wildlife Crime Control Bureau, ER, MoEF & CC, Govt. of India.
8.	Seized meat	01	01	Andaman Wild Pig (<i>Sus scrofa andamanensis</i>)- Sch I (Part I), W(P)A, 1972	Deputy Conservator of Forest, Wildlife Division, Haddo, Port Blair- 744102, Andaman and Nicobar Islands
9.	Seized scales	01	01	Indian pangolin (<i>Manis crassicaudata</i>) - Sch I, W(P)A, 1972	S.I. D. Gangopadhyay, W.L. & E.O. DD., Jorasanko P.S. Kolkata.
10.	Seized earthworms	02	02	Earth worm, <i>Eudrilus eugeniae</i> (Kinberg, 1867). <i>Not protected</i> , W(P)A, 1972	Senior Agriculture Development Officer, Mahasamund 493445, Chhattisgarh
11.	Seized earthworms	02	02	Earth worm, <i>Eudrilus eugeniae</i> (Kinberg, 1867). <i>Not protected</i> , W(P)A, 1972	Senior Agriculture Development Officer, Mahasamund 493445, Chhattisgarh
12.	Seized meat	01	01	Sambar deer, <i>Rusa unicolor</i> (Kerr, 1792) Sch III, W(P)A, 1972	Divisional Forest Officer, Boudh Forest (T) Division. At/Po: Malisahi, Dist; Boudh, Odisha, India. PIN-762014.
13.	Suspected skeleton/ corals	01	01	Coral/fossilized Coral, Sch I (Part I), W(P)A, 1972	Range Officer, Malasi Range, Dehradun, Uttarakhand, India. PIN-248003.
14.	Seized meat	01	01	Buffalo, <i>Bubalus bubalis</i> (Linnaeus, 1758), <i>Not protected</i> , W(P)A, 1972	Forest Range Officer, Ramganga Range. 24 Pgs. (S) Division, West Bengal, India. PIN-743371.
15.	Seized meat-sealed pack portion of Heart, Lungs, Liver, Kidney	01	01	Asian elephant, <i>Elephas maximus</i> (Linnaeus, 1758), Sch I, W(P)A, 1972	Divisional Forest Officer, Gorumara Forest Division. Jalpaiguri, West Bengal, India. PIN-735101
16.	Hair samples	01	01	East Javan langur (<i>Trachypithecus auratus</i>). exotic	Forest Range Officer, Calcutta-I Range,

S. No	Material type	No. of material received	No. of material identified	Species involved along with their Schedule in IWPA, 1972	Name of the department availed service
				species not listed in W(P)A, 1972	Wildlife Crime Control Cell & Data Management Unit, Kolkata, West Bengal PIN-700091.
17.	Seized paint brushes	05	05	Indian grey mongoose (<i>Herpestes edwardsi</i>). Schedule II, part -2 in W(P)A, 1972	Thiru A. Prabhu, Judicial Magistrate No. I Coimbatore, Tamilnadu
18.	Scleractinian corals	6	6	<i>Pocillopora</i> sp. <i>Turbinaria</i> sp. <i>Goniastrea</i> sp. <i>Leptastrea</i> sp.	Dehradun Forest Range, Dehradun division, Uttarakhand
19.	Inanimate coral	1	1	Schedule I (Part IVA) Inanimate coral	Tmt. J. Nagalakshmi, Judicial Magistrate No. II, Erode, Tamil Nadu
20.	Scleractinian corals	2	2	<i>Favites</i> sp.	Thiru. A.M.N. Siva, Forest Range Officer (I/c.) Coimbatore Range Tamil Nadu
21.	Deer skin	1	1	Schedule I (Part IVA) Spotted Deer <i>Axis axis</i> (Erxleben, 1777) Schedule- III	Forest department, Diamond Harbour Range, West Bengal
22.	Shawl	60	60	Tibetan Antelope <i>Pantholops hodgsonii</i> (Abel, 1826), Schedule- I	Customs department, Air cargo export, New Delhi
23.	Shawl	3	3	Tibetan Antelope <i>Pantholops hodgsonii</i> (Abel, 1826), Schedule- I	Customs department, Air cargo export, New Delhi
24.	Mongoose painting brush	2	2	Grey Mongoose <i>Herpestes edwardsii</i> (E. Geoffroy Saint-Hilaire, 1818)	Judicial Magistrate No. II, Coimbatore, Tamil Nadu
25.	Pangolin skin	01	01	Indian Pangolin <i>Manis crassicaudata</i> (E. Geoffroy, 1803), Schedule- I	Wildlife Crime Control Bureau, Eastern Region, Kolkata
26.	Mongoose painting brush	2	2	Grey Mongoose <i>Herpestes edwardsii</i> (E. Geoffroy Saint-Hilaire, 1818) Schedule- II	Judicial Magistrate No. I, Coimbatore, Tamil Nadu
27.	Hair	1	1	Wild Pig	Forest department,

S. No	Material type	No. of material received	No. of material identified	Species involved along with their Schedule in IWPA, 1972	Name of the department availed service
				<i>Sus scrofa</i> (Linnaeus, 1758) Schedule- III	Boudh Forest Division, Odisha
28.	Head & meat	1	1	Striped Hyena <i>Hyaena hyaena</i> (Linnaeus, 1758) Schedule- III	Forest department, Kangsabati Forest Division, West Bengal
29.	Ivory	2	2	Asiatic Elephant <i>Elephas maximus</i> (Linnaeus, 1758), Schedule- I	Forest department, Wildlife (Hq) Division, West Bengal
30.	Head & meat	1	1	Cat sp. <i>Felis</i> sp.	Forest department, Raiganj Forest Division, West Bengal
31.	Horn & meat	3	3	Gaur <i>Bos gaurus</i> (Smith, 1827) Schedule- I	Forest department, Gorumara wildlife Division, West Bengal
32.	Ivory	7	7	Asiatic Elephant <i>Elephas maximus</i> (Linnaeus, 1758), Schedule- I	Directorate of Revenue Intelligence, Siliguri, West Bengal
33.	Hair	01	01	Under process	Forest department, Aravalli-Modasa Forest Division, Gujarat
34.	Skin	2	2	Leopard <i>Panthera pardus</i> (Linnaeus, 1758) Schedule- I	Forest department, Gorumara Wildlife Division, West Bengal
35.	Skin	1	1	Leopard <i>Panthera pardus</i> (Linnaeus, 1758) Schedule- I	Forest department, Wildlife (Hq) Division, West Bengal
36.	Ivory	1	1	Fake material	Police department, Baguiati police station, West Bengal
37.	Deer skin	1	1	Spotted Deer <i>Axis axis</i> (Erxleben, 1777) Schedule- III	Forest department, 24 Parganas (South) Division, West Bengal.
38.	Deer skin	04	04	Spotted Deer <i>Axis axis</i> (Erxleben, 1777) Schedule- III	Forest department, 24 Parganas (South) Division, West Bengal.
39.	Skin	1	1	Clouded Leopard <i>Neofelis nebulosi</i> (Griffith, 1821)	Forest department, Jaldapara National Park,

S. No	Material type	No. of material received	No. of material identified	Species involved along with their Schedule in IWPA, 1972	Name of the department availed service
				Schedule- I	West Bengal
40.	Two lots of dried Manta Ray gills	12	12	One (<i>Mobula ray</i> gills) (not in WPA 1972 schedule)	Customs Preventive Force, Manipur
41.	One lot of confiscated material have been received (Gastropoda)	19	19	<i>Nerita balteata</i> (Reeve, 1855) <i>Telescopium telescopium</i> (Linnaeus, 1758) <i>Cerithidea obtusa</i> (Lamarck, 1822)	The Forest Range Officer, Baruipur Range, 24 Parganas South
42.	Dried skin and bones of Turtle.	01	01	<i>Lissemys punctata</i> (Lacepede, 1788)	Kaliachak Police station, Malda, West Bengal.
43.	Preserves lizard	01	01	<i>Gekko gekko</i> (Linnaeus, 1758)	Range officer, Berhampur, Nadia, Murshidabad Forest, Division, Forest Dept., West Bengal.
44.	Sea Cucumber	20	05	<i>Stichopus herrmanni</i> Semper, 1868, <i>Holothuria edulis</i> Lesson, 1830, <i>Holothuria atra</i> Jaeger, 1833, <i>Stichopus chloronotus</i> Brandt, 1835, <i>Actinopyga mauritiana</i> (Quoy & Gaimard, 1833) and	Department of Environment & Forests, A & N Islands
45.	Gorgonian	01	01	<i>Melithaea</i> sp.	
46.	Molluscs	05	02	<i>Rochia nilotica</i> (Linnaeus, 1767) <i>Pleuroploca trapezium</i> (Linnaeus, 1758)	Department of Environment & Forests, A & N Islands
47.	Molluscs	15	01	<i>Rochia nilotica</i> (Linnaeus, 1767)	Department of Environment & Forests, A & N Islands
48.	Sea Cucumber	02	01	<i>Holothuria atra</i> Jager, 1833	Department of Environment & Forests, A & N Islands
49.	Fish (Grouper)	01	01	<i>Epinephelus lanceolatus</i> (Bloch, 1790)	Department of Environment & Forests, A & N Islands

S. No	Material type	No. of material received	No. of material identified	Species involved along with their Schedule in IWPA, 1972	Name of the department availed service
50.	Molluscs	15	03	<i>Lambis truncata</i> (Humphrey, 1786), <i>Pleuroploca trapezium</i> (Linnaeus, 1758), <i>Rochia nilotica</i> (Linnaeus, 1767), <i>Geloina expansa</i> (Mousson, 1849)	Sakarika Private Emporium, Port Blair
51.	Wild Boar	01	01	<i>Sus scrofa andamanensis</i> Blyth, 1858	Department of Environment & Forests, A & N Islands
52.	Spotted Deer	01	01	<i>Axis axis</i> (Erxleben, 1777)	Department of Environment & Forests, A & N Islands
53.	Mollusc	04	01	<i>Harpago chiragra chiragra</i> (Linnaeus, 1758)	Department of Environment & Forests, A & N Islands
54.	Mollusc	01	01	<i>Pleuroploca trapezium</i> (Linnaeus, 1758)	
55.	Crabs	02	01	<i>Scylla serrata</i> (Forsskål, 1775)	Department of Environment & Forests, A & N Islands
56.	Bivalve	02	02	<i>Pleuroploca trapezium</i> (Linnaeus, 1758)	Department of Environment & Forests, A & N Islands
57.	Sea cucumber	05	01	<i>Holothuriascabra</i> Jager, 1833	Department of Environment & Forests, A & N Islands
58.	Shark	01	01	Blacktip Reef shark, <i>Carcharhinus melanopterus</i> (Quoy & Gaimard, 1824)	Department of Environment & Forests, A & N Islands
59.	Elephant Tusk	02	02	<i>Elephas maximus</i> Linnaeus, 1758	Department of Environment & Forests, A & N Islands
60.	Sea cucumber	100	100	<i>Holothuria atra</i> Jager, 1833	Department of Environment & Forests, A & N Islands
61.	Mollusca	01	01	<i>Cassis cornuta</i> (Linnaeus, 1758)	Department of Environment & Forests, A & N Islands
63.	Reptilia	05	05	<i>Geochelone elegans</i> (Schoepff,	Thane Wildlife Division,

S. No	Material type	No. of material received	No. of material identified	Species involved along with their Schedule in IWPA, 1972	Name of the department availed service
	Photograph			1795), Schedule IV <i>Lissemys punctata</i> (Bonnaterre, 1789), Schedule-I	Maharashtra
64.	Feather sample	01	01	Indian Peafowl, <i>Pavo cristatus</i> (Linnaeus, 1758) included in Schedule I of Wildlife (Protection) Act, 1972	Forest Range Officer, Uran, Raigad district, Maharashtra
65.	Skin sample	01	01	Blackbuck, <i>Antilope cervicapra</i> (Linnaeus, 1758) included in Schedule I of Wildlife (Protection) Act, 1972	Forest Department, Nashik, Maharashtra
66.	Horns	02	02	Indian Gazelle, <i>Gazella bennettii</i> Sykes, 1831 included in Schedule I under the Indian Wildlife (Protection) Act of 1972	Police department, Sangli, Maharashtra
67.	Antlers	04	04	Sambar, <i>Rusa unicolor</i> (Kerr, 1792) under Schedule III of Indian Wildlife (Protection) Act, 1972	Police department Sangli, Maharashtra
68.	Skin sample	01	01	Leopard, <i>Panthera pardus</i> (Linnaeus, 1758) included in Schedule I of Wildlife (Protection) Act, 1972	Assistant police Inspector, Crime Branch, Unit-1, Thane City, Maharashtra
69.	Skin sample	01	01	Blackbuck, <i>Antilope cervicapra</i> (Linnaeus, 1758) included in Schedule I of Wildlife (Protection) Act, 1972	Police department, Mumbai, Maharashtra
70.	Skin sample	01	01	Fake Tiger skin	Police department, Pune, Maharashtra
71.	Skin sample	01	01	Leopard, <i>Panthera pardus</i> (Linnaeus, 1758) included in Schedule I of Wildlife (Protection) Act, 1972	Police department, Mumbai, Maharashtra
Total		387	333		51

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ANNUAL REPORT 2020-2021

SEMINARS, CONFERENCES, WORKSHOPS & MEETINGS ATTENDED

During the year, scientists of ZSI have been actively involved in many important scientific activities like attending webinars, providing talks/lectures workshops, meetings etc.



Meetings/Events (103)

1. Dr. V. D. Hegde, Scientist - E attended the 15th meeting of the governing body of the Meghalaya Zoo Project Implementation Society held at Sylvan House, Lower Lachumiere, Shillong on 01 May, 2020.
2. Dr. Deepa Jaiswal, Scientist-E attended online meeting with Member Secretary, Telangana State Biodiversity Board, Hyderabad on 22nd May 2020 on the occasion of International Day for Biological Diversity.
3. Dr. C. Sivaperuman, Scientist-E attended meeting under the Chairmanship of the Deputy Commissioner, South Andaman in connection with the Blue Flag Certification of Radhanagar Beach, Swaraj Dweep on 28th May 2020
4. Dr. Kailash Chandra, Director, ZSI organized RAMC meeting through video conferencing on 19th June 2020, chaired by Dr. S.C. Gairola, IFS, Head of Forest, Govt. of Maharashtra.
5. Dr. Kailash Chandra, Director, ZSI attended a meeting through video conferencing on 26 June 2020, chaired by Mr Ravi Agarwal, IAS, Additional Secretary, MOEF&CC, Govt. of India.
6. Dr. Kailash Chandra, Director, ZSI organized Monthly Consultative Meeting for the month of June, 2020 for the Officers of Head Quarters and Regional Centres through video conferencing on 29 June 2020.
7. Dr. C. Rahunathan, Scientist-E attended the scientific consultative committee meeting of ZSI HQ on 1st June 2020, Regional Centres on 2nd June 2020 and the meeting with RCs for Vision 2030 on 9th June 2020 through video conferencing;
8. Dr. C. Rahunathan, Scientist-E attended Eco-Sensitive Zone (ESZ) Expert Committee Meeting on 22nd and 23rd June 2020 at MoEFCC through video conferencing.
9. Dr. C. Rahunathan, Scientist-E attended RAMC meeting on 19th June 2020 at ZSI through online and made a presentation of Vision 2030 of ZSI and Annual Programme Research proposals for 2020-2021.
10. Dr. C. Rahunathan, Scientist-E attended meeting with Additional Secretary, MoEFCC on 26th June 2020 through video conference regarding the proposal on Pool Scientists programme in ZSI.
11. Dr. V. D. Hegde, Sci-E & Officer-in- Charge attended 16th meeting of the governing body of the Meghalaya Zoo Project Implementation Society held at Sylvan House, Lower Lachumiere, Shillong on 23rd June, 2020.
12. Dr. V. D. Hegde, Sci-E & Officer-in- Charge attended meeting to discuss flora and fauna on development of appropriate apps on People's Biodiversity Register held at Sylvan House, Lower Lachumiere, Shillong on 25th June, 2020.
13. Dr. Gaurav Sharma, Scientist-E and Dr. Anil Kumar, Scientist-E served as Team Members for the Evaluation of selected 23 National Parks and Wildlife Sanctuaries through Management Effectiveness Evaluation (MEE) Process during 2020-21 organized by Wildlife Institute of India, Dehradun.
14. Dr. Gaurav Sharma, Scientist-E attended 15th Meeting of Uttarakhand State Board of Wildlife" held under the Chairmanship of Sh. Trivendra Singh Rawat, Hon'ble Chief Minister of Uttarakhand at conference hall of Secretariat, Uttarakhand Government, Dehradun on 29th June, 2020.
15. Dr. Archana Bahuguna, Scientist-E coordinated web meeting for discussion on "Deforestation, illegal wildlife trade and pandemic".
16. Dr. C. Sivaperuman, Scientist-E attended the State Coordinator meeting of the Asian Waterfowl Census (AWC) on 20th June 2020 through skype to discuss about the 2020 waterfowl census and future prospects.
17. Dr. C. Raghunathan attended the Eco-Sensitive Zone (ESZ) Expert Committee Meeting on 18th August 2020 organized by MoEFCC, New Delhi and attended Eighth Meeting of the Inter-Ministerial Group on Environmental Economics Accounting-India organized by Ministry of Statistics and Programme Implementation on 26th August 2020.
18. Dr V. D. Hegde, Scientist-E, attended the 18th meeting of the governing body of the Meghalaya Zoo Project Implementation Society held at Sylvan House, Lower Lachumiere, Shillong on 11th August, 2020.
19. Dr. Kailash Chandra, Director, ZSI organized the flag hoisting function of Republic Day on 26.01.2021 at ZSI HQs., Kolkata.
20. Dr. Sanjeev Kumar, Scientist-E attended Town Official Language Implementation Committee (TOLIC) meeting through Google meet platform organized by CAZRI, Jodhpur on 18th August, 2020.
21. Dr. C. Sivperuman, Scientist-E attended Doctoral Committee Meeting to review the progress of the Ph.D. Research scholar of RMRC, Port Blair on 24th August 2020
22. Dr. S. Balakrishnan, Scientist – D attended District level advisory committee meeting towards promoting marine fisheries related

- advisories from INCOIS through Fisher Friend Mobile Application in Bangla version organized by Rural Eco-Development Centre (REDC), M.S Swaminathan Research Foundation (MSSRF), Digha on 14.08.2020.
23. Dr. Gopal Sharma, Scientist-E attended Bihar State Wildlife Board meeting on 13.08.2020 through virtual mode.
 24. Dr. Ch. Satyanarayana, Scientist-D attended a virtual consultative meeting with Indian Oil Corporation Limited (IOCL) authorities and their consultants (INDOMER Coastal Hydraulics P. Ltd.) along with the scientists from ZSI Headquarters under the chairmanship of Director, Zoological Survey of India, in connection with the translocation of Scleractinian corals at Narara, Gulf of Kachchh.
 25. Dr. Kailash Chandra, Director, ZSI attended the Departmental Promotion Committee (DPC) meeting for the post of Administrative Officer (AO), ZSI at UPSC, New Delhi on 8th September 2020.
 26. Dr. Kailash Chandra, Director, ZSI chaired the Monthly Scientific Consultative Virtual Meeting of ZSI HQs and Regional Centres at Baini Prasad Hall on 29th September, 2020.
 27. Dr. C. Raghunathan, Scientist-E attended the inter-ministerial meeting on Environmental Statistics organized by Ministry of Statistics and Programme Implementation on 15th September 2020.
 28. Dr. Sanjeev Kumar, Scientist-E & Officer-in-charge attended and participated in the meeting of State Board of Wildlife of Rajasthan under the Chairmanship of Hon'ble Chief Minister of Rajasthan State on 10th September, 2020 through video conferencing organized by PCCF and CWLW, Forest Deptt. Govt. of Rajasthan.
 29. Dr. Deepa Jaiswal, Scientist-E attended Hindi Diwas programme as Chief Guest organized by Botanical Survey of India on 14th September 2020.
 30. Dr. K. A. Subramanian, Scientist-E participated as a panelist in "Wilderness Tourism" symposium conducted by Tamil Nadu Tourism Department and Chennai Snake Park Trust.
 31. Dr. C. Sivaperuman, Scientist-E attended meeting at Andaman and Nicobar Islands Development Corporation (ANIIDCO) on 30th August, meeting with Principal Chief Conservator of Forests (Wildlife) and Chief Wildlife Warden, Department of Environment and Forests, Andaman and Nicobar islands on 1st September 2020, meeting at Secretariat, under the Chairmanship of Chief Secretary on 1st and 8th September 2020 in connection with the development projects at Great Nicobar and Little Andaman Island; attended meeting at Andaman and Nicobar Secretariat, under the Chairmanship of Ms. Vedika Reddy, IAS, in connection with the Red Oil Palm plantations in Little Andaman Island and Teressa Island on 4th August 2020.
 32. Dr. Kailash Chandra, Director, ZSI Attended the book release event organised on 9th October, 2020 at Acharya Jagadish Chandra Bose Botanical Garden, Howrah. Shri Babul Supriyo, MoS, MoEFCC released following books "Plant Discoveries, 2019", "Flowering Plants of India", "Algae of India" of Botanical Survey of India; "Animal Discoveries 2019: New Species and New Records", "Skinks of India" & "Annual Report 2018-2019" of Zoological Survey of India.
 33. Dr. Kailash Chandra, Director, ZSI chaired the meeting for IUCN Red list Assessment of Indian Fauna through video conferencing on 14th October, 2020, organised by ZSI, Kolkata.
 34. Dr. Kailash Chandra, Director, ZSI attended the meeting with Director, Botanical Survey of India on Review of Modified Flexible Complementing Scheme (MFCS) on 27th October, 2020 at ZSI, Kolkata at Baini Prasad Hall.
 35. Dr. Kailash Chandra, Director, ZSI organized Hindi Pakhwada Prize Distribution at Annandale Hall, ZSI, HQs., on 28.10.2020.
 36. Dr. Kailash Chandra, Director, ZSI chaired the Monthly Scientific Consultative Meeting of Regional Centres and Head Quarters of ZSI via video conferencing on 29th September, 2020 at Baini Prasad Hall, ZSI, HQs.
 37. Dr. Gopinathan Maheswaran, Scientist-E participated in the 8th Governing Body Meeting on Vulture Conservation Breeding Centre on 5 October, 2020 jointly organized by the West Bengal Forest Department and BNHS at Aranya Bhawan, Kolkata.
 38. Dr. Deepa Jaiswal, Scientist-E attended "2nd Meeting of Reconstituted State Board for Wildlife" by Telangana State Forest Department on 5th October, 2020.
 39. Dr. U. Saikia, Scientist-C attended the Governing Council Meeting of Meghalaya Zoo Project Implementation Society on the 19th October, 2020; attended a virtual meeting on "IUCN Red List Assessment of Indian Fauna" held under the Chairmanship of DZSI on 14th October, 2020.
 40. Dr. C. Sivaperuman, Scientist-E served as Chief Guest to deliver inaugural address for the online training Organized by CPREEC, Port Blair unit to the teachers of A & N islands on 5th October

- 2020; attended meeting as a member, State Level Environment Impact Assessment Committee to review the EIA proposal submitted by various agencies on 8th October 2020 at Department of Science and Technology, A & N Administration; attended Annual General Body Meeting of Andaman and Nicobar Islands Forests Development Corporation as nominated by MoEF&CC at Department of Environment and Forests, Port Blair.
41. Dr. S. Sambath, Scientist-E, as an external member attended 29th Research Advisory Group of Tropical Forest Research Institute, Jabalpur (M.P.) for the evaluation of research proposals on 13.10.2020 through virtual mode.
 42. Dr. Pratyush P Mohapatra, Scientist-D, as one of the lead authors attended meeting on Developing Guidelines for Mitigating Human-Snake Conflict for Ministry under the programme on Indo-German Technical Cooperation Project on 'Human Wildlife Conflict Mitigation in India'.
 43. Dr. Kailash Chandra, Director, ZSI chaired the Half Yearly Meeting of Officer-in-Charges of Regional Centres and Headquarters of ZSI for Review of Progress of Annual Programme of Research 2020-21 via video conferencing on 19th and 20th November, 2020.
 44. Dr. Kailash Chandra, Director, ZSI chaired the Monthly Scientific Consultative Meeting of Regional Centres and different Sections of ZSI via video conferencing on 29th November, 2020.
 45. Dr. C. Raghunathan chaired the interview board for the recruitment of JRFs/SRFs/PDFs in ZSI on 23rd to 25th November 2020 and chaired the Scientific Consultative Committee Meeting for Junior and Senior Zoological Assistants of ZSI on 26th November 2020.
 46. Dr. P. M. Sureshan, Scientist-E and Dr. Souvik Sen, Scientist-D attended a virtual meeting of experts for the programme 'Assessment of Threatened Taxa of Kerala' (funded by Kerala State Biodiversity Board) on 17.11.2020.
 47. Dr. Avtar Kaur Sidhu, Scientist-E attended meeting of Wildlife Board for the Union Territory of Jammu & Kashmir under the Chairmanship of the Hon'ble Lieutenant Governor of UT of J&K and Chief Secretary of J&K on 23rd November 2020.
 48. Dr. V. D. Hegde, Scientist-E attended the Governing Council Meeting of Meghalaya Zoo Project Implementation Society held at PCCF & HoFF Office, Sylvan House, Lower Lachumiere, Shillong on 4th November 2020.
 49. Dr. C. Sivaperuman, Scientist-E attended meeting of State Level Environment Impact Assessment Committee to review the EIA proposal submitted by various agencies on 2nd November 2020 at Department of Science and Technology, A & N Administration; attended meeting at INS Utkrosh in connection with the birds hazards/ bird safety in Port Blair airport on 3rd November 2020.
 50. Dr. Deepa Jaiswal, Scientist-E participated as Invited Speaker on "World Science Day for Peace and Development" on 10th November, 2020 observed by Little Flower High School, Hyderabad; attended Andhra Pradesh Biodiversity Board Meeting on 25th November, 2020 to discuss Project proposals on Protected Area of Andhra Pradesh.
 51. Dr. C. Venkatraman, Scientist-E attended review meeting on evaluation of Biodiversity research studies under West Bengal Forest Biodiversity Conservation on 10.11.2020 organized by Forest department, West Bengal.
 52. Dr. Pratyush P Mohapatra, Scientist-D, attended consultation meeting on Developing Guidelines for Mitigating Human-Snake Conflict on 27.11.2020 organized by Deutsche Gesellschaft fur Internationale Zusammenarbeit, Indo-German Biodiversity Programme Office, New Delhi through Virtual mode.
 53. Dr. D.S. Suman, Scientist-D participated in Central Insecticide Board (CIB), DGHS, Nirman Bhawan, New Delhi Meeting on 12 November 2020 and Optimizing One health and Global Vector Control Response to reach the 2030 NTD Roadmap goals on 19th November 2020.
 54. Dr. Kailash Chandra, Director, attended a meeting on National Meet of State Biodiversity Boards and Union Territories on 11 December 2020, organized by National Biodiversity Authority.
 55. 2. Dr. Kailash Chandra, Director, attended the 44th Meeting of TRAC of Wildlife Institute of India, Dehradun through video conferencing on 14th December, 2020.
 56. 3. Dr. Kailash Chandra, Director, attended the 16th meeting of the CPGB Committee No. XII – 'Geoscience for Sustainable Development' through video conferencing on 15th December, 2020.
 57. Dr. Kailash Chandra, Director, chaired the online meeting regarding the discussion on the PG Diploma Course on Integrated Animal Taxonomy on 16th December, 2020.
 58. Dr. C. Raghunathan attended a meeting to Evolve Mechanisms for Evaluating Peoples Biodiversity Register, convened by West Bengal

- State Biodiversity Board on 3rd December 2020.
59. Dr. C. Raghunathan attended the 31st State Level Steering Committee Meeting of Sunderban Biosphere convened by Department of Forests, Government of West Bengal on 8th December 2020.
 60. Dr. P. M. Sureshan, Scientist-E and Dr. Souvik Sen, Scientist-D attended a virtual meeting of experts for the programme 'Assessment of Threatened Taxa of Kerala' (funded by Kerala State Biodiversity Board) on 17th December 2020 through video conferencing.
 61. Dr. S. Sambath, Scientist-E attended Hindi Half-Yearly Meeting on 18.12.2020 at Rajbhasha Section, Indira Market, Jabalpur.
 62. Dr. Jasmine, P., Scientist - E, participated the training programme of General management programme for women scientists in online platform conducted by Administrative staff college of India from 23rd November to 4th December 2020.
 63. Deepa J., Scientist-E and Smt. Rehanuma Sulthana, Asst. Zoologist attended TOLIC meeting on 16th December 2020.
 64. Dr. Gaurav Sharma Scientist-E participated in the 16th Board Meeting of Uttarakhand Biodiversity Board at Conference hall of UBB, Dehradun on 15th December, 2020 and participated as Member of Research Advisory Committee of Forest Entomology Discipline, Forest Protection Division, Forest Research Institute, Dehradun in the Sixth-Month Progress Evaluation of Research Scholars through virtual mode on 21st December, 2020.
 65. Dr. C. Sivaperuman, Scientist-E served as a member in the interview selection committee for selection of Technicians for KVK, CIARI, Port Blair on 19th December 2020 and attended on line training on Science, Administration and Research Management at Administrative Staff College, Hyderabad during 7th – 18th December 2020.
 66. Dr. Pratyush P. Mohapatra, Scientist-D is attending one tour to WII, Dehradun to finalize the Zero Draft of National Guidelines on Mitigation of Snake-Human Conflict w.e.f. 24.12.2020 to 02.01.2021 for field testing in different states.
 67. Dr. BHCK Murthy, Scientist-D attended a meeting with PCCF & CWLW, Karnataka in connection with the permission of survey to Mookambika Wildlife Sanctuary on 15th & 16th December 2020 at Bangalore, Karnataka.
 68. Dr. Kailash Chandra, Director, ZSI chaired the meeting for discussion on updates with regard to the ongoing collaborative project on Geo - Fauna with scientists from ISRO-National Remote Sensing Centre-RRSC (East), Kolkata and ZSI scientists on 6th January 2021 at Baini Prasad Hall, ZSI, HQs., Kolkata.
 69. Dr. Kailash Chandra, Director, ZSI attended the meeting for the Departmental Promotional Committee for consideration of promotion of 6 posts of Junior Administrative Officer (JAO), ZSI at New Delhi on 15th January 2021.
 70. Dr. Kailash Chandra, Director, ZSI chaired the Monthly Scientific Consultative Meeting of Regional Centres of ZSI via video conferencing on 29th January, 2021 at Baini Prasad Hall, ZSI, HQs.
 71. Dr. C. Raghunathan attended the meeting to evaluate the People Biodiversity Register held at West Bengal State Biodiversity Board, Kolkata on 28th January 2021.
 72. Dr. C. Raghunathan attended the release function of the book entitled "Birds of the Sundarban Biosphere Reserve" at the Central Deer Park, West Bengal Forest Department, Salt Lake, Kolkata on 4th January 2021 and delivered a brief lecture on Sunderbans.
 73. Dr. Gaurav Sharma, Scientist-E participated as an External Member in Evaluation of the Research Work of CSIR Fellowship upgradation from JRF to SRF of Mr. Ritesh Kumar Gautam and Ms. Shabnam Rana, Wildlife Institute of India, Dehradun through online virtual mode on 07 January, 2021.
 74. Dr. C. Sivaperuman, attended progress review meeting at Central Island Agricultural Research Institute on 18th January 2021; Served as Guest of Honour in the GSDP training programme organized by CPREEC, Port Blair on 28th January 2021.
 75. Dr. Gopal Sharma, Scientist E, attended the Nagar Rajbhasha Karyanvayan Samiti (NARAKAS) meeting on 28th Jan. 2021 organized by Chief Commissioner of Income Tax, Department of Income Tax, Patna.
 76. Dr. S.S. Talmale, Scientist-B attended 18th State Level Forestry and Wildlife Research Advisory Committee Meeting at Aranya Bhavan, Bengaluru, Karnataka on 19th January 2021 and presented the programme details for obtaining permission to conduct surveys and collection of small mammals.
 77. Dr. Kailash Chandra, Director, ZSI chaired the 31st monthly consultative meeting for Junior Zoological Assistant and Senior Zoological Assistant of ZSI HQ, via video conferencing 4th February 2021.

78. Dr. Kailash Chandra, Director, ZSI chaired the 16th Editorial Board Meeting of the Publication Division on 9th & 10th February 2021.
79. Dr. Kailash Chandra, Director, ZSI chaired the meeting for discussion on 'Faunal Diversity Studies in Various Protected Areas of West Bengal' via video conferencing on 23rd February, 2021.
80. Dr. C. Raghunathan attended the World Wetlands Day celebration at MoEFCC on 2nd February 2021 in which Hon'ble Union Minister [State], MoEFCC, Shri Babul Supriyo released the ZSI publication 'Faunal Diversity of Ramsar Wetlands of India'.
81. Dr. C. Raghunathan attended inauguration of Atal Paryavaran Bhawan of Union Territory of Lakshadweep on 19th February 2021 in which Hon'ble Union Minister, MoEFCC, Shri Prakash Javadekar released ZSI publication on *Faunal Diversity of Biogeographic Zones: Coasts of India*.
82. Dr. P.S. Bhatnagar, Scientist-E attended a meeting on 25th February 2021 at the Van Bhavan, Forest Department, Pune under a committee constituted by APCCF (Wildlife) to consider grant of permission to external project.
83. Dr. S. Sambath, Scientist-E served as an external member in the DPC meeting of Tropical Forest Research Institute (TFRI), Jabalpur on 02.02.2021; attended meeting on 26.02.2021 through video conferencing, organized by the Office of the PCCF (WL) Madhya Pradesh, for the field permission to undertake faunistic survey of protected areas of Madhya Pradesh
84. Dr. Gopal Sharma, Scientist-E attended a meeting with Principal Secretary, Department of Environment Forest, and Climate Change, Government of Bihar on 23.02.2021 in the Sichi Bhawan, Patna
85. Dr. Ch. Satyanarayana, Scientist-D attended a meeting with IOCL, Vadinar in connection with the Translocation of Corals proposal on 19th of February 2021 and National Wildlife Board meeting chaired by the Honorable Minister for MoEFCC along with the PCCF (Wildlife), Gujarat Forest Department and Director, GEER Foundation, Gujarat on 18th February 2021.
86. Dr. P. M. Sureshan, Scientist-E and Dr. Souvik Sen, Scientist-D attended the first physical meeting of the expert committee on 'Threatened Taxa of Kerala' on 4th February 2021 at ZSI, WGRC, Kozhikode.
87. Dr. Anil Mohapatra, Scientist-E, served as External Expert member of the Selection Committee for the recruitment of Project Assistant in the OURIIP-Seed project at Khallikote University, Berhampur – on 05.02.2021.
88. Dr. Anil Mohapatra, Scientist-E, had attended the Departmental Research Committee (DRC) meeting of Natural Resources management and Geo-informatics (NRMG), Khallikote University on 28.02.2021.
89. Dr. Kailash Chandra, Director, Zoological survey of India laid the foundation stone for Visiting Scientists Hostel in ZSI, Port Blair and inaugurated the Molecular Systematics Laboratory in ANRC, ZSI along with Shri Tarun Coomar, IFS, PCCF, Andaman & Nicobar Islands.
90. Dr. Kailash Chandra, Director, Zoological survey of India inaugurated the National Webinar and Painting Competition for kids on 12th March on World Sparrow Day at ZSI, HQ., Kolkata.
91. Dr. Kailash Chandra, Director, Zoological survey of India released the two books namely "Current status of Faunal Diversity of Telangana" and "Faunal Diversity of Bhoj Wetland Bhopal, Madhya Pradesh" and also inaugurated Regional Museum of FBRC, ZSI, Hyderabad from 25th March, 2021 to 29th March, 2021.
92. Dr. Kailash Chandra, Director, Zoological survey of India chaired the Editorial and Publication Meeting for selling of books on 2nd March, 2021 at Baini Prasad Hall.
93. Dr. Kailash Chandra, Director, Zoological survey of India chaired the meeting with PCCF and Senior Officers of Forest Department of Govt. of West Bengal 8th March, 2021 to 9th March, 2021 at Baini Prasad Hall.
94. Dr. Kailash Chandra, Director, Zoological survey of India chaired the Monthly Scientific Consultative Meeting of ZSI HQs. and Regional Centres of ZSI for the month of March, 2021 via video conferencing on 31st March, 2021 at Baini Prasad Hall, ZSI, HQ, Kolkata.
95. Dr. C. Raghunathan attended the meeting with IOCL for the coral translocation study on 9th March 2021; Chaired the interview for recruitment of JRF on 17th March 2021; PBRs evaluation meeting organized by West Bengal Biodiversity Board on 22nd March 2021; XXXI meeting of the State Level Steering Committee for Sunderban Biosphere Reserve on 23rd March 2021.
96. Dr. P. M. Sureshan, Scientist-E attended the state level steering committee meeting for Nilgiri Biosphere Reserve and Agasthyamalai Biosphere Reserve on 26.3.2021 organized by Kerala State Forest and Wildlife Department through video conferencing.
97. Dr. V D Hegde, Sci-E attended the 22nd

- Governing Body meeting of Meghalaya Zoo Project Implementation Society, Shillong on 18th March, 2021; also attended an interview as an expert member of the interview Board for various positions in Meghalaya Forest Dept. on 19th March at Shillong.
98. Dr. C. Sivaperuman, Scientist-E attended the Institutional Animal Ethics Committee meeting to review the ongoing Research work in Regional Medical Research Centre, ICMR, Port Blair on 9th March 2021; attended the Doctoral Committee meeting to review the ongoing Ph.D. Research work in the Department of Ocean Studies and Marine Biology, Pondicherry University on 8th March 2021; attended the Human Ethical Committee meeting to review the ongoing Research work in Regional Medical Research Centre, ICMR, Port Blair on 9th March 2021.
 99. Dr. Deepa Jaiswal, Scientist-E participated in Board meeting of Andhra Pradesh State Biodiversity Board on 24th March, 2021 and discussed about the preparation of PBR & Project proposal regarding faunal diversity of Protected Areas of Andhra Pradesh.
 100. Dr. Gaurav Sharma Scientist-E had attended the six monthly research scholars progress evaluation Research Advisory Committee Meeting organized by Forest Protection Division, Forest Research Institute, Dehradun on 25th March, 2021, as an external member.
 101. Smt. I J Kharkongor, Sci- E attended the 1st meeting of "State level PBR Quality Evaluation Monitoring Committee" on 22nd March, 2021 at Shillong.
 102. Dr. Narendra Sharma attended 1st meeting of the State Level People's Biodiversity Registers (PBRs) quality Evaluation Monitoring Committee on 11th March, 2021 at State Forest Research Institute, Van Vihar, Chimpur, Government of Arunachal Pradesh.
 103. Dr. P. Girish Kumar, Scientist-C attended a virtual meeting conducted by Mahila Shakti Kendra, Ministry of Women and Child Development, Govt. of India on 22.03.2021.
- Webinars/ Conferences (67)**
1. Dr. Gaurav Sharma, Scientist-E participated in online video presentation of "Dragonfly South Asia Virtual Meeting 2020" through www.streamyard.com/ facebook group organized by Society of Odonate Studies and South Asian Council of Odonatology" at 5:30pm to 6:30pm during 23 to 29 April, 2020.
 2. Dr. K. A. Subramanian, Scientists-E participated and delivered an online lecture on "Biogeography of Odonata of South Asia" during online Facebook lecture series conducted by Dragonfly South Asia, Society of Odonata Studies and South Asian Council for Odonata studies on 26th April 2020.
 3. Dr. Bineesh, K.K., Scientist – D, participated four-day video conference in the workshop of IUCN South East Asia Red List of Endemic Sharks and Rays during 15th, 22nd 29th and 30th April 2020.
 4. Dr. Kailash Chandra, Director, ZSI attended Webinar on Forest Certification organised by Network for Certification and Conservation of Forests (NCCF) on 19th May 2020; and online Meeting for the Long Term Ecological Observatories (LTEO) project under the ongoing central sector scheme of Climate Change Action Plan, the Ministry of Environment, Forest and Climate Change (MoEFCC) on Saturday, May 02, 2020 from 3 to 6 pm.
 5. Dr. Gaurav Sharma, Scientist-E delivered invited lecture on 'Faunal Diversity & their Conservation in India' on Webinar Series Virtual Meeting for 'Celebration of International Day for Biological Diversity' organized by Indian Institute of Soil and Water Conservation (ICAR), Dehradun in collaboration with ZSI, NRC, Dehradun on 22nd May 2020.
 6. Dr. Gaurav Sharma, Scientist-E participated in lectures on 'Ecology of Himalayan Brown Bear and areas of Conservation importance in Himachal Pradesh' and 'Decoding the Draft EIA Notification 2020' organized by different organizations in different dates during the month.
 7. Dr. A. K. Sidhu, Scientist-E attended webinar on biology, rearing and conservation of butterflies, USA on 26.05.2020
 8. Dr. K. A. Subramanian, Scientist-E participated and delivered online lectures on "*Freshwater Biodiversity of India and Conservation*" organized by Kottayam Nature Society on 12th May and "*Natural History of Palghat Gap*" organized by Natural History Society Palakkad on 17th May 2020.
 9. Dr. Deepa Jaiswal, Scientist-E attended an online session with Dr. M. Karuthapandi, Scientist-C on the topic 'Freshwater Biodiversity of India and Conservation' delivered by Dr. Subramanian, SRC, Chennai on 12th May 2020.
 10. Dr. M.E. Hassan, Scientist-E attended "Freshwater Biodiversity of India and conservation" organized by Kottayam Society of Nature, Kerala delivered by Dr. Subramanian, SRC, Chennai on 12th May 2020

11. Dr. Yogesh Kumar, Scientist - D has attended 6 webinars on different topics related to conservation of marine organisms held on different dates during the months organized by different forum.
12. Dr. N. Marimuthu, Scientist-D attended Webinar on COVID19, Friend or Foe to Coral Reefs Conservation on 16.05.2020, conducted by Universiti Malaysia Terengganu, Malaysia and World Dugong Day on 28.05.2020, conducted by NCF, Bengaluru.
13. Dr. K.P. Dinesh, Scientist-D conducted a webinar on 'DNA Barcoding and Phylogenetics' for the 24 M.Sc. Zoology students of Veerashiva College, Bellary on Zoom meeting (Meeting ID; 5734495869) on 16 May, 2020.
14. Dr. S. D. Gurumayum, Scientist-D attended virtual National Seminar on "Role of biodiversity during Covid-19" on 22nd May 2020 at 11 am organized by Zoology Department, PG Government College for Girls, Sector-42, Chandigarh on International Day of Biological diversity, 2020.
15. Dr. Bineesh, K.K. Scientist-D, participated in the three-day video conference in the workshop of IUCN South East Asia Red List of Endemic Sharks and Rays during 22nd, 26th, 28th May 2020.
16. Dr. Temjenmongla, Scientist-C attended and presented a webinar talk on 'International Day for Biological Diversity' which was organized by G.B. Pant National Institute of Himalayan Environment, Itanagar, Arunachal Pradesh on 22nd May, 2020.
17. Dr. T. Kubendran, Scientist-C attended three webinars on various scientific topics from Kerala and Tamil Nadu. He also acted as resource persons and delivered two lectures in webinar on "Writing a Research Proposal and funding opportunities in India – An overview" and "Challenges and Opportunities in Research" in Department of Botany, Nirmala College for Women (Autonomous), Coimbatore, Tamil Nadu on 23.05.2020 & 24.05.2020.
18. Dr. Chitra, Scientist-C participated in Webinars on mosquitoes control, SPSS tool and freshwater biodiversity of India organized by different institutions in different dates during May 2020.
19. Dr. Muhamed Jafer Palot, Scientist-B participated in the webinar seminar on "Mangrove conservation" on 22nd May 2020 organized by Wild Trust of India & Kannur Kandal Project on the occasion of International Biodiversity Day 2020.
20. Shri. Sreejith S. Kumar attended the "The Wild Side" webinar series conducted by Young Naturalists Kerala, Dragonfly South Asia Regional Talk Series (in Malayalam & Marathi), International Webinar on Biotechnological Perspectives and Recent Advancements in Bio and Nanomaterials conducted by different organizations in different dates during May 2020.
21. Dr. C Rahunathan, Scientist-E attended and delivered a lecture on World Environment Day on the topic of Biodiversity on 5th June 2020.
22. Dr. M. E. Hassan, Scientist-E, has participated in national webinar on "World Ozone Day", "Prevention & Control of Vector Borne Diseases amidst COVID-19" and "Locust attack-Ecological speaking" organized by different organizations during the month.
23. Dr. Basudev Tripathy, Scientist-E attended and delivered a talk on 'Faunal Diversity and Conservation' on 5th June 2020 through free online webinar on the occasion of World Environment Day Celebration-2020 organised by the Indian Institute of Engineering Science and Technology, Shibpur (Formerly Bengal Engineering and Science University, Shibpur) Howrah, West Bengal;
24. Dr. Basudev Tripathy, Scientist-E attended and delivered a talk on 'Mysterious life of the Ridley Turtles: conservation and way forward' on 7th June 2020 through free online webinar Nature Classrooms: Weekend Talk Series on Biodiversity & Conservation organized by Regional Museum of Natural History, Bhubaneswar, Odisha;
25. Dr. Basudev Tripathy, Scientist-E attended and delivered a talk on "Distress Call of Living Fossil Horseshoe Crab of Odisha Coast" on the occasion of the First International Horseshoe Crab Day on 20th June, 2020 (12 Noon – 02 PM) Organized by Estuarine Biology Regional Centre, Zoological Survey of India, Gopalpur-On-Sea, Odisha; participated in the Meeting with Additional Secretary, MoEFCC held through video conference on 26th June 2020 on Pool Scientists Schemes proposal at ZSI, Kolkata.
26. Dr. Anjum N. Rizvi, Scientist-E, and Smt. Anindita Ghosh, Asstt. Zoologist attended two Webinars on "The Generation and Distribution of Biodiversity in the East Himalaya from Trees to Birds" (18th June 2020) and "The origins of complexity and the complexity of origins" (26th June 2020) organized by Punjabi University Patiala.
27. Dr. Chitra, J Scientist C, participated in webinar INYAS- CUPB Lecture Workshop 'tangled bank' encompassing 15 lectures, Transmission Electron Microscopy for Nano materials,

- Renaissance of Mother Earth – 2020, Biodiversity and Its Conservation, Commemoration of World Oceans Day, Impact of Covid-19 on Lifestyle and Quality of Life and Coping Strategies, and Freshwater Biodiversity Conservation in Western Ghats organized by different institutions in different dates.
28. Dr. S.R. Patil and Dr. S.S. Talmale participated in two days National Webinar on “Taxidermy as an Art vis-à-vis Science” on 10th & 11th June, 2020 organized by College of Veterinary Science & Animal Husbandry, Nanaji Deshmukh Veterinary Science University, Jabalpur, Madhya Pradesh.
 29. Mr. Sreejith S. Kumar and Dr. D. Vasanthakumar participated in the webinars on 'Taxidermy as an Art vis-à-vis Science,' Locust swarming in India amidst COVID-19 pandemic; Marine life; Remote Sensing & GIS Technology and Applications; Science Leadership Workshop organized by different organization in different dates during June 2020, while Dr. Vasanthakumar also participated in an insightful overview on environmental issues, challenges and management; Natural Pesticide for the betterment of Eco-System - Present Status and Future Prospects.
 30. Dr. Muhamed Jafer Palot, Scientist-B served as a Panelist and delivered a lecture in a Webinar organized by M.S. Swaminathan Research Foundation & Agrobiodiversity Centre, Kalpetta, Wayanad for the school students and teachers on 5th June 2020, on the occasion of World Environment Day.
 31. Dr. V. D. Hegde, Sci-E & Officer-in- Charge attended a webinar on 13th June, 2020 on '*Reflections of Higher Education Scenario – Post COVID-19*' delivered by Sri Tathagatha Roy, Hon'ble Governor of Meghalaya.
 32. Dr. Gaurav Sharma, Scientist-E participated in Lecture presentation on *COVID-19: A Pandemic of Mistreated Nature; Creation of National Television series on Gulf of Mannar Biosphere Reserve; Desertification and Drought Day, 2020* organized by MoEFCC/WII in different days during June 2020.
 33. Dr. Kubendran, Scientist-C, Dr. Kamal Saini, Assistant Zoologist and Dr. Priyanka, PDF attended webinars on World Environment Day Celebrations of MoEF&CC
 34. Dr. Ch. Satyanarayana, Scientist-D made a lecture “*Paradise lost? – Coral Reefs, the highly productive ecosystems in the Oceans*” at a webinar organized by a Department of Zoology, Loyola College, Chennai on the World Oceans Day, 8 June 2020.
 35. Shri C. Surendar and Shri. R Rajendar Kumar, and Kum. J. Vanishree, Senior Research Fellow, participated various on-line webinars on 'Science Leadership', 'Research Article Writing and Reference Management using Mendeley', 'Popular Science Writing under AWSAR programme', 'Biologically Active Mudflats' and 'Marine Conservation', which were organized during this month.
 36. Ms. Sudipta Mandal, SRF delivered lecture on “Importance of Biodiversity and Human life” on the occasion of World Environment day programme at FBRC, ZSI, Hyderabad.
 37. Dr. Deepa Jaiswal, Scientist-E attended the online World Environment day celebrations on 5th June, 2020 conducted by Environmental Protection Training Research Institute, Gachibowli, Hyderabad and discussed on Role of ZSI in Conservation of Biodiversity.
 38. Sk Rehanuma attended Webinar on Foster Biodiversity Nurture Nature organized by Department of Botany, Adikavi Nannaya University on 05.06.2020 through virtual mode.
 39. Dr. S. Prabakaran, Scientist-E attended “Past and Future of Dermatobotanicals in Dermatopharmacology” an International webinar conducted by the department of Zoology, Loyola College, Chennai on May 26th, 2020 and “Paradise lost? - Coral reefs the highly Productive ecosystems in the oceans” National webinar in connection with World Ocean day -2020 conducted by Environment management division, Entomology Research Institute, Chennai on 8th June 2020.
 40. Dr. P. M. Sureshan, Scientist E & Officer-in-Charge attended and delivered a talk on 'Biodiversity and it is time for nature' in the webinar organized jointly with Kerala State Council for Science & Technology, Centre for Water Resources Development and Management (CWRDSM) Kozhikode.
 41. Dr. Anil Mohapatra, Scientist-E delivered a lecture on “Conservation of Marine Fauna: an urgent need – high time to look beyond flagship species” NATURE CLASSROOMS: WEEKEND TALK SERIES on Biodiversity & Conservation in the Webinar organized by Regional Museum of Natural History, Bhubaneswar on 13.06.2020.
 42. Dr. SD Gurumayum attended virtual Seminar Inauguration of INYAS- CUPB Lecture workshop organized by Department of Botany, Central University of Punjab.
 43. Dr. Varadaraju, Scientist-D and Praveen, K., participated in a webinar on Marine life-Oceans

- day celebration on 8th June, 2020 organized by Loyola College, Chennai.
44. Dr. Kailash Chandra, Director, ZSI addressed the 'National Webinar on Aquatic Entomofaunal Diversity in India' as a keynote speaker, organized by FBRC, ZSI, Hyderabad on 3rd September, 2020.
 45. Dr. Kailash Chandra, Director, ZSI addressed the 'National Webinar on Taxonomy and its Application' as a Keynote speaker, organized by WRC, ZSI, Pune on 9th September, 2020.
 46. Dr. Kailash Chandra, Director, ZSI addressed the webinar on 'Butterfly Conservation in India' organized by the Department of Zoology, Ravenshaw University in collaboration with Big Butterfly Monitoring Network, a consortium of conservation organizations, India, while celebrating the Big Butterfly Month, on 9th September 2020.
 47. Dr. Kailash Chandra, Director, ZSI addressed the webinar on the 'Impact of Climate Change on Pollinators of High Altitudes of North-West Himalayas' as a keynote speaker organized by ZSI, HARC, Solan, H.P. on 16th September, 2020, on the occasion of 'International Day for the Preservation of Ozone Layer'.
 48. Dr. Kailash Chandra, Director, ZSI addressed the inaugural speech on the National Webinar and Online Essay Writing Contest on 16th September, 2020, organized by ENVIS, ZSI HQs, Kolkata.
 49. Dr. Kailash Chandra, Director, ZSI addressed the National Webinar on the occasion of 'International Day for the Preservation of Ozone Layer' as a keynote speaker organized by ANRC, ZSI, Port Blair on 16th September, 2020.
 50. Dr. Kailash Chandra, Director, ZSI convened the webinar on the Red Panda on the occasion of International Red Panda Day organized by Amity Institute of Forestry & Wildlife (AIFW) & ZSI in collaboration with Society for Conservation Biology (SCB), India Chapter on 19th September, 2020.
 51. Dr. Kailash Chandra, Director, ZSI addressed the Key Note address on 'Grassland Ecosystem in Arid Zone of India: A faunal Diversity Perspective' during the National Webinar organized by the Desert Regional Centre, ZSI, Jodhpur on 19th September 2020.
 52. Dr. Kailash Chandra, Director, ZSI addressed the 'National Webinar on Wetland Fauna of Gangetic Plains: Status and Conservation Challenges' as a keynote speaker on 21st September, 2020, organized by GPRC, ZSI Patna.
 53. Dr. Kailash Chandra, Director, ZSI presented the keynote address in the "National Webinar on Beetle (Insecta: Coleoptera) Diversity of India" on 1st October, 2020.
 54. Dr. Kailash Chandra, Director, ZSI attended the Inaugural Programme on AiDRR, jointly organized by NIDM & Wildlife SOS on 5th October, 2020 via video conferencing.
 55. Dr. Kailash Chandra, Director, attended as chief guest the workshop cum webinar on "Post COVID: Environmental Challenge and Livelihood" from 18th December, 2020 to 22nd December, 2020 at Ranchi University Campus, Ranchi.
 56. Dr. Kailash Chandra, Director, organized the National Webinar on "*Parasitic and Vector Borne Diseases and their Control*" organized by Chaudhary Bansi Lal University, Bhiwani and Zoological Survey of India on 23rd December 2020.
 57. Dr. Kailash Chandra, Director, attended the "Biodiversity Conclave" and presented a paper on 'Biodiversity Heritage, People, Culture and Livelihood', organized by National Botanical Research Institute, Lucknow on 23rd December, 2020.
 58. Dr. Gopal Sharma Scientist 'E' attended an International Online Webinar on "Recreation of interest in fundamental Science" organized by Patna University, Patna in collaboration with Bihar Brain Society, Patna on 3rd -5th Dec. 2020.
 59. Dr. Gopal Sharma Scientist E participated as jury member in the zoology session oral presentation in the International Seminar on 4th Dec. 2020 organized by Patna University, Patna in collaboration with Bihar Brain Society, Patna on 4th Dec. 2020.
 60. Dr. Gopal Sharma participated as a jury member in the 28th National Science Congress 2020 Patna District Children Science Congress on 12.12.2020 organized by Science For Society, Patna, Catalysis and cooperation by National Council of Science and Technology Communication, Government of India at Sri Krishna Vigyan Kendra, Patna.
 61. Dr. Gopal Sharma participated in the National Seminar on "Post- COVID Environmental Challenges and Livelihood", organised by YUGANTAR BHARTY at Ranchi University Ranchi from 19-21 Dec 2020.
 62. Dr. D.S. Suman, Scientist-D acted as an Organizing secretary for National Webinar on Parasitic & Vector borne diseases and their control held at Chaudhary Bansi Lal University, Bhiwani, Haryana, 23rd December 2020.

63. Dr. Kailash Chandra, Director, ZSI inaugurated the “National Webinar on Herpetology” via video conferencing on 20th January 2021.
64. Dr. C. Raghunathan conducted the Ph.D. Viva voce examination of Ms. Preeti Pareira on 20th January 2020 on the topic “Studies on Marine Sponges of Andaman and Nicobar Islands”.
65. Dr. Gaurav Sharma, Scientist-E and Dr. Anil Kumar, Scientist-E participated as Team Member in “Planning workshop for Management Effectiveness Evaluation (MEE) of 210 National Parks and Wildlife Sanctuary” organized by the Director, Wildlife Institute of India, Dehradun through online virtual mode on 11th January 2021 inaugurated by Hon'ble Minister of MoEFCC, Sh. Prakash Javadekar.
66. Dr. Kailash Chandra, Director, ZSI attended foundation stone laying ceremony of a new building of Southern Regional Centre, ZSI, Chennai and a Seminar on 'Biodiversity of the Western Ghats and Conservation Challenges' was organized at Chennai on 5th February, 2021
67. Dr. Kailash Chandra, Director, ZSI organized a 'National Conference on Deep Sea Bio-resources in the Indian Ocean' at ZSI, HQs. Kolkata on 25th & 26th February 2021. Shri Prakash Javadekar, Hon'ble Cabinet Minister MoEFCC, Government of India inaugurated the conference and also released the book titled 'Deep Sea Faunal Diversity of India' via video conferencing.
6. Dr. Jasmine, P., Scientist-E participated the training programme of General management programme for women scientists in online platform conducted by Administrative Staff College of India from 23rd November to 4th December 2020.
7. Dr. Dhriti Banerjee, Scientist-E, participated the training programme of General management programme for women scientists in online platform conducted by Administrative staff college of India from 23rd Nov to 4th December, 2020.
8. Dr. L. Kosygin Singh, Scientist-E attended one Regional Capacity Building Program on “Biotechnological Tools in Aquatic Genetic Resource Management and Ex Situ conservation” from 7 - 18 December, 2020 organized by NGFGR, Lucknow.
9. Dr Gopal Sharma Sc E inaugurated an exhibition on SAVE GAURAIYA on 13.12.2020 in S.K.PURI Park, organized by Kalamgar Team, Patna.
10. Dr. Kailash Chandra, Director, ZSI inaugurated the “Workshop on Coastal and Marine Biodiversity of Island Ecosystem” via video conferencing on 7th January, 2021.
11. Dr. Souvik Sen, Scientist-D attended DST sponsored online Training Workshop on “Biodiversity Conservation” organized by Wildlife Institute of India, Dehradun from 22nd to 26th February 2021.
12. Dr. Kailash Chandra, Director, Zoological survey of India, inaugurated the DST-SERB-CRC-Training Workshop on Population Estimation of Olive Ridley Turtle at Estuarine Biology Research Centre, ZSI, Gopalpur, Odisha from 4th March, 2021 to 5th March, 2021.
13. Dr. Kailash Chandra, Director, Zoological survey of India inaugurated the International Training Workshop on Ichthyotaxonomy via video conferencing on 23rd March, 2021.
14. Dr. Avtar kaur Sidhu, Scientist-E and Officer-in-Charge attended Online Training Programme on “Vigilance & Discipline” on 19th March and 20th March, 2021 organized by ITPR, New Delhi.

Trainings/Workshops (14)

1. Dr. C.R. Sreeraj attended Virtual Training programme on “Writing a Research Paper based on Meta-analysis” through Video Conferencing on April 17, 2020 conducted by Dr. P. Krishnan, Principal Scientist, NAARM, Hyderabad.
2. Dr. Bineesh, K.K. Scientist-D, participated in the three day video conference in the workshop of IUCN South East Asia Red List of Endemic Sharks and Rays during 22nd, 26th, 28th May 2020.
3. Dr. Rahul Joshi attended 6 days INYAS-CUPB online workshop “Tangled Bank” lecture series on Biodiversity, organized by Central university of Punjab, Bathinda from 31st May to 05th June, 2020.
4. Dr. Pratyush P. Mohapatra, Scientist-D attended Virtual workshop on IUCN Red List Assessment for Amphibians of Central India and Eastern Ghats (26/08/2020 to 28/08/2020).
5. Dr. Kamal Saini attended the one-week National e-training on “Wildlife Conservation

Television Interview/ Radio talk (02)

1. Dr. S. Balakrishnan, Scientist – D gave an interview on sea foam from Digha coast on 16th

May 2020 for a television channel, Zee 24.

2. Dr. Anil Mohapatra, Scientist-E delivered a radio talk in Odia language “COVID abasara Samudra o Samudrika parnika upare paribesa ra sakaratmaka pravaba” which was broadcasted by Akasvani Kendra, All India Radio, Berhampur on 09.06.2020.

Lectures Delivered (147):

1. Dr. J.S. Yogesh Kumar, Scientist-D delivered a lecture entitled “Importance & Conservation of corals” in a webinar “Renaissance of Mother Earth” organized by MARC, ZSI, Digha on 4th June 2020.
2. Ms. Debashree Dam, Scientist – B, delivered two lectures online to the students of The Ryan International School, Masdar City, Abu Dhabi, UAE on 14th June 2020 on the Blue Planet and The Vast Blue World to spread awareness on Marine Fauna as part of World Ocean day, 2020 celebrations as part of interactive virtual classroom session.
3. Dr. A. Anand Kumar, Scientist – B, delivered an online lecture on “Annelids with special reference to Polychaete-Biodiversity, Importance, collection, preservation and identification” in the National internship on collection, preservation and identification of Marine faunal diversity of India organized by MBRC, ZSI, Chennai, on 4th June 2020.
4. Dr. K.A. Subramanian, Scientist-E delivered a lecture on odonates during INYAS-CUPB Lecture workshop on 4th June, organized by Department of Botany, Central University of Punjab.
5. Dr. Gaurav Sharma, Scientist-E delivered a lecture on conservation of environment and biodiversity to the Scientists and staff at ZSI, NRC on 5th June, 2020.
6. Dr. L. Kosygin Singh, Scientist-E delivered a talk as resource person on “Freshwater Fish Diversity in India: An overview” in the National Webinar on “Freshwater Fish Diversity in India” organized by Freshwater Biology Regional Centre, ZSI, Hyderabad, on 13th August 2020.
7. Dr. Rajmohana K, Sci. E delivered a Keynote address on the 'Impact of Covid-19 on Biodiversity', on 25th August 2020 in a webinar organised by SPC Govt. College, Ajmer. And also Participated in a panel discussion named “Anthropogenic Effect on Biodiversity” on 26th August 2020.
8. Dr. S. Sheela, Scientist-E delivered lecture in the National Webinar on “Taxonomic Tools in Life Science” organized by Department of

Zoology, All Saints College, Trivandrum, Kerala on 13th August, 2020.

9. Dr. K.P. Dinesh, Scientist-D delivered a lecture on Molecular Taxonomy at the National Webinar on 'Principles and Practices of Animal Taxonomy: Classical & Molecular Approach' organized by the Zoological Survey of India, Western Ghats Regional Centre, Kozhikode on 24 August, 2020.
10. Dr. Muhamed Jafer Palot, Scientist-B delivered a lecture on Butterfly diversity of Western Ghats at the National Webinar on 'Faunal Diversity of India' on 19 August, 2020 organized by the Zoological Survey of India, Western Regional Centre, Pune.
11. Dr. Sameer Kumar Pati, Assistant Zoologist delivered a lecture on Freshwater Crab diversity of Western Ghats at the National Webinar on 'Faunal Diversity of India' on 19 August, 2020 organized by the Zoological Survey of India, Western Regional Centre, Pune.
12. Dr. Pratyush P. Mohapatra, Scientist-D delivered two talks on “Scorpions: the incredible arachnids” at Assam Don Bosco University on 08.08.2020 and 09.08.2020; “Secret life of Scorpions” at SAALIGA, Arachnology Webinar Series (Talk-15), Tamil Nadu on 23.08.2020.
13. Dr. Sanjeev Kumar, Scientist-E delivered a talk entitled Is pandemic lockdown a green moment for biodiversity in a National Webinar organized by Deptt. of Zoology & Botany, Sophia Girls College (Autonomous), Ajmer, Rajasthan on 24th August, 2020 through Google meet platform.
14. Dr. Indu Sharma, Scientist-E delivered a talk entitled Fish Diversity of North West Himalaya with Reference to Environmental Stresses in a National Webinar on FRESHWATER FISHES OF INDIA organized by FBRC, ZSI, Hyderabad on 13th August, 2020 through Google meet platform.
15. Dr. K. A. Subramanian, Scientist-E delivered online lectures on odonates and aquatic insects during webinars organized by EBRC, ZSI, Gopalpur; Sikkim University, Gangtok; Yenepoya University, Mangalore; WWF, New Delhi and WWF, Trivandrum.
16. Dr. S.S. Jhadav and Dr. Boni Amin Laskar, Scientists – D delivered the lectures in National Webinar on “Freshwater Fish Diversity
17. in India” organized by ZSI-Freshwater Biology Regional Centre, Hyderabad, Telangana on 13th August 2020

18. Dr. G. Maheswaran, Scientist-E, ZSI, Kolkata delivered a talk on “Conservation of Coastal and Marine Birds” on 7th August 2020 in the Webinar conducted by ZSI- EBRC, Gopalpur-On-Sea, Odisha.
19. Dr. K.A. Subramaniam, Scientist-E delivered a talk on “Aquatic Insect diversity of India” on 10th August 2020 in the Webinar conducted by ZSI-EBRC, Gopalpur-On-Sea, Odisha.
20. Dr. P.M. Sureshan, Scientist-E, WGRC, ZSI, Kozhikode delivered a talk on “Understanding Insect
21. Diversity- Praying Mantids” on 18th August 2020 in the Webinar conducted by ZSI-EBRC, Gopalpur-On-Sea, Odisha.
22. Dr. Yogesh Kumar, Scientist - D delivered a lecture entitled “Ornamental fish Resources from Indian water” on 4th August 2020 in Kongunadu Arts and Science College, Coimbatore, Tamil Nadu
23. Dr. Lalit K. Sharma, Scientist-C, ZSI, Kolkata delivered a talk on “Use of GIS and Remote Sensing on faunal studies” on 27th August 2020 in the Webinar conducted by ZSI-EBRC, Gopalpur-on-Sea, Odisha.
24. Dr. C. Raghunathan, Scientist-E delivered a lecture on the Cave Ecosystem during the inaugural address of the webinar on “In perpetual Darkness: The Amazing World of cave Animals” organized by ZSI –NERC on 23rd September 2020.
25. Dr. P. M. Sureshan, Scientist-E delivered a talk on the topic “Insect diversity and decline” on 04.9.2020 in a Webinar organized by Zoology Teachers Association, Kozhikode.
26. Dr. Gaurav Sharma, Scientist-E delivered invited lecture on “Mammalian Diversity & their Conservation in India” in National Webinar organised by ZSI, EBRC, Gopalpur on 11th Sep., 2020.
27. Dr. Anil Kumar Scientist-E delivered invited lecture entitled, 'Avifauna of North-West Trans-Himalayan Landscape, India' in a Webinar on “Environment Conservation and Socio-economic Development of the Indian Himalayan Region” on 3rd September, 2020, organized by GBP-NIHE, Himachal Regional Centre, Mohal, Kullu.
28. Dr. Anil Mohapatra, Scientist-E delivered a key note address on “Current trends in marine fish discovery in India” in the International Webinar on Perspectives on Fish Taxonomy, organised by Bajkul Milani Mahavidyalaya on 20th September, 2020.
29. Dr. K. Rajmohana, Scientist-E delivered an invited talk on ' Parasitic Hymenoptera of India –An overview”, at webinar, “on 18th Sept 2020 organised by EBRC, ZSI.
30. Dr. L. Kosygin Singh, Scientist-E delivered a lecture in the National Webinar on “Taxonomy, Diversity & Conservation of Freshwater Fishes of NE India” organized by the Presidency College, Manipur on 29 September, 2020
31. Dr. Deepa Jaiswal, Scientist-E delivered lecture on “Water Beetle diversity in India” in the Webinar- “Aquatic Entomofaunal Diversity in India” organised by FBRC, ZSI, Hyderabad on 3rd September, 2020.
32. Dr. Manpreet Singh Pandher, Scientist-C delivered lecture on 'Trichoptera Diversity in India' in a National Webinar organised
33. by Freshwater Biology Regional rd Centre, ZSI Hyderabad, held on 3 September, 2020
34. Dr. S. Prabhakaran, Scientist-E delivered lecture on The Cockroach diversity in India in the Webinar organized by FBRC, ZSI, Hyderabad on 3rd September.2020.
35. Dr Gopal Sharma, Scientist E delivered an invited lecture on “Conservation of Riverine fauna of Gangetic Plains” in a National Webinar organized by Patna Women's College, Patna University Patna on 22.09.2020
36. Dr. P.S. Bhatnagar, Scientist-E delivered a talk on “dksfoM-19 eDq r y{;nhi” on the occasion of gUnh f nol on 14th September 2020.
37. Dr. Rajkumar Rajan, Scientist-E delivered a lecture titled 'Underwater Treasures – The Corals' at the webinar organized by Marine Aquarium Research Centre, Digha, on 24.09.2020.
38. Dr. K.P. Dinesh, Scientist-D presented a talk on 'Amphibian Taxonomy' to the participants of 'Amphi-Bio' workshop of Kalinga
39. Centre for Rain Forest Ecology, Agumbe on 5th September 2020.
40. Dr. K.P. Dinesh, Scientist-D presented a talk on 'Amphibians of India: Diversity status' to the First year M. Sc. Biodiversity students of Bharathiya Vidyapeeth, Pune on 27th September 2020.
41. Dr. D.S. Suman, Scientist- D delivered a lecture in National Webinar on “Aquatic Diptera wrf to Mosquito diversity in India, organized by FBRC, ZSI Chennai on 3rd Sept 2020
42. Dr. S.S. Talmale, Scientist-B delivered lecture on “Rodents of Agricultural Importance” in National Webinar on Taxonomy and its applications- learn from the experts organized by Western Regional Centre, Pune on 9th

September 2020.

43. Dr. Uttam Saikia, Sci-C, delivered a lecture on Relevance & Scope of Animal Taxonomy in India, in the webinar organized by the Zoological Society of Assam, Siphajhar College, Assam on 19 September, 2020.
44. Dr. Jasmine.P, Scientist- D delivered lecture on "A journey to the top of the world: Arctic Fauna" organized by EBRC, Gopalpur under the webinar series Let us discuss Biodiversity: Meet the Expert Programme.
45. Dr. S. S. Mishra, Scientist-D delivered a talk on "Amazing World of Coastal and Marine Fishes: Diversity and distribution in India" on 04.09.2020 at the National webinar organized by EBRC, Gopalpur.
46. Dr. Pratyush P., Scientist-D Mohapatra, Scientist-D delivered talks on "Scorpions of Madhya Pradesh, at Regional Museum of Natural History, Bhopal.
47. Dr. R. H. Raina, Scientist-D delivered an invited talk entitled "Impact of Climate Change on Hymenopteran Pollinators in North- West Himalaya on the occasion of National Webinar on "Impact of Climate Change on Pollinators of High Altitudes of North-West Himalaya" organized by Zoological Survey of India, High Altitude th Regional Centre, Solan (H.P.) on 16 September 2020
48. Dr. Souvik Sen, Scientist-D delivered a lecture on "Spider fauna of Western Ghats" on 24.9.2020 in a Webinar organized by WGRC, Kozhikode.
49. Dr. P. Girish Kumar, Scientist-C delivered a lecture on "Vespid wasps of Western Ghats" on 24.9.2020 in a Webinar organized by WGRC, Kozhikode.
50. Dr. Sheela, S, Scientist- E delivered an invited talk on "Insect Taxonomy" to the students and teachers of colleges in Kerala organized by St. Peter's College, Ernakulam on 25.09.2020.
51. Dr. Sanjeev Kumar, Scientist-E delivered invited lecture on the occasion of closing ceremony of Wildlife Week 2020 organized by Office of Head of Forest & PCCF, Forest Department, Govt. of Rajasthan on 7th October, 2020 through Google meet platform.
52. Dr. Gopal Sharma Scientist E delivered a lecture on Dolphin Day 2020 organized by Department of Environment, Forest and Climate Change, Patna Division at Gandhi Ghat, Patna.
53. Dr. K.P. Dinesh, Scientist-D, presented a talk on 'DNA Barcoding in assessing biodiversity' to the students of the Providence Women's College, Kozhikode on 26th October 2020.
54. Dr. Kamal Saini delivered an online invited talk on "Environment & Biodiversity "to BSc and MSc students of Career Point University, Hamirpur (HP) on 13-10-2020.
55. Dr. Souvik Sen, Scientist-D delivered a talk on "Diversity of spiders of Western Ghats: An overview" on 17.10.2020 in a Webinar organized by FFA group in collaboration with Seva Bharati Mahavidyalaya, Kapgari, Jhargram and Drishticon Organization.
56. Dr. Chitra J, Scientist C delivered lecture entitled "Role of Taxonomy in Faunal diversity and conservation on 10-10-2020 organized by P.G. & Research Department of Zoology, Government Arts college, (Autonomous), Kumbakonam, Tamil Nadu.
57. Dr. Sethy delivered a talk in National webinar on "Taxidermy as a Science towards preservation of our Animal Wealth", organized by Estuarine Biology Regional Centre, Gopalpur-on-Sea, Odisha. On 16-10- 2020.
58. Dr. Ch. Satyanarayana delivered a talk on "Restoration of Corals with special reference to the remarkable restoration efforts of Zoological Survey of India" as a guest of honour in the Inaugural of the Association of the Zoology department titled "ZOION" of Justice Basheer Ahmed Sayeed College for Women (Autonomous) Chennai on 27.10.2020.
59. Dr. Muhamed Jafer Palot, Scientist-B, delivered a talk on 'Faunal diversity of the Western Ghats' in a webinar jointly organized by the Zoology Association of Providence Women's College, Kozhikode and the Extension Division of the Kerala Forest Department in connection with the Wildlife Week celebration on 3rd October 2020; a talk on 'Importance of Mangrove ecosystem' in a webinar organized by the Social Forestry Division of Kannur district in connection with the Wildlife Week celebration on 4th October 2020; on 'Pelagic bird monitoring in Kerala' in a webinar jointly organized by the Social Forestry Division of Kozhikode and the Malabar Natural History Society in connection with the Wildlife Week celebration on 6th October 2020 and on 'Mangrove biodiversity of Kerala' in a workshop organized by the World- Wide Fund for Nature, Kerala State Office, Thiruvananthapuram on 10th October 2020.
60. Dr. Kailash Chandra, Director, ZSI delivered keynote on the 'Impact of Invasive Alien Species on Biodiversity Conservation' in a webinar organized by Southern Regional Centre, ZSI, Chennai on 4th November, 2020; Delivered a keynote lecture in the 'National

- Webinar on Soil Fauna of India- Exploring the Unexplored' via video conferencing on 11th November, 2020, organized by Training and Extension Division, ZSI, Kolkata.
61. Dr. C. Raghunathan delivered a lecture on Marine Invasive Species in India in a Webinar "Impact of Invasive Alien Species on Biodiversity Conservation' organized by ZSI-SRC, Chennai on 4th November 2020 and a lecture on Soil fauna – diversity, ecosystem services and threats in the Webinar on Soil Fauna of India – Exploring the unexplored organized by ZSI Headquarters on 11th November 2020
 62. Dr. P. M. Sureshan, Scientist-E delivered a talk on topic "Your Environment your responsibility" to the graduate students of Malabar Christian College, Calicut during the Orientation Programme on 5.11.2020; on "Awareness on Environment and wildlife" to graduate students of St. Xavier's College, Calicut during the Orientation Programme Alpha 2020 on 6.11.2020 in virtual mode.
 63. Dr. C. Sivaperuman, Scientist-E delivered a talk on the Biodiversity of A & N Islands to the trainees of Assistant Conservator of Forests, Forest Range Officers on 31st October 2020 organized by Forest Training Academy, Coimbatore, Tamil Nadu; delivered a talk on the Avifauna of A & N Islands to the teachers of A & N Islands and mainland on 10th November 2020 organized by CPREEC, Chennai as a part of Wipro Earthian 2020-2021.
 64. Dr. Dhriti Banerjee, Scientist-E delivered a lecture on "Soil Entomo fauna- Concepts and practices in managing soil health" at National webinar on "Soil Fauna of India- Exploring the Unexplored" organized by ZSI Headquarters on 11th November 2020.
 65. Dr. K. Rajmohana, Scientist-E delivered a talk on Exploring the Unknown: A taxonomist's perspective. in the webinar series on Progress and Prospects in Zoology, on 8th Nov. 2020.
 66. Dr. D.S. Suman, Scientist-D delivered a talk at the International Webinar Organized by Govt. PG College, Jiwaji University, Sheopur, MP on 9th November 2020.
 67. Dr. S.D. Gurumayum, Scientist-D delivered a talk on National webinar organized by Natural Science Association, St Joseph's college, Bengaluru on Fishes of Arunachal Pradesh on 9th November 2020.
 68. Dr. C. R. Sreeraj, Scientist-C delivered a lecture on Slug trails: Basics of the diverse molluscan group". for the Zoology students of Kannur University, Kerala on 6th November 2020.
 69. Dr. Muhamed Jafer Palot, Scientist-B, delivered a talk on "Mangrove Biodiversity of Kerala" at the international conference
 70. on "Mangrove Ecosystems: Synergies for Fishery Potential (CMESFP)" jointly organized by the Department of Environmental Sciences, University of Kerala, Thiruvananthapuram and the Estuarine & Coastal Science Association (ECSA), U.K. on 20th November 2020; delivered a talk on "Faunal Diversity of Kerala" in the webinar series (ENWENAR Session) jointly organized by the department of Zoology, Christian College, Chengannur and the Kottayam Nature Society, Kottayam, Kerala on 22nd November 2020.
 71. Dr. Kailash Chandra, Director delivered a keynote address in the webinar on "Biodiversity Conservation: Issues and Challenges" through video conferencing on 2nd December, 2020.
 72. Dr. Kailash Chandra, Director, delivered a keynote address in the webinar on "Biodiversity Heritage, People, Culture and Self-reliant Rural India, IISF-2020" via video conferencing on 23rd December, 2020.
 73. Dr. C. Raghunathan, delivered a lecture on Ornamental fishes of India: Trade, Status and Diversity during the Webinar on Ornamental fishes of India: Diversity and Prospects organized by ZSI Headquarters on 1st December 2020.
 74. Dr. Deepa J. Scientist-E delivered a lecture in the webinar on "Biodiversity hotspots of India" conducted by St. Anns PG College on 24th December 2020.
 75. Dr. K. Rajmohana, Scientist-E delivered an invited talk on 26th December 2020 on the topic, 'Wonderful World of Insects' in the National webinar series for students organized by 'The Space Club'- NGO, Calicut, Kerala.
 76. Dr. Gaurav Sharma, Scientist-E delivered a Lecture on "Faunal Diversity and their Conservation in India" to M.Sc. Forestry students from the Forest Research Institute (Deemed University), Dehradun during their visit to ZSI, NRC, Dehradun on 15th December, 2020.
 77. Dr. C. Sivaperuman, Scientist-E delivered a talk on the Biodiversity of A & N Islands (In Tamil) organized by the Department of Science and Technology, Tamil Nadu and Department of Information and Broadcast, New Delhi on 10th December 2020
 78. Dr. D.S. Suman, Scientist-D delivered invited talk on "Arthropod vectors in India with emphasis on management of dengue vectors"

- at National Webinar on Parasitic & Vector borne diseases and their control at Chaudhary Bansi Lal University, Bhiwani, Haryana 23 December 2020.
79. Dr. K.P. Dinesh, Scientist-D delivered an online talk on "Amphibian Diversity in India" in the Biodiversity-13 Webinar organized by the Flora and Fauna Asia Facebook Group, Department of Botany, Seva Bharati Mahavidyalaya, Kapgari, Jhargram, West Bengal in collaboration with DRISHTICON organization on 5th December 2020.
 80. Dr. C.R. Sreeraj, Scientist-C delivered one lecture on 18.12.2020 with topic "Introduction to Marine Biology", in a webinar organized by Dept. of Zoology, Nehru Arts and Science College, Kasaragod, Kerala.
 81. Dr. Chitra J, Scientist C participated as Chief guest and delivered lecture on "Introduction and Importance of faunal diversity in soil Health" during "World soil Day" celebrated and organized by Eco club, Sri Akhilnadeshwari Women's college Wandiwash, Thiruvalluvar University, Tamil Nadu (Video conferencing).
 82. Dr. T. Kubendran, Scientist-C delivered lecture on "Personality in Personalities" as motivational speech to post graduate and under graduate students organized by department of Zoology, Ayya Nadar Janaki Ammal College of Arts and Science, Sivakasi, Tamil Nadu on 22.11.2020 through Google meet.
 83. Dr. S.S. Talmale, Scientist-B delivered an online talk on "Small mammals of Indian scenario with special emphasis to conservation in India" in the Biodiversity Webinar 15 series organized by the Flora and Fauna Asia Facebook Group, Department of Botany, Seva Bharati Mahavidyalaya, Kapgari, Jhargram, West Bengal in collaboration with DRISHTICON.
 84. Dr. C. Raghunathan, Scientist-E delivered a lecture on Herpetofauna – an overview in the Webinar on Herpetology organized by ZSI on 20th January 2020.
 85. Dr. Sanjeev Kumar, Scientist-E delivered an invited lecture in a Webinar organized on the occasion of Udaipur Bird Festival 2020-21 organized by Rajasthan State Forest Department, Udaipur on 22nd January 2021 through virtual mode.
 86. Dr. Sanjeev Kumar, Scientist-E delivered an invited lecture in a Gyan Ganga Programme – A State level online training programme under Initiative for teaching – learning excellence in Zoology jointly organized by Commissionerate College Education, Rajasthan & Department of Zoology, Government Dungar College, Bikaner on 27th January 2021 through virtual mode.
 87. Dr. P. M. Sureshan, Scientist-E delivered a lecture on the topic 'Animal Taxonomy' at Sir Syed College, Thaliparamba, Kerala on 15th January 2021.
 88. Dr. Anil Mohapatra, Scientist-E delivered a talk on "Marine faunal conservation: Indian prospective" in the National Webinar organized by S.V.M. Autonomous college, Jagatsinghpur, Odisha on 23.01.2021.
 89. Dr. Jasmine, Scientist - E delivered a talk on "Polar ecosystem Study: Arctic" for Postgraduate and under Graduates students of NSS college, Kottayam, on 22th January, 2021 through virtual mode.
 90. Dr. S. D. Gurumayum, Scientist-E delivered an invited lecture on Aquatic Fauna diversity of Arunachal Pradesh with emphasis on Edible and Ornamental Fishes on 20th January 2021 at a Certificate course on People's Biodiversity Register Management organized by GB Pant National Institute of Himalayan Environment.
 91. Dr. D. S. Suman, Scientist – D delivered an invited talk on "Mosquito, Agriculture and Associated problems in vector management" at Department of Entomology, Guru Kashi University, University of Agriculture, Punjab on 12th January 2021.
 92. Dr. Mukesh Thakur delivered a key note and the lecture on Role of Conservation Genetics in Wildlife Conservation in the 2nd International Conference on Recent Trends in Biotechnology organized by the Jamal Mohamed College, affiliated to Bharathidasan University, Tamil Nadu on 19th Jan. 2021.
 93. Dr. K.P. Dinesh, Scientist-D delivered an online talk on "Overview of Amphibians of India" in the National Webinar on Herpetology organized by the Training and Extension Division, Zoological Survey of India, Kolkata on 20th January 2021.
 94. Dr. J.S. Yogesh Kumar, Scientist–D, delivered lecture to Jayaraj Annappackiam College for Women, Periyakulam, Tamil Nadu on 05th January 2021 on "Recent trends and innovations from the tropical marine forest".
 95. Dr. Ch. Satyanarayana, Scientist-D, delivered a talk "Ecological restoration of corals and coral reefs" at the Refresher Course for the PG Teachers in Environmental Sciences, organised by the UGC- Human Resource Development Centre, Goa University, on 22 January 2021.
 96. Dr. G. Sivaleela, Scientist-D, delivered a lecture 'Maintenance of Marine Ornamentals in

- Captivity' at the training programme on
98. clown fish culture organized by the Coastal and Marine Biodiversity Centre of the Mangrove Foundation, Mumbai, Maharashtra, on 28th January, 2021.
 99. Dr. Pratyush P. Mohapatra, Scientist-D delivered a talk on "Studies on Snakes in India" during National Webinar on "Herpetology" on 20.01.2021, organized by the Training and Extension Division, ZSI, Kolkata.
 100. Dr. S.K. Pati, Assistant Zoologist delivered a lecture on "Animal Taxonomy" as a resource person during the online Pre-PhD course work conducted by the Dr. Babasaheb Ambedkar Marathwada University, Aurangabad on 20th January 2021.
 101. Dr. C. Raghunathan delivered a talk on the status of taxonomical research in the inaugural session of the Post Graduate Diploma course on Integrative Animal Taxonomy held on 1st February 2021.
 102. Dr. C. Raghunathan delivered a keynote lecture on the Faunal Diversity of Western Ghats in the seminar on Biodiversity of Western Ghats: Prospects and Conservation organized by ZSI-SRC, Chennai on 5th February 2021 on the occasion of foundation stone laying ceremony for the additional building for SRC, Chennai.
 103. Dr. C. Raghunathan delivered a lecture on Marine Biodiversity in India for the students of Post Graduate Diploma course on Integrative Animal Taxonomy on 22nd February 2021.
 104. Dr. C. Raghunathan delivered a keynote lecture on Deep Sea Faunal diversity in India in the National Conference held on Deep Sea Bio-resources in Indian Ocean on 25th and 26th February 2021 organized by ZSI
 105. Dr V D Hegde, Scientist-E delivered a lecture on the history and achievements of NERC Shillong for the participants of the PG Diploma on Integrated Animal Taxonomy course on 4th February 2021.
 106. Dr. S.S. Talmale, Scientist-B delivered lecture as resource person on the topic 'Collection, Preservation and Identification of Rodents of Economic Importance' in the training workshop (virtual mode) organized by the All India Network Project on Vertebrate Pest Management, Central Arid Zone Research Institute, Jodhpur on 12th February, 2021.
 107. Dr. Muhamed Jafer Palot, Scientist-B delivered a talk (online) on 'Faunal diversity of Kerala- An Overview' at the International Webinar series (Esperenza-2021) organized by the Department of Zoology, CPA College of Global Studies, Puthanathani, rd Malappuram district, Kerala on 03 February, 2021.; delivered a talk on 'Vertebrate Faunal Diversity of Western Ghats' at the Seminar on 'Biodiversity & conservation of the Western Ghats' on 05th February, 2021 organized by Zoological Survey of India, Southern Regional Centre, Chennai in connection with the release of the book, Fauna of Western Ghats Biogeographic Zone; delivered a talk on 'Mangrove wetlands of Kerala' at the Wetland day webinar organized by NSS College, Manjeri, Malappuram district on 02nd February, 2021; delivered a talk on 'Butterflies of Western Ghats' for the Zoology students of Malabar Christian College, Kozhikode on 05th February, 2021.
 108. Dr. Pratyush P. Mohapatra, Scientist-D delivered a talk on "Herpetofauna of Chhattisgarh" at Chhattisgarh Vigyan Sabha on 02.02.2021; delivered an invited talk on "Prospects in Zoological Studies" during a webinar organized by the Dept. of Zoology, Govt. Sundar Agrawal PG College, Sihora, Jabalpur on 12.02.2021 organized by the Dept. of Zoology, Govt. Shyam Sundar Agrawal PG College, Sihora, Jabalpur.
 109. Dr. Sanjeev Kumar, Scientist-E made a presentation on the Introduction of Desert Regional Centre of Zoological Survey of India at Jodhpur, Rajasthan to the students of Post Graduate Diploma in Integrative Animal Taxonomy Course as part of the Inaugural Function of the course conducted by ZSI, HQ, Kolkata on 3rd February, 2021 through virtual mode.
 110. Dr. Sanjeev Kumar, Scientist-E delivered the lectures on The Desert Ecology on 17th February, 2021 and Desert and Arid Zone Faunal Diversity on 23rd February, 2021 to the students of Post Graduate Diploma in Integrative Animal Taxonomy Course under conducted by ZSI, HQ, Kolkata on through virtual mode.
 111. Dr. Gopal Sharma, Scientist-E delivered an introductory lecture on the History and Achievements of GPRC ZSI, Patna from its inception in the inaugural session of Post Graduate Diploma Course in Integrative Animal Taxonomy on 3.02.2021.
 112. Dr. Avtar Kaur Sidhu, Scientist-E & Officer in Charge delivered an introductory lecture on "High Altitude Regional Centre: its activities and achievements" at inaugural session of PG Diploma Course in Integrative Animal Taxonomy being organized by ZSI, Kolkata, on 03.02.2021.
 113. Dr. Avtar Kaur Sidhu, Scientist E delivered a

- lecture on “High Altitude faunal diversity” to students of PG Diploma Course in Integrative Animal Taxonomy being organized by ZSI, Kolkata 23.02.2021.
114. Dr. Archana Bhauguna, Scientist-E delivered invited lecture on “Biodiversity of freshwater turtles and tortoises of Ganga and Baanganga (Haridwar: Uttarakhand) by using molecular tool for their conservation” in National workshop (online) Biodiversity and Ecosystem Health Assessment of Upper Ganga Basin on 25th February 2021 organized by Department of Zoology and Environment Science Gurukul Kangri University Haridwar and National Institute of Hydrology, Roorkee, Uttarakhand
 115. Dr. P. M. Sureshan, Scientist-E delivered a lecture on the topic 'Brief on Western Ghats Ecology' under module Ecological Principles and Methods for PG diploma course on Integrative Animal Taxonomy being conducted by ZSI, Kolkata on 18th February 2021.
 116. Dr. Anil Mohapatra, Scientist-E presented on “Sea Turtle tagging”: on 10.02.2021 in the workshop on Sea Turtle Management,
 117. 2021, Organized by State Forest Department, Odisha.
 118. Dr. Narender Sharma, Scientist-E delivered a lecture on “Gap Areas with particular reference to Faunal Studies in Arunachal Pradesh” in a workshop organised by the Arunachal Pradesh State Council for Science and Technology and North East Regional Centre (NERC), G.B. Pant National Institution of Himalayan Environment (GBPNIHE), on 24.02.2021 at Itanagar and also delivered an Introductory lecture on ZSI, APRC, Itanagar and Faunal Diversity of Arunachal Pradesh to the participants of Post Graduate Diploma in Integrative Animal Taxonomy on 3rd February 2021
 119. Dr. A.N. Rizvi, Scientist-E delivered lecture on Soil Faunal Diversity to students of Post Graduate Diploma in Integrative Animal Taxonomy.
 120. Dr. M.E. Hassan, Scientist-E delivered a lecture on “Ecosystem: Agriculture” under the Module - Ecological principles and methods in the Post Graduate Diploma in Integrative Animal Taxonomy-2021.
 121. A Rameshkumar, Scientist-C delivered a lecture on “Ecological Niches & flows” under the Ecology module for PG Diploma in Integrative Animal Taxonomy.
 122. Dr. Mukesh Thakur delivered a lecture as a Resource person in the Faculty Development Program on “Good Laboratory Practices” organized by the Department of Life Sciences, School of Basic Sciences and Research, Sharda University, Greater Noida, India on 8th Feb 2021.
 123. Dr. Mukesh Thakur delivered a lecture in the module 1: Ecology principles and methods, PG Diploma course in Integrative Animal Taxonomy during 8th Feb-10th Feb 2021.
 124. Dr. Mukesh Thakur delivered a lecture as a Resource person in “Use of Wildlife Forensic in Investigation” in the e-course on Investigation of Wildlife crime cases organized by the Central Detective Training institute, Jaipur during 22nd to 24th Feb 2021
 125. Dr. C. Sivaperuman, Scientist-E delivered a talk on Island Faunal Diversity to the diploma trainees of ZSI, Kolkata on 24th February 2021; Delivered a talk on Faunal Diversity of Island ecosystem to the student and teachers of Government Model Senior Secondary School, Port Blair visited on 27th February 2021 as a part of World Science Day 2021 organized by Department of Science & Technology, A & N Islands.
 126. Dr. P. M. Sureshan, Scientist-E delivered a lecture on the topic “Role and functions of ZSI” in the Webinar cum virtual study tour on 08.3.2021 organized by PG and Research department of Zoology, Sree Narayana College, Pattambi, Kerala.
 127. Dr. Sanjeev Kumar & Dr. H. S. Banyal, Scientist-E attended and presented research papers in Official Language Scientific Seminar on Role of science in building self- reliant India organized by Defence Laboratory, DRDO, Jodhpur on 15th -16th March 2021.
 128. Dr. Sanjeev Kumar, Scientist-E delivered invited lecture on Conservation of Wildlife from a common man's perspective organized by Regional Institute of Education, Ajmer, Rajasthan under the Environmental Education - Theme Park on 23rd March, 2021 through virtual mode.
 129. Dr. C. Sivaperuman, Scientist-E delivered a talk on Antarctica: A Fascinating journey through everlasting ice to the trainees of the Refresher course in Environmental Studies organized by UGC-Human Resource Development Centre, Madurai Kamaraj University, Madurai on 20th March 2021.
 130. Dr. G. Maheswaran, Scientist-E delivered a lecture on World Sparrow Day on 20 March, 2021.
 131. Dr. K. A. Subramanian, Scientist-E, delivered lecture on “Biodiversity and Conservation Challenges in the Western Ghats” on 10th March, 2021 at Entomology Research Institute,

- Loyola College, Chennai and on biodiversity conservation laws and IUCN threat assessment to the students of PG Diploma Course in Taxonomy, ZSI, Kolkata on 11th & 12th March, 2021.
132. Dr. Anil Kumar, Scientist-E presented an invited talk titled, "Avifauna of India: Identification techniques, taxonomical advances and significance" on 4th March 2021, through online mode in a National level Workshop titled, 'Fish and Avian Diversity: Identification and Conservation, 03-04 March, 2021' organised by Faculty Development Centre, Kurukshetra University, Kurukshetra, Haryana.
 133. Dr. Anil Mohapatra, Scientist-E & Officer-in-Charge had online presented "Faunal Diversity Profile of India: Fishes (Marine)" on 01.03.2021 for the students of Post Graduate Diploma in Integrative Animal Taxonomy, organized by Zoological Survey of India, Kolkata.
 134. Dr. Anil Mohapatra, Scientist-E had online presented "Taxonomy of marine eels: with special reference to the Indian waters" in the International Training Workshop on Ichthyotaxonomy on 25th, March, 2021, organized by University of Kerala.
 135. Dr. A. Rameshkumar, Scientist-C delivered a lecture on "Introduction on Sampling and Collection methods with reference to Entomological research" under the module 3 (Statistical applications in Biodiversity studies) for PG Diploma in Integrative Animal Taxonomy.
 136. Imran Alam, has delivered a lecture on Bird Diversity Profile of India: an overview to PG Diploma student on 11th March 2021.
 137. Dr L Kosygin Singh, Scientist-E delivered a lecturer on Freshwater Fishes for the students of the Post Graduate Diploma course of ZSI.
 138. Dr. Rajmohana K, Scientist-E delivered an invited lecture on 'Parasitic Hymenoptera of India', on 3.3.2021, at the 6th National Conference on Biological Control, organised by NBAIR, Bengaluru; As Coordinator of ENVIS Centre, organised a National Webinar on World Sparrow Day, 20th March 2021 and also online painting competition for Kids of the age group 7-12 years.
 139. Dr Gopal Sharma Scientist E delivered an invited lecture on 8th March 2021 at Sahibganj on Diversity of Ganga and its conservation under swachhata week organized by Sahibganj District administration.
 140. Dr. K.P. Dinesh, Scientist-D provided webinar class on the "General aspects of Integrative Taxonomy" to the PGDC students of the Zoological Survey of India, Kolkata on 26th February 2021; on the "Amphibian diversity in India" to the PGDC students of the Zoological Survey of India, Kolkata on 2nd March 2021.
 141. Dr. Mukesh Thakur delivered a lecture in the Department of Life Sciences, SBSR, Sharda University, Noida, to celebrate World Wildlife Day. Lecture delivered on Genetic monitoring of threatened mammals in Indian Himalayan region on 03rd March 2021.
 142. Dr. M.J. Palot, Scientist-B delivered an online talk on "Biodiversity around us" organized by the Aranyakam Foundation, Thrissur, Kerala for the school students on 3rd March 2021; delivered an online talk on "Faunal diversity of Kerala— An overview" in the webinar jointly organized by the Kerala Forests & Wildlife Department (Social Forestry & Extension Division, Kozhikode) and the NSS Unit of MES College, Ponnani on the occasion of the Wildlife Day on 3rd March 2021.
 143. Dr. N. Marimuthu presented Chief- Guest Address, online entitled, "Role of Basic Sciences in Marine Biodiversity Assessment" to Government Arts and Science College, Sivakasi, Tamil Nadu during the National Science Day 2021 celebration on 01.03.2021.
 144. As a Team leader, conducted the module-3 (Statistical applications in the Biodiversity studies) of PG Diploma course on Integrated Animal Taxonomy in ZSI, Kolkata.
 145. Dr. Pratyush P. Mohapatra, Scientist-D delivered an online talk on "Snakes (Reptilia)" for the PG Diploma on Integrative Animal Taxonomy, organized by the Zoological Survey of India, Hqs., Kolkata on 03.03.2021.
 146. Dr. S.S. Talmale, Scientist-B delivered a lecture on "Taxonomy of Mammals" as a resource person to the students of B.Sc. and M.Sc. Zoology of the Padmashri Vikhe Patil College of Arts, Science & Commerce, Prawaranagar, Ahmednagar on 20th March 2021.
 147. Dr. V M Sathish Kumar, Scientist-B delivered an invited lecture on "Cybertaxonomy: merits and demerits" on 05.03.2021 at a webinar hosted by the Sacred Heart College, Thevara Higher educational institution, Kochi, Kerala.

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ENVIS CENTRE ON FAUNAL DIVERSITY

ENVIS (Environmental Information System) Centre on Biodiversity (Fauna)- the Centre is one of 85 network partners of the Environmental Information System (ENVIS), the focal point of which is located in the Environmental Information System (ENVIS) Government of India at New Delhi.

ZSI Headquarters is functioning as the host of the Environmental Information System (ENVIS) on faunal diversity in India. The primary objectives of ENVIS are, to build up storage, retrieval and dissemination capabilities, with ultimate objective of dissemination of information speedily to the users in the field of animal diversity; to provide national environmental information system relating to the fauna of the country; to promote national and international co-operation and Liaison for exchange of information relating to the subject area; to promote exchange of information relating to the subject area amongst developing countries and to promote, support and assist education and personal training programmes designed to exchange animal biodiversity related information processing and utilizing capabilities.

During the year following targets were achieved by the ENVIS Centre

Programs Conducted	Details
Publication During The Period	ZSI ENVIS Newsletter Vol 27 (2020-21) 1. Issue I: Theme: Insects of Economic Importance: Locust 2. Issue II: Theme: Insects of Economic Importance: Silk Moths 3. Issue III: Theme: Insects of Economic Importance: Bees 4. Issue IV: Theme: Insects of Economic Importance: Lac Insects
Poster/ Leaflet / Knowledge Product	POSTERS: 4 • COVID-19: Do's and Don'ts • International Horseshoe Crab Day • International Day of Yoga • <u>World Wildlife Day 2021: Forests and Livelihoods Sustaining People and Planet</u>: On the Honey hunters of Indian Sundarban BROCHURE: 1 • Threatened species of Sharks & Rays in India DATABASE PREPARATION: • Endemic Fauna of Andaman & Nicobar Islands: 1032 species. (uploaded to ENVIS websites) Source: Rao, D.V., Chandra, K. and Devi, K. 2017. Endemic Fauna of Andaman & Nicobar Islands. pp.1–184. Published by the Director, Zool. Surv. India, Kolkata. (http://www.zsienviis.nic.in/UserMajorActivities.aspx?ID=19011) • Faunal diversity of India: (http://www.zsienviis.nic.in/UserMajorActivities.aspx?ID=21021) • Faunal Database of Lakshadweep: Completed, verification under progress). Source: Fauna of Lakshadweep (1991). Published by Director, Zoological Survey of India. pp. 413. • Faunal Diversity of Indian Himalaya: Total 4085 (Pisces: 316; Amphibia: 80; Reptilia: 200; Aves: 936; Mammalia: 279; Mollusca: 423; Tardigarda: 23; m Diplopoda: 52; Chilopoda: 51; Mecoptera: 10; Siphonaptera: 35; Diptera: 1680) MOBILE APP: Mobile App on State Birds and Animals of India NES GRIDSS ISBEID: • Ecological Data: 5 Data set of physico-chemical parameters and population along with 6 thematic maps. • Database generation on Dist. Purulia, State: West Bengal (ongoing), Format sent by ENVIS Sect. MoEF CC, New Delhi.

Programs Conducted	Details
Symposium/ Conference & Competition/ Contest Organized	1) ENVIS Centre on Biodiversity (Fauna), Zoological Survey of India, organized a national webinar on the 'International Day for the Conservation of the Mangrove Ecosystem' for PG students, Research Scholars and Faculty Members on 27th July 2020. Along with the webinar one online elocution competition on the theme 'Mangroves of India' was also organized for the students in 11th and 12th standards. 600 e-Certificates were distributed among the participants and also to the winners of the elocution competition 2) ENVIS Centre on Biodiversity (Fauna) observed 'World Ozone Day' on 16th September, 2020 at ZSI Hq. One National Level Webinar on 'Ozone for life: 35 years of ozone layer protection' from 12.30–2.30 pm. Dr. Jayanarayan Kuttippurath, Assistant Professor, Centre for Oceans, Rivers, Atmosphere and Land Sciences (CORAL), Indian Institute of Technology, Kharagpur delivered an invited talk on 'Montreal Protocol and Ozone loss in the Arctic'. Online Essay Competition for college students on the Ozone Day on 16th September 2020. More than 300 e-certificates were distributed among participants based on feedback forms 3) A national webinar and a painting competition were organized to observe World Sparrow Day on 20th March 2021. Dr. Gopinathan Maheswaran, Scientist-E, ZSI, delivered an invited talk on the 'Status of House Sparrow and Common birds in Urban environment'. The programme was moderated by Dr. Rajmohana K., Scientist-E and Coordinator, ENVIS, ZSI. An online painting competition on the theme Common Backyard Birds for kids (age group between 7 and 12 years) was also organized. 44 kids participated from different parts of India in the programme. Sri Sathyan Meppayur was the evaluator for the painting competition
Other Activities	• Various designing work on Posters and certificates • Typesetting: • A Checklist of family Mutillidae (Insecta: Hymenoptera) of India: Version 1.0. dealing with 218 sp. • A Checklist of Ampulicidae (Insecta: Hymenoptera: Apoidea) of India. Version 1.0. dealing with 35 sp. • A Checklist of Sphecidae (Insecta: Hymenoptera: Apoidea) of India. Version 1.0. dealing with 61 sp. • A Checklist of Tiphidae (Insecta: Hymenoptera: Vespoidea) of India. Version 1.0. dealing with 75 sp. • A Checklist of Stephanidae (Insecta: Hymenoptera: Stephanoidea) of India. Version 1.0. dealing with 31 sp. • A Checklist of Chalcididae (Insecta: Hymenoptera: Chalcidoidea) of India. Version 1.0. dealing with 241 sp.
Updating Of Website & Fb Pages	Updating of websites by maintaining data repository, newspaper reports, and information of the upcoming events. Total Download: 1095 (www.zsienvis.nic.in)
Achievements	• Through Website and FB, ENVIS activity reached to more than 15,000 public including students, researchers, scientists, academicians, policy makers etc. (Source: ENVIS web and ENVIS FB) • The webinars organized by ENVIS RP at ZSI was attended by the participants from 25 States and UTs of India and 4 foreign countries like, Nigeria, Morocco, Iran and Singapore.

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INFRASTRUCTURE DEVELOPMENTS

ZSI is continuously upgrading the laboratories, sections and Centres, repositories for strengthening its functioning ability, during 2020-21, several such developments have been initiated and completed.

1. The DNA and Molecular Systematic Laboratory were inaugurated on 5th March, 2021 at EBRC, ZSI
2. C.S. Kar Centre for Sea Turtle in the name of Dr. C.S. Kar, one of the Pioneer sea turtle researchers of Odisha was inaugurated on 5th March, 2021 at EBRC, ZSI
3. Foundation Stone was laid for the Visiting Scientists Hostel at ZSI Residential Quarters campus on 12th March 2021 at ANRC, ZSI
4. Molecular Systematics Laboratory was inaugurated on 12th March 2021 at ANRC, ZSI.
5. Foundation stone for new building of Southern Regional Centre, Chennai was laid on 5th February, 2021.

New Vehicles procured

During the past, 05 new Scorpio S11 2WD Vehicle have been purchased for HQ. Also 03 New Scorpio Vehicle S11 4WD and 04 New Scorpio Vehicle S11 2WD for WRC Pune, FBRC Hyderabad & HARC Solan and DRC Jodhpur, MBRC Chennai, ANRC Port Blair & NRC Dehradun have been purchased respectively. Total 12 New Scorpio Vehicle have been purchased.

e-Procurement and Govt-e-Market

Zoological Survey of India has adopted the e-Procurement and Govt-e-Market which is being handled by the Stores section. Following material have been procured adopting this system:

SI No	Description	SI No	Description
1	Work Stations server	7	Hot Air Oven
2	Printers	8	Water Purification system
3	Photocopier Machine	9	Chairs
4	UPS	10	Stock Purpose Items
5	Spilt Air conditioner 1.5 Ton	11	Stationery items
6	esktop Computers qty-35	12	Spares for Microscope

Annual Maintenance Contract

Annual Maintenance Contracts have been concluded for different Equipment held at ZSI after adopting tendering system. AMC was undertaken for the following

SI No	Details	SI No	Details
I	Computer & Printers etc	v	Split Air Conditioner
ii	Microscope	vi	Photocopier Machine
iii	SEM	vii	EPABX System
iv	VRF Air Conditioner	viii	Equipment held at DNA Lab

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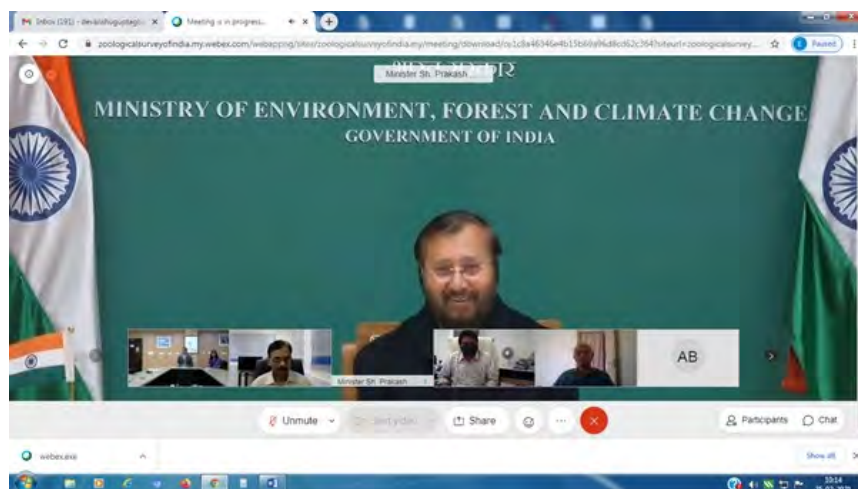
EVENTS & ACTIVITIES

ZSI Headquarters and all its Regional Centres are actively organizing many events and activities for creating awareness for the Biodiversity and its Conservation.



Hon'ble Minister, Shri Prakash Javedkar, released the book titled 'Faunal Diversity of Biogeographic Zones of India: Coasts' at Lakshadweep

Hon'ble Minister, Shri Prakash Javedkar released the book titled 'Deep Sea Faunal Diversity of India through video conferencing



World Environment Day: 5th June 2020 was celebrated at ZSI-HQ by organizing series of waraeness lectures by Scientists



Three Books were relaeased by the Hon'ble Minister Shri Babul Supriyo



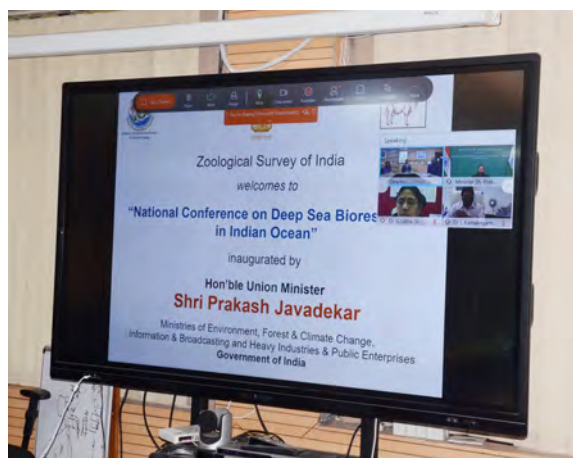
"Faunal Diversity of Ramsar Wetlands of India" book released by Hon'ble Minister Shri Babul Supriyo

Foundation stone for the new building of Zoological Survey of India, Chennai





Paleozoology Museum was inaugurated by the Director ZSI at ZSI-HQ



National Conference on Deep Sea Bioresources in India Ocean was inaugurated by Hon'ble Union Minister, Shri Prakash Javadekar



Book release by Minister of Environment & Forest, Shri. Allola Indrakaran Reddy at FBRC, ZSI



FBRC-Regional Museum
Inauguration by Shri Adhar Sinha,
IAS

Visiting Scientists Hostel and
Molecular Systematics Laboratory
at ANRC, ZSI



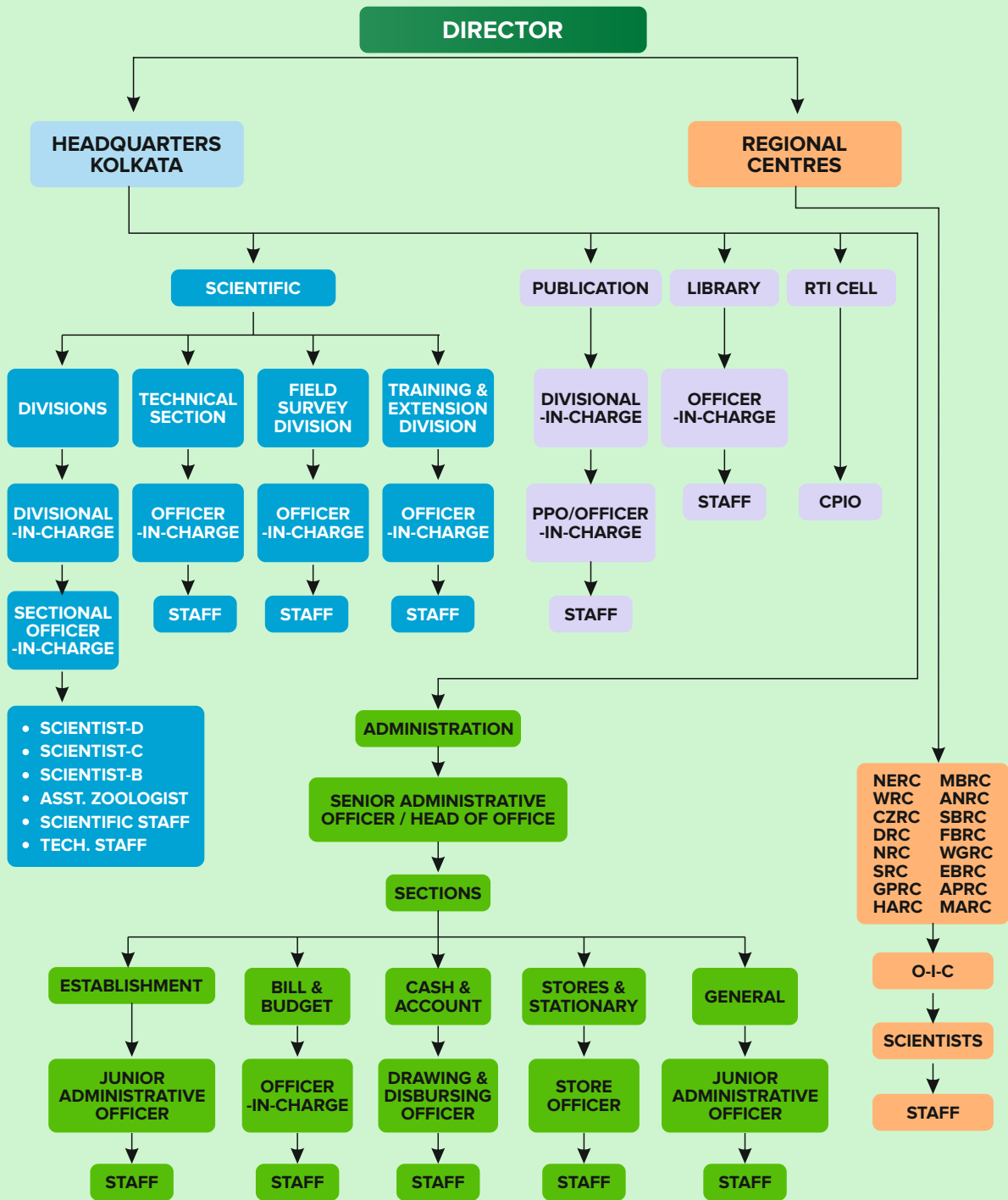
Inauguration of DNA and Molecular Systematics Laboratory & C.S. Kar Centre for Sea Turtle Research at EBRC, ZSI

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ORGANIZATIONAL STRUCTURE

ZOOLOGICAL SURVEY OF INDIA

ORGANIZATIONAL STRUCTURE



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ACCOUNTS

Statement of Actual Expenditure up to 31.03.2021
(From 01.04.2020 to 31.03.2021)

Sub-heads	BE	Expdt.	Balance	Percentage
as Demand	2020-21	Upto the		
for Grants		31.03.21		
Salary	452800000	452214639	585361	99.87
Wages	598000	597644	356	99.94
O.T.A.	21000	20875	125	99.40
Medical	4000000	3993541	6459	99.84
D.T.E.	3000000	2867221	132779	95.57
F.T.E.	0	0	0	0.00
O.E.	38500000	38344400	155600	99.60
RRT	2000000	1993476	6524	99.67
Publication	4800000	4760151	39849	99.17
S. & M.	15560000	15755059	-195059	101.25
Min. Works	29980000	29979540	460	100.00
OCS	41100000	41098439	1561	100.00
Grants-in-Aid	50000	50000	0	100.00
Sch. & Stp.	8000000	7992714	7286	99.91
Other charges	1540000	1546431	-6431	100.42
Total :	601949000	601214130	734870	99.88

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ACKNOWLEDGEMENTS

Zoological Survey of India acknowledges the encouragements and support provided by

- **The Honourable Minister, Ministry of Environment, Forest & Climate Change,**
- **The Secretary, Ministry of Environment, Forest & Climate Change**
- **Additional Secretary, Ministry of Environment, Forest & Climate Change**
- **Joint Secretary, Ministry of Environment, Forest & Climate Change**



सत्यमेव जयते



Ministry of Environment
Forest & Climate Change

75
Azadi Ka
Amrit Mahotsav



ANNUAL REPORT 2020-21

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Forest and Climate Change
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