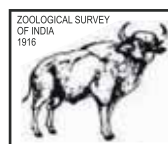




Ministry of Environment
Forest & Climate Change



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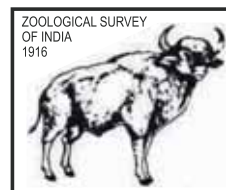
ZOOLOGICAL SURVEY OF INDIA



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ANNUAL REPORT 2019-2020

ZOOLOGICAL SURVEY OF INDIA

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VISION

Taxonomy towards conservation and sustaining biodiversity/faunal diversity for future.

MISSION

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

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FROM THE DESK



It is my immense pleasure to present the Annual Report 2019-20 of Zoological Survey of India [ZSI], highlighting the significant progress made by the organization in survey, documentation of faunal resources, description of new species, assessment on the status of threatened species, biodiversity monitoring, advisory services, molecular studies, capacity building and outreach activities.

Faunistic surveys in all the ecosystems of our country is the integral activity of ZSI and it has conducted 119 long-term surveys in all the ecosystems and ten biogeographic zones of India covering mountain, flood plain, wetlands, marine, estuarine and freshwater habitats. Altogether 118 research programmes dealing with faunal components from Protozoa to Mammalia on pan India basis have been handled. In addition, 31 grants-in-aid projects have also been operated with the financial support of different funding agencies.

Description of new species is imperative in ZSI by exploring the unexplored fauna in the hydrosphere and lithosphere. During the year 128 species have been described as new to science mostly from Himalayas and Western Ghats. Majority of them are insects, followed by fishes, amphibians and reptiles. Further 65 species were found as first report to Indian context.

OF DIRECTOR...

Knowledge on various arena of zoological affairs acquired by the scientists of ZSI is regularly being disseminated in the form capacity building trainings and workshops to the students, researchers, academicians, wildlife managers and law enforcing authorities especially on taxonomy of different faunal groups, wildlife forensics and crime control, Vector borne diseases, Antarctic penguins, GIS and remote sensing techniques etc. Over 20 such programmes have been organized in which 1144 participants benefited across the country.

Having state-of-art laboratories for DNA molecular studies in ZSI headquarters and six Regional Centres, ZSI is regularly barcoding the animal species and during the year 1325 DNA barcodes have been generated for 384 species and submitted to BOLD and NCBI.

Further to add that, significant achievement on the publications of ZSI could be witnessed as 34 books, 150 papers in SCI journals, 158 in International and National Journals, 136 Book chapters and 4 issues of Records of ZSI.

ZSI also made its contribution in UNCCD-CoP 14 at Greater Noida on August 2019 and CMS-CoP at Gandhinagar during February 2020 by organizing side events on Faunal Diversity of Indian Deserts and Transboundary migratory species in Indian land and seascape respectively which drawn an attention of audience from different countries to understand India's effort on biodiversity conservation.

As a part of infrastructural development, Himalayan faunal repository at Himachal Pradesh Regional Centre has been dedicated to the Nation while the construction of Estuarine Museum in Estuarine Biology Regional Centre is under progress.

With this noteworthy progress, I take this opportunity to extend my gratitude to entire fraternity of ZSI for providing relentless support to achieve the goals of ZSI efficiently and to service to the Nation for effective conservation of nature and its bio-resources.

JAI HIND

[Dr. Kailash Chandra]

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EXECUTIVE SUMMARY

Zoological Survey of India [ZSI] is 104 years 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 diversified ecosystems by effectively conducting periodic surveys. In recent years much emphasis has been given to record the animals in Protected Areas, Biogeographic Zones, Ramsar Sites of the country. Having the strength of data on faunal distribution in the country, the ZSI is providing inputs to policy related issues especially on biodiversity management, climate change, forensic studies, environmental impact assessments in the ecologically fragile areas, status survey of threatened species etc.

The ZSI is periodically updating the data on faunal species in India and as on 31st December 2019 it is to the tune of 1,02,161 species in which Arthropods stands tall with 76,461 species. India contributes 6.52 percent global faunal diversity with an endemism of about 28 percent. Among the animals reported from the country over 2,800 species are protected under different schedules of Wildlife (Protection) Act, 1972.

The jurisdiction of ZSI is the entire landmass of our country including Exclusive Economic Zones at high seas for the faunal exploration. Assessment of faunal diversity of State and Union Territories of India is one of the major tasks of ZSI in which so far 25 States and Union Territories are documented. Presently the fauna of Himachal Pradesh, Telangana, Assam, U.T. of Puducherry, U.T. of Lakshadweep and U.T. of Ladakh are under the process of documentation based on the data acquired through various surveys over the period.

Studies on the animal resources in ten Biogeographic Zones is one of the priority areas in which ZSI documented the faunal resources in most of them. It is found that 30,377 species in Himalayas, 3,324 species in Trans-Himalayas, 11,009 species in Islands, 11,883 species in Coasts, 18,257 species in North-East biogeographic zone while compilation of data for Desert, Semi-Arid and Deccan Peninsula is under progress.

In order to protect the biodiversity, 903 protected areas sprawling over 5.02 per cent of the Country's geographical areas have been designated, of which faunal communities have been thoroughly listed from over 120 protected areas by ZSI. Besides, 20,444 species from marine, 9,457 species from freshwater, 3,939 species from estuarine, 5,747 species from mangroves and 6,602 species from wetlands ecosystems.

Presently the surveys were intensified to document the animals in terrestrial and marine ecosystem of Andaman and Nicobar Islands, Lakshadweep, Eastern Himalayas, Eastern Ghats, Flood plain wetlands,

Agro ecosystems etc. while assessing the insect pollinators in croplands.

During the financial year 2019-2020 alone 118 scientific programmes and 31 externally funded projects have been handled by ZSI Headquarters and its Regional Centres. Altogether 121 long-term surveys and several short-term local surveys in various ecosystems of the Nation were completed during the year. Regional Centres of ZSI made 68 surveys within their jurisdiction and the headquarters conducted 51 surveys covering different States of the Country. The surveys covered a vast area in terrestrial, wetland, marine and freshwater regions to the extent of 31,806 square kilometres. To assess the biodiversity of protected areas, 42 surveys were conducted to protected areas during the year.

ZSI is one of the largest faunal specimen repositories in the world, and it maintaining 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, of which, the current year surveys added 1,15,587 specimens under 31 different faunal groups in National Zoological Collections. It is pertinent to mention that 1,11,242 specimens have been taxonomically identified and registered during year. All the species identified are also digitized with the habitat details for the benefit of the needy. The number of species identified during the year leads to 8,912 comprising 48 groups of animals from terrestrial, freshwater, estuarine and marine environments. Further, a total of 128 species have been newly described by scientists of ZSI while 64 species were reported for the first time from country.

ZSI provides the identification and advisory services to the law enforcing agencies, universities, institutions, students and researchers in faunal perspectives and as a result several agencies approaching ZSI every year. During the year, 4,630 specimens and photographs were identified for 151 different institutions, while 962 materials received from 53 departments were identified exclusively for

confiscated material of different animals or parts of the body for the benefit of Court of law to culminate the wildlife crime.

The outcome of the research findings is regularly published by ZSI in its home journals, special volumes and also in the externally published peer reviewed journals. The present year alone 484 publications are made out by ZSI, of which 34 books, 150 papers in SCI journals, 158 in National and International Journals, 136 Book chapters and 4 issues of Records of ZSI are mention worthy. The few books especially Biogeographic Zones: Trans-Himalayas and Fauna of Punjab are the comprehensive documents which disseminate complete list of species reported from the region.

Capacity building is one of the key activities of ZSI in which series of training programmes, seminars, workshops, conferences on different thematic areas are being organized. The students, researchers and academicians to the wildlife conservators, managers, law enforcing authorities and policy makers are regularly getting benefitted out them. Current year alone 14 such programme have been conducted. Altogether 1,144 participants were enrolled for these outreach programmes during the year.

ZSI has well established laboratories for DNA molecular studies in its Headquarters at Kolkata and Regional Centres viz, 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 Himachal Pradesh Regional Centre, Solan. Though ZSI is committed to barcode all animal species in India, the animals under new species, rare, threatened, scheduled, endangered and endemic species are given priority to barcode. During the current year 1,325 nucleotide sequences belonging to 384 species have been submitted to Barcode of Life Data System (BOLD) and nucleotide sequences at GenBank.

The primary role of a natural history museum is to provide the scientific community and general public with current and historical specimens for

research and to improve our understanding of the nature and in turn to conserve the biodiversity. The ZSI Headquarters as well as all Regional Centres maintaining the Museum by exhibiting important faunal elements of the particular regions for the benefit of the large section of people. Visitors of the museum in Regional Centres were 2,46,314 persons as per the registered entries.

ZSI is periodically making short films depicting the importance of the fragile ecosystems and its biodiversity conservation. During the year, a film on East Kolkata Wetlands and Coastal Corridor - Chilka lagoon have been released for wide publicity. Besides, the knowledge obtained by the scientists of ZSI in different arena of zoological affairs is regularly being disseminated in the form of lectures, group discussions, training etc. On this line more than 250 lectures have been delivered by the scientists for the benefit of students, researchers and academicians of various universities, colleges and schools during the year.

ZSI entered a Memorandum of Understanding with different Universities in India for collaborative research on zoological studies and also to undertake Ph.D. programme in which large number of research fellows working under various projects in ZSI availed this opportunity. Presently 110 students are enrolled for Ph.D. degree programme under the supervisor-ship of ZSI scientists. During the year 10 students have been awarded for Ph.D. degree while 5 students submitted their thesis.

Library of ZSI is one of the largest knowledge centres in Asian region especially on the zoological affairs. This facility is not only used by the incumbents of ZSI but also by the students, researchers and academicians from various universities across the country. Over 4,000 persons utilized this facility during the year. In order to further strengthen the library 711 journals and 976 books have been added at all the libraries of ZSI in Headquarters and Regional Centres.



The scientific infrastructure of ZSI is being extended to the researchers and students for undertaking taxonomical studies. Several students availed internship and dissertation works on their interested group of animals ranging from Protozoa to Mammalia by utilizing the laboratory facilities and National Zoological Collections of ZSI. Hundred and fifty researchers availed the laboratories at Headquarters and Regional Centres for their studies during the year.

To cope with modern taxonomical research, the ZSI is periodically updating its facilities by adding new version of equipment par with international standards. Accordingly, during the year Microscopes, Projectors, Work Stations, Insect Storage Systems, Digital Camera with underwater housing, Water Quality Analyser, Interactive Flat Panel display and GPS were added.

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-welling.

The Zoological Survey of India is a premier institution established on 1st July 1916 to promote survey, exploration and research leading to the advancement in our knowledge of various aspects of exceptionally rich faunal resources of the erstwhile 'British Indian Empire'. The survey has its origin in the establishment of the Zoological Section of the Indian Museum at Calcutta in 1875. This national institution is functioning under the Ministry of Environment, Forest and Climate Change (MoEFCC), Government of India. Over the years the scope of ZSI has been expanded based on the need of the country 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. and acts as a custodian of the National Zoological Collections as ZSI 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, Inventorying and Monitoring of faunal diversity in various States, Ecosystems and Protected Areas of India.
- Taxonomic studies of all faunal components collected.
- Periodic review of the status of Threatened and Endemic species.
- Preparation of Red Data Book, Fauna of India and Fauna of States.
- Bioecological studies on selected important communities/ species.
- Maintenance & Development of National Zoological Collections.
- Training, Capacity Building and Human Resource Development.
- Faunal Identification, Advisory services and Library Services.
- Publication of results including Fauna of India and Fauna of States.

SECONDARY OBJECTIVES

- Environmental Impact Assessment Studies.
- Maintenance and Development of Museum at Headquarters and Regional Centres.
- Development of ENVIS and CITES Centres.
- Research Fellowship, Associateship and Emeritus Scientist Programmes.
- Collaborative research programmes on Biodiversity with other Organizations.
- GIS and Remote Sensing studies for animal diversity as well as for selected threatened species.
- DNA Barcoding of important taxa

PRINCIPAL THRUST AREAS OF WORK (2019-2020)

- 1. Faunal Inventorization of States and Union Territories:** Inventory of different Faunal group on the following states and Union Territories were undertaken, viz. Andaman & Nicobar Islands, Lakshadweep, Andhra Pradesh, Arunachal Pradesh, Assam, Bihar, Chattishgarh, Goa, Gujarat, Haryana, Himachal Pradesh, Jharkhand, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Mizoram, Meghalaya, Odisha, Punjab, Rajasthan, Tamil Nadu, Uttar Pradesh, Uttarakhand and West Bengal.
- 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: Cauvery, Pennaru, Narmada-Tapti (4) Mangrove ecosystem: Odisha and Sunderbans (5) Freshwater Ecosystem: Chambal River, High altitude lakes and rivers, Bhoj, Govind Sagar, Chandratol, Riverine Ecosystems of Western Ghats (6) Himalayan Ecosystem, (7) Desert Ecosystem: Thar Desert, (8) Cold desert of Himachal Pradesh and Jammu & Kashmir
- 3. Faunal Inventorization of Conservation Areas:** Gulf of Mannar Marine Biosphere Reserve, Satkosia, Baisipalli, Sundarbans, Sonamukhi, Betua-Dahuri, Talley Valley, Mehao, Bornadi, Nongkhyllam, Hazaribagh, Lawalong, Point Calimere, Saddle Peak, Malabar, Thattekkad Bird Sanctuary, Sultanpur Bird Sanctuary, Govind, Rajaji, Sonanadi, Valley of Flowers, Samaspur, Nauradehi, Koyna, Navegaon, Sariska, Govind, Kalatop Khajjiar, Thattekkad Bird Sanctuary etc.
- 4. Status Survey of Threatened Species:** Coral reef, Himalayan Musk Deer, Cra-eating macaque, Horseshoe crab, Swamp Deer, Hoolock Gibbon, Robber Crab, Nicobar Megapode, Great Indian Bustard, Wild Ass, Hispid Hare etc.
- 5. 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 and Mammals.
- 6. Maintenance of National Zoological Collections (NZC):** Preservation and Maintenance of NZC, holding more than 20,000 Type specimens
- 7. Advisory, Training and Extension Services:** Provided as and when sought by different Institutions/ Organizations and confiscated wildlife material for law enforcing authorities.
- 8. 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.zsi.nic.in).
- 9. Collaborative Research Programmes / Projects:** ZSI is involved in many collaborative research programmes with several Institutes and Universities across the country.
- 10. Checklist of faunal groups:** More than 80 Checklist are uploaded in ZSI webportal (zsi.gov.in).

HEADQUARTERS, KOLKATA

Headquarters of ZSI at Kolkata houses 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 seven 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 Mammals. The different sections of headquarters are:

SECTION 01 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 1,500 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 8,778 specimens with 979 species. The type collections include 321 slides of 109 species of free-living and parasitic protozoans. Among that about 1,130 slides of ciliates, 153 of which are types slides representing 49 holotypes and 104 paratypes.

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 and soil ecosystem. A total of 8 research programmes are operational in this section, in which 3 programmes dealing with Protected Areas and other 5 are based on ecosystem oriented research. Two externally funded programmes (DST-SERB) on protozoans of marine and freshwater ecosystem are also dealt by this section namely, Seasonal dynamics of microzooplankton and its role in the pelagic ecosystem of coastal waters of northern Bay of Bengal and Barcoding of free living protozoan ciliates from the conserved aquatic ecosystems of Himachal Pradesh.

SECTION 02 PLATYHELMINTHES

Platyhelminthes section deals with Phylum Platyhelminthes or flatworms which include the planarians, flukes and tapeworms. Platyhelminthes section deals with the following groups of organisms: Trematode, Cestode and Monogenean parasites of Vertebrates and Acanthocephala. More than 35 programmes have been handled by the section and completed the database of 17 States and UTs. Altogether 87 Families of Platyhelminthes and Acanthocephala have been dealt till date. The section has total holdings of 22,107 comprising (identified 21,735 + unidentified 372) including 452 Type Collections. Presently the section is involved in 4 ongoing programmes on Trematodes of Fishes.

SECTION 03 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 42 programmes have been handled by the section and completed the database of 24 States and UTs. The present holdings of the section include 25,376 identified specimens and 7,391 vials of unidentified wet collections. Besides, Type collections include 187 slides and 249 specimens of wet collections. DNA barcodes of 5 species of helminthes from herpetofauna have been submitted to NCBI. Five new species were described by the section during the year.

SECTION 04 GENERAL NON-CHORDATA

General Non-Chordata section is conducting studies on the groups that are associated with Corals and coral reef habitat such as Porifera, Soft corals, Octocorals, Polychaetes, Echinodermata and minor-phyta. It also includes the terrestrial group, Annelida. The section houses 8,41,621 specimens which includes Porifera, Cnidaria, Annelida, Echinodermata and Minor-phyta. Among these, 1,640 specimens are Type specimens.

SECTION 05 CRUSTACEA

The section holds Crustacean samples like Shrimps, Crabs, Hermit crabs, Woodlice, Fice-lice, 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 1,05,072 specimens of crustaceans including 6,505 Types specimens.

SECTION 06 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. Holdings of the section include 2,05,220 specimens (as on March 2020) of which about ~ 1,500 are Types. 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. Presently, the section is involved in 10 ongoing programmes and five externally funded projects. Annually, there are more than 30 research papers dealing with taxonomy and allied fields are publishing from this section. Almost all visitors to ZSI pay their visit to the displays and collections present in the section, apart from the researchers community, who frequently consults Mollusca Section for their research work on taxonomic revisions.

07 SECTION CENTRAL ENTOMOLOGY LABORATORY (CEL)

CEL is 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 28,111 specimens of which 24,493 specimens are identified and 3,618 specimens are unidentified. The section also has total holdings of Type collections which consist of 13,584 specimens of 22 insect orders. Presently the section is involved in ongoing programme on Studies on Formicidae (Hymenoptera) of Buxa Tiger Reserve and Mahananda Wildlife Sanctuary.

SECTION 08 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 3,853 vials of termite specimens, of which 3,353 are identified. The section also has 1,059 specimens of 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.

SECTION 09 LEPIDOPTERA

Lepidoptera Section is involved primarily in collection, preservation, identification, cataloguing/ computerization, digitization and documentation of Lepidopteran (moths and butterflies) fauna of our country. The section holds 1,05,562 specimens of which 59,663 are named specimens and the rest 45,899 are unnamed specimens. Type specimens of Lepidoptera are deposited in Central Entomological Laboratory of ZSI, Kolkata.

SECTION 10 HYMENOPTERA

Hymenoptera section is dealing with pollinators, parasitic and predatory groups of hymenopteran families (Apidae, Halictidae, Megachilidae, Encyrtidae, Mymaridae, Evaniidae, Vespidae, Sphecidae etc.). Sectional staffs are involving in collection, preservation, identification and cataloguing, digitization as well as computerization of the hymenopteran fauna. Presently the section is involved in three research programmes. The section has total holding comprising 40,532 specimens out of which 21,864 specimens are identified.

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 52,282 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 major families currently dealt in the section are Carabidae, Dytiscidae, Noteridae, Gyrinidae, Haliplidae, Hydrophilidae, Scarabaeidae, Geotrupidae, Lucanidae, Passalidae, and Coccinellidae.

12 SECTION MISCELLANEOUS INSECT ORDERS (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, Myanmar, Germany, Canada, USA, USSR, Croatia, Indonesia, etc. The section has a total of 13,519 specimens, of which 11,808 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.

SECTION 13 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, Microcoryphia and Zygentoma have been worked out. More than 210 research publications including Pictorial handbook of Collembola & Thysanura, and revisionary studies of Collembola was published. Presently the section is involved in 6 on-going programmes. The section has a holding of 38,872 specimens of Apterygota of which 22,105 specimens are identified and 16,767 specimens are unidentified. Type Collection includes 838 specimens belonging 101 species.

SECTION 14 ORTHOPTERA

Orthoptera Section deals with following group of Organism: Orthoptera, Blattodea, Mantodea, Phasmida and Dermaptera. The section has holdings of 35006 specimens of which 33136 are named specimens. Type specimens of Orthoptera are deposited in Central Entomological Laboratory of ZSI, Kolkata. More than 40 programmes have been handled by the section and completed the database of 25 States and UTs. Presently the section is involved in 7 ongoing programmes on Orthoptera.

SECTION 15 HEMIPTERA

Hemiptera Section is primarily mandated for the collection, preservation, identification, registration, digitization and documentation of the true bugs. Hemiptera Section is the largest among hemimetabolous insects and has a holding of 1,46,339 specimens (identified-48,621) of terrestrial, semi aquatic and aquatic bugs. Fauna of India-Aphididae (8 vols.) are the major achievements of the section apart from some other major contributions like. A check-list 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 fauna of Himachal Pradesh, Uttar Pradesh, Maharashtra, Punjab, Haryana, Tripura, Satkosia Tiger Reserve, Indian Himalays, Kanyakumari Wildlife Sanctuary, Mangrove Ecosystem in India, Tarai Grassland of Gangetic plains and presently engaged in the documentation of Hemipteran fauna of Buxa Tiger Reserve, Gorumara NP and Chapramari WLS, Mahananda WLS and Neora Valley NP, fauna of Bihar (agroecosystem), Manipur (freshwater) and Puducherry.

SECTION 16 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 58 years of fly research, Diptera section (estd:1962) is currently carrying out research to solve this discrepancy in both classical and applied field of 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 84 programmes have been handled by the section and completed the database of 15 States and UTs. 92 Families of Diptera have been dealt till date. The section has total holdings comprising a national zoological collection of 96,197 specimens which includes 94,666 specimens in General Collections and 1,531 samples in Type Collections. A group of young researchers (more than 7) also completed their Ph. D. from this section with a notable research publication. Presently the section is involved in 4 ongoing programmes on Diptera.

SECTION 17 ACAROLOGY

The section deals with the following groups of organisms: Soil mites, Plant mites, Parasitic mites, Water mites and Ticks. About 35 programmes have been handled by the section and completed the database of 18 States and 2UTs. 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 15,965 General Collections and 416 Type Collections. Presently the section is involved in 02 ongoing programmes on Soil mites.

SECTION 18 ARACHNIDA

Arachnida Section deals with the following groups of organisms: Spiders (Order: Araneae) Scorpions (Order: Scorpiones), Pseudo scorpions (Order: Pseudoscorpiones), Whip Scorpions (Order: Thelyphonida) Opiliones (Order: Opiliones), Sun spiders (Order: Solifugae), Sea Spider (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 35,247 general collections and 2,585 examples (added 05 ex.) of type collections. Presently the section is involved in two ongoing programmes.

SECTION 19 MARINE FISH

Marine Fish Section deals with all marine fishes grouped under 60 orders. It has a holding of 4,91,219 (approximately) identified and 238 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 1,012 type material of 432 species. The section has completed about 50 programmes and now involved in many ongoing programmes.

SECTION 20 FRESHWATER FISH

The freshwater fish section of the Zoological Survey of India, Kolkata is the largest repository for freshwater fishes in the country hosting 3.3 lakh specimens including 1,263 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.

SECTION 21 AMPHIBIA

At present, the section is involved in several programs on Anurans (frogs and toads), caecilians and the Himalayan salamander in the Eastern Himalayas, Eastern Ghats and the mangrove coastal areas. 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. 14 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 35,206 specimens comprising 34,935 identified specimens and 271 unidentified wet collection specimens. Besides, the section also possesses 143 specimens from other countries and 326 type specimens.

SECTION 22 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). 25 programmes have been handled by the section and completed the database of 18 States and 2 UTs. 19 Families of Reptiles have been dealt till date. The section has a total holding comprising 33,628 General Collections and 524 Type collections. Three groups and 19 families were worked out till date. Presently the section is involved in 2 ongoing programmes on Reptiles.

SECTION 23 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 43,933 specimens have been identified up to species level and the remaining are being identified on monthly basis. 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 and the recent one is "Status survey of Endangered Hispid hare *Caprolagus hispidus* using camera traps in India".

SECTION 24 MAMMAL & OSTEOLOGY

The Mammal & Osteology holds 29,121 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.

SECTION 25 PALEOZOLOGY: INVERTEBRATE AND VERTEBRATE

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 forty 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.

Vertebrate and Invertebrate Palaeozoology sections are holding also a lot of vertebrate (fish, reptile and mammal) and invertebrate fossils (Mollusca, echinodermata collection 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 25,500 specimens are present in the holdings of three sections of Palaeozoology section.

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 the section is implementing largely focused on population assessment, habitat ecology in different landscape of the country. The section has implemented several projects in the past and currently implementing demand driven and action projects in Indian Himalayan Region, Gangetic plains and Chhota Nagpur plateau and Southern Bengal 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 two annual projects sanctioned under the annual programme of research of Zoological Survey of India, Kolkata.

SECTION 27 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. All the specimens are also digitized for RFD. Along with these, 126 earthworm specimens have been identified as Advisory services.

SECTION 28 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 1,017 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 holding 6 research programmes approved by ZSI, Annual Programme of Research.

SECTION 29 CENTRE FOR DNA TAXONOMY, MOLECULAR SYSTEMATICS DIVISION

The Centre for DNA Taxonomy (CDT) under Molecular Systematics Division (MSD) was established in 2011 at the Zoological Survey of India (ZSI), Kolkata along with four regional centres (WRC, Pune; NRC, Dehradun; FBRC, Hyderabad; and SRC, Chennai) to generate DNA barcode sequences of Indian fauna. As of now, the CDT, MSD has generated more than 6,000 DNA barcode data of various animal taxa, especially the threatened, indicator, ecologically and economically important taxa. The generated DNA barcode data has contributed greatly to the global databases (GenBank and BOLD) to accelerate the systematics and evolutionary research. CDT, MSD is trying to resolve and answer

specific questions of cryptic speciation, phylogenetics, evolutionary relationships, wildlife forensics etc. Several externally funded projects funded by the Department of Science and Technology (DST), Department of Biotechnology (DBT), Council of Scientific and Industrial Research (CSIR), Indian Council of Agricultural Research (ICAR), Ministry of Environment Forests and Climate Change (MoEFCC) are ongoing/competed at CDT, MSD. Comparative Mitogenomics, Environmental Metagenomics, Gut Microbiome, Metasystematics, Wildlife Forensics, and Population Genetics are some of the current thrust areas of the Centre.

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 2,674 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 i.e. Faunal diversity of Neora Valley National Park, West Bengal.

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RESEARCH PROGRAMMES: HEADQUARTERS

ZSI is involved in the research covering primitive organisms belonging to Kingdom Protista to the highly evolved Mammalia of the Kingdom Animalia, inhabiting different Ecosystems, Protected Areas, States & UTs, Biogeographic zones as well as Conservation 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 both HQ and Regional Centres of ZSI.

During this year, out of the 49 In-house programmes, 3 were completed, 31 were ongoing and 15 programmes were newly inducted by ZSI, HQ.

FAUNA OF EASTERN HIMALAYA- ARUNACHAL PRADESH-COLEOPTERA 01

Investigators: Dr. Devanshu Gupta, Dr. O.P. Srivastava, Mrs. Abha Sar, Mr. S. K. Ghosh & Mr. R. K. Kushwaha.

Period: April 2016 to March 2018

Status: Completed

Objective: Taxonomic study of Coleoptera: Families Scarabaeidae, Staphylinidae, Dytiscidae, Gyrinidae, Haliplidae, Noteridae and Carabidae.

Outcome: A total of 1,370 examples were examined which resulted in identification of 227 species belonging to 118 genera under 9 families.

Significant findings: Four species have been described as new to science viz. *Odontotrupes (Odontotrupes) tawangensis* Gupta, Chandra & Hillert, 2016, *Pukupuku arunachalensis* Gupta, Chandra & Bézdek, 2017, *Enoplotrupes (Enoplotrupes) tawangensis* Gupta, Chandra & Král, 2019, and *Bolboceras arunachalensis* Chandra, Gupta & Ghosh, 2020. Besides, 50 new distributional records from Arunachal Pradesh and 3 new records from India were also reported.

Status: Completed

Objective: To study and inventorize the Echinoderm fauna of Lakshadweep group of Islands.

Outcome: Four surveys were conducted and 338 specimens of Echinoderms including Crinoidea, Asteroidea, Ophiuroidea and Echinoidea were identified belonging into 40 species.

Significant findings: A new genus and a new species have been described while two new records to India. Besides, 14 new records to the UT of Lakshadweep were made.

03 VALIDATION OF CHIROPTERAN SPECIES PRESENT IN THE NATIONAL ZOOLOGICAL COLLECTIONS (NZC)



Nicobar leaf-nosed bat *Hipposideros nicobarulae* Millor, 1902

Investigators: Dr. C. Venkatraman & Dr. M. Kamalakaran

Period: April 2017 to March 2020

Status: Completed

Objective: To validate the Chiropteran species present in the National Zoological Collections (NZC).

Outcome: Out of 228 species and subspecies, 99 species have been revalidated/ synonymised with the current nomenclature. The 154 species and subspecies of bats present in NZC collected from 31 foreign countries. Baculum (structure of penis bone) was extracted for morphological studies from 60 species of bats.

Significant findings: Four bat species viz. Durga

FAUNA OF LAKSHADWEEP ISLANDS: ECHINODERMS 02



Thelenota ananas (Jaeger, 1833)

Investigators: Dr. N. Marimuthu & Dr. Rajkumar Rajan

Period: April 2017 to March 2020

Das's Leaf-nosed Bat *Hipposideros durgadasi* Khajuria, 1970, Greater Long-tongued Fruit Bat *Macroglossus sobrinus* K. Andersen, 1911, Least leaf-nosed Bat *Hipposideros cineraceus* Blyth, 1853, and Schneider's leaf-nosed bat *Hipposideros speoris* (Schneider, 1800) have been reported to have distribution range to other parts of India, other than their known collection locality.

MORPHOLOGICAL AND MOLECULAR SYSTEMATICS OF THYSANOPTERA OF ODISHA & GUJARAT 04

Investigators: Dr. Kaomud Tyagi & Dr. Vikas Kumar

Period: April 2017 to March 2020

Status: Ongoing

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

Progress:

A survey to the state of Odisha state was conducted. Fifty two species from Gujarat and 48 species from Odisha state have been identified of which 15 species were new to both the states.

ZSI-NATIONAL FAUNAL GENOME RESOURCES (ZSI-NFGR): SEQUENCING FIFTY ANIMALS MITOGENOMES-PHASE-I 05

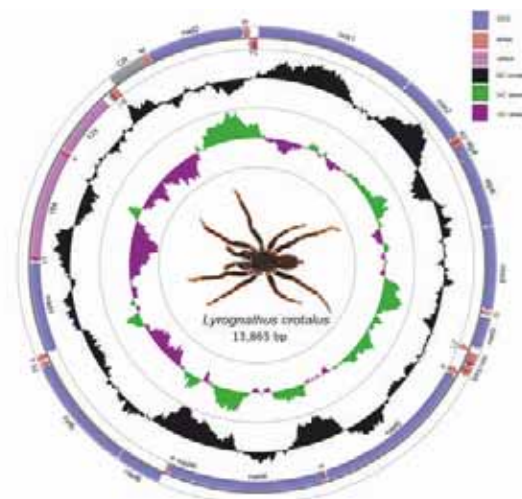
Investigators: Dr. Kailash Chandra & Dr. Vikas Kumar

Period: April 2017 to March 2020

Status: Ongoing

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

Progress: Complete Mitochondrial Genomes of seven species have been sequenced from



The circular representation of the complete mitochondrial genome of *Lyrognathus crotalus* pocock, 1895

different taxa: thrips, spiders, turtles, etc. In addition, sequencing of 20 species have also been done. Assembly of mitogenomes from WGS data has been done and analysis of these mitogenome is under process

06 DIVERSITY OF DEEP SEA COPEPODS FROM EAST COAST OF INDIA-BAY OF BENGAL

Investigator: Dr. Honey U. K. Pillai

Period: April 2018 to March 2019

Status: Ongoing

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

Progress: A total of 77 samples collected through participation in the cruise in FRV Sagar Sampada and 2,548 examples identified belonging to 62 species under 26 families. Microzooplankton composition showed dominance of small sized zooplankton in most of the locations. Copepoda was observed as the dominant taxa. Abundance of pyrosoma was noticed at few locations. Other common groups include chaetognaths, hydrozoans, pteropods, heteropods, gastropods, cephalopods, ostracods, lucifers, salps and doliolids. Molecular sequencing of the deep-sea tunicate (gelatinous plankton) *Pyrostremma spinosum* (Herdman, 1888) was carried out and deposited to NCBI. Four copepod species recorded as rare species from Bay of Bengal.

07 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

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

Progress: One survey was conducted and 50 water samples were collected. Identification include 16 species (167 examples) belonging to 16 genera. A patent was submitted based on the interaction between ciliates and bacteria. Molecular sequences are being generated for the identified species.

08 FAUNA OF LAKSHADWEEP



View of Kalpitti Islet of Lakshadweep

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

Subject Investigators: Subject experts

Period: April 2017 to March 2020

Status: Ongoing

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

Progress: One survey was conducted to three Islands of Lakshadweep namely, Kavaratti, Minicoy & Agatti and one Islet Kalpitti. A total of 4,640 examples belonging to 22 faunal groups were collected and observations were made on four species of reptiles and two species of mammals, besides soil samples were collected for the study of soil fauna. Identified 161 species from the collections made so far comprising 45 species of Nematoda, 14 species of Coleoptera, 5 species of Odonata, 21 species of Orthoptera, 8 species of Collembola, 44 species of Hemiptera and 24 species of Diptera.

09 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: Ongoing

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

Progress: Local surveys were undertaken to East Kolkata Wetlands and localities viz. Subash Sarovar, Patuli Water Park, Mydan Tank, Wetlands in Dhapa, Rabindra Sarobar, various water bodies in Bariapur, Santhragachi Jheel and nearby water bodies, Mudiali Nature Park, Taratla and Nalban berry at Nalban food park, Captain Bherry, Devighat, Nalban 1,2, Bamanghatta, Kulberia, Dharamtala Pachuria, Jagatipota, Mukundapur, Panchasayar, Shantipark, East Kolkata Wetlands Goltala, Bantala from where collections on various aquatic organisms like zooplanktons, crustaceans, pisces, molluscs, insects etc. and water and sediment samples for protozoans were made. Observations were also made for the presence of higher vertebrates like reptiles, birds and mammals. Faunal samples collected include ants, hemiptera, crustacea, earthworms, coleoptera, leech, mollusca and aquatic insects.

FAUNA OF CHILIKA LAKE ODISHA 10

Coordinator: Dr. Basudev Tripathy

Investigators: Subject experts from ZSI HQ and Regional Centres.

Period: April 2016 to March 2019

Status: Ongoing

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

Progress: Identified 503 species from the collections made so far comprising 34 species of Protozoa, 79 species of Platyhelminthes, 94 species of Nematodes, 57 species of Crustacea, 33 species of Formicidae, 9 species of Collembola, 18 species of Acari, 165 species of Fishes, 4 species of Cyclopoida, 5 species of Calanoida, 2 species of Cladocera, 2 species of Rotifer and 1 species of Mysids were identified. Significant findings include one new genus and new species of Collembola described, while two species of Protozoa, two species of Nematodes and 4 species of Acari as new records to India.



Olive Ridley turtles *Lepidochelys olivacea* (Eschscholtz, 1829)

Status: Ongoing

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

Progress: Towards long term monitoring of olive ridley sea turtles along Odisha coast, surveys were undertaken to the Rushikulya and Gahirmatha and offshore and onshore population enumeration was done.

FAUNA OF GAHIRMATHA MARINE SANCTUARY IN ODISHA 11

Investigator: Dr. Basudev Tripathy

Period: April 2018 to March 2021

Status: Ongoing

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

Progress: Two surveys have been undertaken and a total of 26 species belonging to 19 genera under 17 families have been identified so far.

13 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 761 species were identified from the collections made out of surveys. Identification include 13 species of Protozoa, 10 species of Collembola, 29 species of Nematoda, 247 of species Mollusca: 22 species Isoptera, 23 species Diptera, 43 species of Odonata, 52 species of Hymenoptera, 93 species of Lepidoptera, 63 species of Orthoptera, 32 species aquatic beetles, 11 species of Scarabeid beetles, 62 species of Hemiptera, 17 species of Crustacea, 5 species Decapoda, 16 species of Fishes, 9 species, Amphibia: and 14 species of Reptiles. Besides observations were made on 139 species of Birds and 18 species of Mammals.

LONG TERM MONITORING OF OLIVE RIDLEY SEA TURTLES ALONG ODISHA COAST 12

Investigator: Dr. Basudev Tripathy

Period: April 2018 to March 2021

EFFICACY OF DNA BARCODING IN IDENTIFICATION OF PLATYGASTROIDEA (HYMENOPTERA) FROM INDIA 14

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: DNA isolation completed for 106 specimens belonging to 46 species. PCR completed for 58 specimens (19 species and sequencing done for 15 specimens belonging to 9 species). Besides, 22 specimens belonging 12 species have been morphologically identified.

TAXONOMY AND ECOLOGY OF AEDES MOSQUITO VECTORS (CULICIDAE: DIPTERA) OF DENGUE, CHIKUNGUNYA AND ZIKA 15

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

Period: April 2018 to March 2021

Status: Ongoing

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

Progress: One survey was conducted in Southern India (Tamil Nadu) for the collection of mosquitoes. Around 20 mosquito species were recorded. The data on morphology, molecular and sounds were generated.

Significant findings: A patent application has been filed based on sound data to develop automated surveillance system. DNA barcodes have been generated for several species.

16 FAUNAL INVENTORIZAZION OF BUNNING & ZEILAD WILDLIFE SANCTUARIES, MANIPUR



Garra lissorhynchus (McClelland 1842)

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: Conducted two surveys and collected faunal groups comprising Insecta, Annelida, Crustacea, Mollusca, Pisces, Amphibia and Reptilia: 19 species fishes have been identified. Among the mammals, threatened species like Hog badger (*Arctonyx collaris*), Hoolock Gibbon (*Hoolock hoolock*), Slow loris (*Nycticebus bengalensis*) etc. were also observed during the survey. Several bird species were also observed during the survey. Among the amphibians, the Gerbil's stream frog (*Amolops gerbillus*), common Indian toad (*Duttaphrynus melanostictus*), Pierre's cricket frog (*Fejervarya pierreii*), the Indian Bull frog (*Hoplobatrachus tigerinus*), Point-nosed frog (*Clinotarsus alticola*), Khare's gliding frog (*Pterorana khare*), Large hill frog (*Megophrys major*), Mawphlang frog (*Odorrana mawphlangensis*), and Manipur skittering frog (*Euphyctis ghoshii*), were collected from the study area of which last four species are known to be endemic to the region.

STATUS SURVEYS OF HISPID HARE 17

Investigator: Dr. G. Maheswaran

Period: April 2017 to March 2020

Status: Ongoing

Objective: To ascertain the status of Hispid Hare.

Progress: One survey conducted and 5 vials of pellets were collected for DNA analysis. Analysis is in progress.

DNA BARCODING OF VERTEBRATE FAUNA PRESENT IN NATIONAL ZOOLOGICAL COLLECTION (NZC) OF ZSI W.S.R. TO PRIMATES 18

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

Period: April 2017 to March 2020

Status: Ongoing

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

Progress: A total of 180 samples were utilized from the preserved faunal specimens available in the NZC of ZSI. This includes species viz. Indian Pangolin, Chinese Pangolins, Red Panda, Ibex, blue sheep, Goral, Jungle cat, wolf, red fox, snow leopard, common leopard, barking deer etc. In total 75 sequences/barcodes of vertebrates from museum samples were generated.

FAUNAL DIVERSITY OF CORINGA WILDLIFE SANCTUARY, ANDHRA PRADESH 19

Coordinator: Dr. C. Raghunathan

Investigators: Subject experts

Period: April 2018 to March 2021

Status: Ongoing

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

Progress: Four surveys have been conducted covering marine, mangrove, estuarine and mudflat ecosystems of Coringa WLS. A total of 8,278 specimens under 20 major groups have been collected and 508 species identified comprising Mollusca, Arthropoda, Brachiopoda, Cnidaria, Fishes, Prawns, Slugs and Reptilia. Carcasses of several Olive Ridley turtles were observed along the highest high tide line of Hope Island.



Atrina pectinata (Linnaeus, 1767)

ZOOARCHAEOLOGY OF FAUNAL REMAINS OF KALIBANGAN, RAJASTHAN - AN INDUS VALLEY SITE 20

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: Altogether 2,440 specimens of animal remain from Kalibangan site have been identified so far belonging to 23 species under 12 genera, 10 families and six orders.

STATUS SURVEY OF BROWN BEAR IN WESTERN HIMALAYAS 21



Brown bear, *Ursus arctos* Linnaeus, 1758

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. The data analysis pertaining to population abundance is in progress by using the DNA based samples and also based on the statistical method for extrapolation of the densities of the brown bear in its suitable habitats

FAUNAL DIVERSITY OF GANGA (GANGOTRI TO GANGASAGAR) 22

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: Two surveys conducted covering Ganga River from Varanasi in Uttar Pradesh to Kakdwip in West Bengal. Considering the vastness of the ecosystem, it was realized and suggested to implement Metagenomic analysis using the e-DNA for which water samples were collected from about 35 locations throughout the entire length of the Ganga River. The analysis of the samples pertaining to taxonomic richness and abundance of different taxon is in progress using the NGS based protocols.



View of Gangotri River

23 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: Ongoing

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

Progress: One new species, *Ophichthus kailashchandrai* Mohapatra, Ray, Mohanty & Mishra 2020, has been described and two species, viz., *Muraenichthys gymnopterus* (Bleeker 1853) and *Skythrenchelys zebra* Castle & McCosker 1999, were reported as new to east coast of India. The findings include 53 species belonging to 6 families found along east coast of India.

MORPHOLOGICAL AND MOLECULAR STUDY OF MULLETS (MUGILIFORMES: MUGILIDAE) OF INDIA 24

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: A key to the species of the family presently known from India (18 species) has been prepared. About 20 tissue samples have been sequenced. Analysis of the data is under process.

STUDIES ON THE CARDINAL FISHES (PERCIFORMES: APOGIONIDAE) OF WEST COAST OF INDIA 25

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 and species of the family Apogonidae are prepared for 20 species presently reported or observed from the west coast of India. A final report deals with 75 species.

DNA BARCODING STUDIES ON HOLOTRICHIA COMPLEX. (SCARABAEIDAE: COLEOPTERA) ON SUGARCANE CROPS FROM NORTH AND CENTRAL INDIA 26

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: Twenty four species of the genus *Holotrichia* were identified. The male genitalia of 9 species viz., *H. farinosa*, *H. fissa*, *H. longipennis*, *H. nagpurensis*, *H. nicobarica*, *H. rustica*, *H. sculpticollis*, *H. serrata* and *H. tetarana* were dissected and illustrated. The re-descriptions of these species were written along with the habitus photographs. Additionally 64 DNA barcode sequence were also generated for studying closely related species.



Holotrichia serrata (Fabricius, 1781)

27 FAUNA OF BUXA TIGER RESERVE, WEST BENGAL

Coordinator: 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: A total of 377 species have been identified which includes 5 species of Ciliate, 26 species of Amoebae, 42 species of Trematodes, 34 species of Nematodes, 22 species of Mollusca, 52 species of Ants, 13 species of Termites, 17 species of Odonata, 55 of Orthoptera 33 species of Hemiptera and 78 species of Hymenoptera. Observations were made on 2 species of Reptiles and 8 species of Mammals.



Elephas maximus indicus (Cuvier, 1798) at Buxa Tiger Reserve

FAUNA OF MAHANANDA WILDLIFE SANCTUARY, WEST BENGAL 28

Coordinator: Dr. Shelley Acharya

Investigators: Subject experts

Period: April 2017 to March 2020

Status: Ongoing

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

Progress: A total of 572 species have been identified. The faunal groups include 20 species of Protozoa, 38 species of Trematodes, 36 species of Nematodes, 26 species of Mollusca, 32 species of Ants, 33 Hemiptera, 40 Hymenoptera, 15 Coleoptera, 10 Collembola, 83 Lepidoptera, 16 Isoptera, 5 Diptera, 12 Odonata, 23 Arachnida, 45 Orthoptera, 51 Acari, 9 Annelids, 8 Crustaceans, 49 Fishes, 5 Amphibia and 7 species of Reptilia. The observations were made on 55 species of Birds and species 57 of Mammals.

29 FAUNA OF ASSAM

Coordinator: Dr. Dhriti Banerjee

Investigators: Subject experts

Period: April 2017 to March 2020

Status: Ongoing

Objective: To identify and inventorize the fauna of Assam.

Progress: A total of 445 species including 40 species of Nematodes, 30 species of Collembola, 123 species of Diptera, 19 species of Odonata and 233 species of Orthoptera have been identified,

30 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: One survey was conducted. A total of 344 species have been identified from the collections. It includes, 19 species of Protozoa, 39 species of Mollusca, 34 species of Hemiptera, 11 species of Collembola, 71 species of Lepidoptera, 6 species of Diptera, 12 species of Odonata, 34 species of Orthoptera, 4 species of Annelida, 25 species of Trichoptera, 5 species of Crustacea, 20 species of Fishes, 23 species of Amphibia and 53 species of Reptilia.



Pareas monticola (Cantor, 1839)

FAUNA OF GORUMARA NATIONAL PARK AND CHAPRAMARI WILDLIFE SANCTUARY 31



Bos gaurus (Smith, 1827)

Coordinators: Dr. M. E. Hassan & Mrs. 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: Three surveys were conducted and 15 faunal groups were collected. A total of 233 species have been identified from the collections made so far comprising 11 species of Ciliate, 24 species of testate Amoebae, 33 species of Nematoda, 23 species of Mollusca, 10 species of Isoptera, 25 species of Odonata, 9 species of Collembola, 60 species of Orthoptera and 38 species of Hemiptera. Observations were made on 11 species of Mammals.

FAUNA OF SINGALILA NATIONAL PARK 32

Coordinator: Dr Kaushik Deuti

Investigators: Subject Experts.

Period: April 2018 to March 2020

Status: Ongoing

Objective: To document the faunal diversity of Singhalila National Park

Progress: Three surveys were conducted and 15 animal groups were collected, besides 138 packets of Mosses, 36 packets of soil samples and 15 vials of water samples were also collected for soil fauna. Identifications include 17 species of Protozoa and 16 species of Earthworms. Observations were made on 83 species of Birds and 4 species of Mammals.

33 FAUNA OF EASTERN GHATS

Coordinator: Dr Swetapadma Dash

Investigators: Subject Experts from HQ and SRC

Period: April 2018 to March 2020

Status: Ongoing

Objective: To assess the faunal diversity of Eastern Ghats

Progress: Two surveys were conducted and collected 14 faunal groups. A total of 343 species comprising 24 species of Protozoa, 10 species of Rhizopoda, 34 species of Rotifers, 30 species of Cladocera and 17 species of Ostracoda, 42 species of Orthoptera, 12 species of Diptera, 9 species of Coleoptera, 146 species of Lepidoptera, 12 species of Acari and 7 species of Fishes have been identified.

34 TAXONOMIC REVISION OF POTAMID FRESHWATER CRABS OF INDIA

Investigator: Mr. Santanu Mitra

Period: April, 2019 to March, 2022

Status: Initiated

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: Two surveys were undertaken in Abor hills region of Arunachal Pradesh, Sikkim and North Bengal. Ten species of Potamid crabs have been identified.

BIOGEOGRAPHY AND SYSTEMATIC REVISION OF FRESHWATER MOLLUSCA GYRAULUS (GASTROPODA: HETEROBRANCHIA: PLANORBIDAE) OF INDIA 35

Investigator: Dr. Basudev Tripathy

Period: April, 2019 to March, 2022

Status: Initiated

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

Progress:

One survey was undertaken to the area of North Bengal in which more than 300 examples of *Gyraulus* were collected and identified two species viz. *Gyraulus convexiusculus* (Hutton, 1849) and *Gyraulus labiatus* Benson, 1850 and wherein population was reported to be dominated by *Gyraulus convexiusculus* (Hutton, 1849).

TAXONOMIC STUDIES ON MOTHS (LEPIDOPTERA: INSECTA) OF DECCAN PENINSULA OF INDIA 36

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

Period: April 2019 to March 2022

Status: Initiated

Objective: Taxonomic inventorization of Lepidopteran fauna of Deccan Peninsula

Progress: Three surveys conducted in the Deccan Plateau of Tamil Nadu, Deccan Plateau of Maharashtra and Deccan Plateau of Madhya Pradesh. A total of 4,577 examples of Lepidoptera have been collected.



Mangina argus (Kollar, 1844)

37 STUDIES ON INSECT POLLINATORS OF WEST BENGAL



Apis dorsata, Fabricius 1793

Investigator: Dr. K. Rajmohana

Period: April 2019 to March 2022

Status: Initiated

Objective: To study the insect pollinators of West Bengal.

Progress: One survey was undertaken and a total of 885 examples were collected of which approximately 695 examples containing diverse groups of dipteran examples and 70 pollinating non dipteran examples were collected from the different areas and habitats of Murshidabad district. Identification is in progress.

FAUNA OF SUNDERBAN NP, SAJNEKHALI WLS, HALLIDAY ISLAND WLS AND LOTHIAN WLS, WEST BENGAL 38

Coordinator: D. Suresh Chand

Investigators: Subject experts

Period: April 2019 to March 2022

Status: Initiated

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

Progress: One survey was undertaken and specimens belonging to 10 groups were collected. So far, 12 species of Trematodes, 12 species of Orthoptera, 17 species of Odonata, 5 species of Crustacea and 7 species of Fishes were identified.



View of Sunderban forest

39 STUDY OF HEMIPTERA FAUNA OF AGRO-ECOSYSTEM OF BIHAR AND IDENTIFICATION OF SOME POTENTIAL HEMIPTERAN PREDATORS.



Hemipteran predator, *Eocanthecona furcellata* (wolff, 1801)

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

Period: April 2019 to March 2022

Status: Initiated

Objective: To study the Hemipteran fauna of Agro-ecosystem of Bihar and identification of some potential hemipteran predators.

Progress: Two surveys were conducted in the Agro-ecosystem of Bihar and various faunal groups of which 15 species of Hemiptera were identified.

40 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: Initiated

Objective: To study the aquatic and semi-aquatic Hemiptera of important floodplain Wetlands of

Manipur, North-East India.

Progress: One survey conducted in the Imphal East, Imphal West, Bishnupur and Thoubal districts of Manipur. A total of 361 examples collected. Identified 11 species of aquatic and semi-aquatic Hemiptera.

FAUNAL DIVERSITY OF WILDLIFE SANCTUARIES OF WEST BENGAL (BETHUADAHARI WLS, BIBHUTIBHUSHAN WLS, BALLAVPUR WLS, RAMNABAGAN WLS) 41

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

Investigators: Subject Experts

Period: April 2019 to March 2021

Status: Initiated

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

Progress: One survey was conducted in Bibhutibhushan Wildlife Sanctuary of West Bengal and collected Diptera, Hymenoptera, Lepidoptera, Hemiptera and Siphonoptera. A total of 11 species of Diptera identified.

FISHES OF THE SIANG RIVER, BRAHMAPUTRA DRAINAGE, ARUNACHAL PRADESH, NORTH EAST INDIA 42



View of Siang River

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

Period: April 2019 to March 2022

Status: Initiated

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

Progress: One survey conducted and 1,148 specimens of freshwater fishes collected from field. The fauna identified includes many hill stream and economically important riverine fishes like *Neolissochilus hexagonolepis*, *Tor tor*, *Barilius bendelisis*, *Semiplotus semiplotus*, *Schizothorax richardsoni*, *Xenentodon cancila*, *Rasbora daniconius*, *Channa gachua*, *Wallago attu*, *Amblyceps apangi*, *Devario devario*, *D. aequipinnatus*, *Garra sp.*, *Aborichthys sp.* and *Schistura sp.*

43 DISTRIBUTION AND INCIDENCE OF FRESHWATER TURTLES IN INDIA



Lissemys punctata (Bonnaterre, 1789)

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

Period: April 2019 to March 2021

Status: Initiated

Objective: To perform ecological studies on all the 23 species of fresh-water turtles of India.

Progress: One survey conducted to southern West Bengal and Odisha, which revealed presence of five species of turtles. The Indian eyed turtle (*Morenia petersi*) was sighted at Egra in Midnapur district of West Bengal.

TAXONOMIC STUDY AND DISTRIBUTION OF AGAMID LIZARDS OF INDIA 44

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

Period: April 2019 to March 2021

Status: Initiated

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

Progress: One museum study was made to ZSI, ANRC, Port Blair, during which 190 specimens of Agamid lizard belonging to three genera and five species were studied. Specimens of two rare species *Coryphophyllax brevicaudus* from Andamans and *Bronchocoela danieli* from Great Nicobar were also identified.

Coordinator: Dr. Vikas Kumar

Investigators: Dr. Inderjeet Tyagi & Dr. Kaomud Tyagi

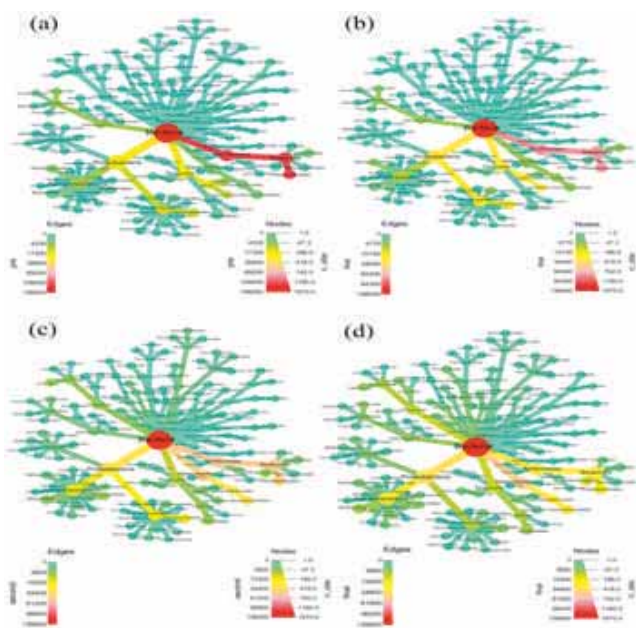
Period: April 2019 to March 2022

Status: Initiated

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

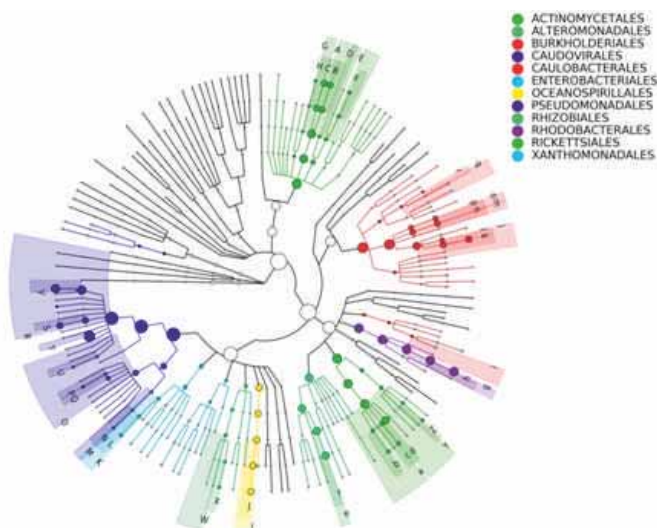
Progress: One survey was undertaken to Uttar Pradesh. Water samples in triplicate from multiple sites including ETPs and STPs were collected. Data of these water samples have been generated. Water indexing of these water samples was done by using physico-chemical parameters.

DNA METASYSTEMATICS STUDIES FOR THE ASSESSMENT OF THE MACROBIOME AND MICROBIOME IN FRESHWATER ECOSYSTEM WITH RELATION TO THE NOXIOUS POLLUTANTS 45



Heat tree of bacterial diversity in paper industries

46 INSIGHTS INTO THE GUT MICROBIOME OF THRIPS (THYSANOPTERA: INSECTA) FROM INDIA



Phylogenetic tree of gut bacterial diversity of thrips species

Co-ordinator: Dr. Vikas Kumar

Investigators: Dr. Kaomud Tyagi & Dr. Inderjeet Tyagi

Period: April 2019 to March 2022

Status: Initiated

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

Progress: One survey to Uttarakhand State was conducted. A total of 10 samples were processed for WMS (Whole Metagenome Sequencing) and analysis is under progress. Bacterial genus *Wolbachia* was detected as the most dominant genus.

FAUNAL DIVERSITY OF MUDFLATS 47

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: Initiated

Objectives:

i. To identify the faunal communities of mudflat ecosystems of India.

Progress: One survey was conducted to Puducherry and Tamil Nadu states covering the mudflats of mangrove, coastal areas, and estuarine zones. A total of 614 specimens under 11 groups have been collected. Altogether 84 species of fauna under 4 groups have been identified. Besides, 71 species of birds under 35 families were observed.

48 FAUNAL DIVERSITY OF PUDUCHERRY STATE



Lysiosquilla tredecimdentata Holthuis, 1941

Coordinator: Dr. C. Raghunathan

Investigators : Dr. K.G.Emiliyamma, Dr. C. Venkatraman, 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: Initiated

Objectives:

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

Progress: Two surveys were conducted in Pondicherry and Karaikal districts of Puducherry State covering mangrove, sandy and rocky beaches, coastal and marine, freshwater and terrestrial ecosystems. A total of 11,191 specimens under 36 groups have been collected. Altogether 218 species of faunal communities under 11 groups have been identified. Observations were made on the inter-tidal regions of Pondicherry and Karaikal districts. Explorations were made by SCUBA diving for identifying reef areas along the Pondicherry Coast. Data analysis and identification of other faunal groups is under progress.

ANNUAL REPORT **2019-2020**

RESEARCH PROGRAMMES: REGIONAL CENTRES

The Regional Centres of ZSI are spread across the country and dealing with research programmes on States, Conservation Areas and Ecosystems, under their jurisdiction. The 16 Regional Centres of ZSI handled 70 research programmes. Among them 11 completed programmes, 43 ongoing programmes and 16 programmes initiated during the year 2019-20.

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, 125 research programmes covering various aspects of faunal diversity in the Northeastern states have been completed by the Centre. At present, the Centre is handling three research programmes in the states of Manipur, Meghalaya and Mizoram. The Centre maintains a museum exhibiting the faunal wealth of the northeastern region and also holds a collection of about 97,000 identified specimens and over 1,60,000 unidentified specimens representing various faunal groups. During the year, out of the five programmes, one completed, three ongoing and one programme was initiated during 2019-20.

NORTH EASTERN REGIONAL CENTRE, SHILLONG, MEGHALAYA

STATUS SURVEY OF *RAORCHESTES SHILLONGENSIS* (PILLAI & CHANDA, 1973) (AMPHIBIA: ANURA: RHACOPHORIDAE) - A CRITICALLY ENDANGERED FROG ENDEMIC TO MEGHALAYA, NE INDIA

01

Investigators: Mrs. I. J. Kharkongor & Mr. B. Saikia.

Period: April 2018 to March 2019

Status: Completed

Objective: To determine the current status of Critically endangered and endemic frog *Raorchestes shillongensis* in Meghalaya.

Outcome: The Critically endangered and endemic frog *Raorchestes shillongensis* (Pillai & Chanda, 1973) was reported from 27 out of 35 localities surveyed in EKH and Ri Bhoi Districts of



A calling male of *Raorchestes shillongensis* (Pillai & Chanda, 1973)

Meghalaya including a few localities that were previously not reported, thereby extending its geographical range in the state. Six major colour morphs of this species were also reported. Though the status of the population is highly fragmented or isolated within Shillong city (estimated to be <5 individuals/sq.m), a healthy/viable population of the species (estimated to be >5 individuals/sq.m) is found in the Government Protected Forest (12.96 sq.km in area) in the southern and south-western parts of the City and in the fringe areas of this Protected Forest. Overall, the status of the population is on a decline in Shillong city due to several factors, but it is significant to note that the species has been able to colonize new areas adjacent to the City thereby extending its geographical range in the state of Meghalaya.

RESURVEY OF SIJU CAVE ALONG WITH KREM LABIT AND UMLAWAN, MEGHALAYA (CAVE ECOSYSTEM) 02

Investigators: Officer-in-Charge and scientists of NERC

Period: April 2017 to March 2020

Status: Ongoing

Objectives: i. To document the species diversity of various faunal groups in the cave ecosystem

ii. To record any changes in faunal diversity in recent times based on earlier faunal documentation.

Progress: One survey was conducted and 8 faunal groups were collected both from the cave as well as outside cave. Identification include 3 species of Crustacea, 11 species of Mollusca, 5 species Pisces, 5 species of Amphibia, 4 species of Reptilia and 5 species of Mammals (Chiroptera).

FAUNAL INVENTORY OF MURLEN NATIONAL PARK, MIZORAM 03



Cristidorsa otai (Mahony, 2009)

Investigators: Mrs. I. J. Kharkongor, Dr. U. Saikia, Dr. D. Khyntiam, 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: One survey was conducted and 6 faunal groups were collected. Identification include, 2 species of Coleoptera, 2 species of Mollusca, 27 species of Lepidoptera, 6 species of Pisces, 10 species of Amphibia and 3 species of Reptilia.

04 TAXONOMIC STUDIES OF HILL STREAM FISHES OF MEGHALAYA

Investigator: Dr. Dimos Khyntiam

Period: April 2018 to March 2021

Status: Ongoing

Objective: Taxonomic studies of hill stream fish fauna in Meghalaya

Progress: One survey was conducted and 232 specimens were collected. 46 species of fishes under 38 genera were identified.

DIVERSITY AND STATUS OF SMALL MAMMALIAN FAUNA (CHIROPTERA, RODENTIA AND SORICOMORPHA) OF MANIPUR STATE, NORTH EASTERN INDIA

05



Landscape in Tamenglong district

Investigator: Dr. Uttam Saikia

Period: April 2019 to March 2022

Status: Ongoing

Objectives:

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

Progress: One survey was conducted covering six districts of Manipur and a total of 40 examples of Chiroptera and Rodentia were collected among which 11 species Chiroptera were identified. Five species of bats collected and are new records for the state of Manipur including a few lesser known species.

The Western Regional Centre (WRC) was established at Pune, Maharashtra during September 1959. The primary objective of this Centre is to explore and document faunal diversity particularly from the western India and Western Ghats. WRC has completed various research programmes, including Fauna of India, Fauna of Ecosystem, State Fauna, Wildlife Sanctuaries, National Parks, Tiger Reserves and Status surveys. Over 85 new species and one new family have been described by the scientists of the Centre. A museum, displaying over 500 specimens, is a part of the center to educate and generate awareness on biodiversity and conservation among locals and visitors including students. WRC also with a DNA Barcoding laboratory, which has so far generated 63 DNA barcodes. Scientists from WRC have published many 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. The National Zoological Collection of ZSI holdings is 1, 91,389, including 85,139 named collections and 336 type specimens. Four programmes were undertaken by the centre during this year of which two are ongoing and two programmes were new programmes for 2019-20.

**WESTERN
REGIONAL
CENTRE,
PUNE,
MAHARASHTRA**

TAXONOMIC STUDIES OF AMPHIBIANS OF WESTERN GHATS 01

Investigator: Dr. K.P. Dinesh

Period: April 2018 to March 2021

Status: Ongoing

Objective: Taxonomic study of Amphibians of Western Ghats.

Progress: Two surveys were conducted and collected 83 examples of amphibians. A total of 80 examples were identified, under 28 species, 13 genera and 8 families.

FAUNAL DIVERSITY OF YAWAL WILDLIFE SANCTUARY, JALGAON DISTRICT, MAHARASHTRA 02



Sphaerotheca pashchima Padhye et. al., 2017

Investigators: Officer-in-Charge and all Scientific Staff

Period: April 2018 to March 2021

Status: Ongoing

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

Progress: Two surveys were conducted and 39 groups of fauna were collected. Out of the collected specimens total 122 examples were identified belonging to 7 species of odonata, 10 species of butterflies, 7 species of aquatic beetles and 2 species of freshwater crabs.

03 TAXONOMIC STUDIES OF SMALL MAMMALS OF SOUTHERN WESTERN GHATS



Cynopterus sphinx (Vahl, 1797)

Investigator: Dr. S. S. Talmale

Period: April 2019 to March 2021

Status: Initiated

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: Two surveys were conducted and 24 examples of small mammals were collected. One species of shrew, four species of rodents and four species of bats were identified.

FAUNAL DIVERSITY OF GAUTALA AUTRAMGHAT WILDLIFE SANCTUARY, MAHARASHTRA 04

Investigators: Officer-in-Charge and all Scientific Staff

Period: April 2019 to March 2022

Status: Initiated

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

Progress: Two surveys were conducted and 1,343 examples belonging to 39 groups were collected. Identification is in progress.

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 142591 numbers of holdings are catalogued comprising 76119 identified and 66472 unidentified specimens. This regional centre has completed 41 Research Programmes involving faunal exploration in various protected and non-protected areas of Madhya Pradesh and Chhattisgarh along with studies on behavior, taxonomic revisions 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.

CENTRAL ZONE REGIONAL CENTRE, JABALPUR, MADHYA-PRADESH

FAUNAL DIVERSITY OF PANNA TIGER RESERVE, DISTRICTS PANNA AND CHHATARPUR, MADHYA PRADESH 01

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 48 species were identified belonging to Orthoptera, Lepidoptera (moths and butterflies), Coleoptera (Coccinellidae), Arachnida (Aranaea), Amphibia and Reptilia. Observations were made on 30 species of Birds and 10 species of Mammals.

FAUNAL DIVERSITY OF KANHA TIGER RESERVE AND NATIONAL PARK, MADHYA PRADESH 02



Rucervus duvaucelii (G. Cuvier, 1823)

Investigators: Officer-in-Charge & Scientists of CZRC & 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: One faunistic survey was conducted and collected 685 examples under 20 faunal groups. A total of 300 species comprising of 27 species of Mammals, 137 species of Birds, 18 species of Reptiles, 9 species of Amphibians, 4 species of Scorpions, 12 species of Odonata, 48 species of Butterflies, 40 species of Moths and 5 species of Hemiptera were identified.

FAUNAL DIVERSITY OF SANJAY, PANNA AND FOSSIL NATIONAL PARKS, DISTRICT PANNA & CHHATTARPUR, MADHYA PRADESH 02

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: Two surveys were conducted and 34 species of moths was identified from Sanjay National Park, while 6 species of butterflies and 5 species of moths was identified from the Panna National Park along with 4 species of butterflies and 11 species of moths were identified from Fossil National Park.

03 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: Critically Endangered bush frog *Philautus sanctisilvaticus* Das & Chanda, 1997 and other species distributed across the fragmented forests of Deccan Peninsula and the northern Eastern Ghats were investigated. Based on

mitochondrial 16S rRNA, the phylogenetic relationships across *Philautus sanctisilvaticus* Das and Chanda, 1997, *Raorchestes terebrans* (Das and Chanda, 1998) and *P. similipalensis* Dutta, 2003 were found to be genetically extremely similar, with pairwise uncorrected distances <1% in the 16S gene, and were phylogenetically placed within the genus *Raorchestes*. On the basis of Principle of Priority in article 23.1 of the ICZN, *Philautus sanctisilvaticus* Das and Chanda, 1997 is the first available nomen for these taxa and hence with the new combination of name *Raorchestes sanctisilvaticus* (Das and Chanda, 1997), *Philautus terebrans* Das and Chanda, 1998 and *P. similipalensis* Dutta, 2003 were treated as junior subjective synonyms. The findings are notable from the conservation point of the species and present a novel case with remarkable genetic homogeneity across the fragmented forests of Deccan Peninsula and Eastern Ghats.



Raorchestes sanctisilvaticus (Das & Chanda, 1997)

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 at present DRC. The Jurisdiction of the Centre is spread over 3,42,239 Sq. km. area of Rajasthan and 1,81,1000 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 region 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. Taxonomic expertise on Lepidoptera, Hymenoptera, Coleoptera, Hemiptera, Arachnida, Pisces, Amphibians,

DESERT REGIONAL CENTRE (DRC), JODHPUR, RAJASTHAN

Reptiles, Birds and Mammals are available currently at the Centre. The total holdings of the Centre include 482661 specimens with 74254 Identified specimens and 408407 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 2019-20, the Centre was engaged in five research programmes of which two were completed, two ongoing and one programme was initiated.

STUDIES ON FAUNAL DIVERSITY OF JAISAMAND WILDLIFE SANCTUARY, RAJASTHAN 01



Terpsiphone paradisi (Linnaeus, 1758)

Investigator: Dr. SanjeevKumar, Dr. H.S. Banyal and Scientific staff

Period: April 2018 to March 2019

Status: Completed

Objective: Inventorization and documenting the faunal diversity of Jaisamand WL Sanctuary based on literature.

Outcome: 51 species of zooplankton, 14 species of insects, 68 species of fishes, 8 species of amphibians, 35 species of reptiles, 262 species of birds and 45 species of mammals have been dealt in the document.

02 EXPLORATION OF ICHTHYOFAUNAL DIVERSITY IN SOME SELECTED TRIBUTARIES OF CHAMBAL RIVERINE SYSTEM, RAJASTHAN, INDIA

Investigators: Dr. H. S. Banyal & Dr. Sanjeev Kumar

Period: April 2018 to March 2019

Status: Completed

Objectives:

- i. Survey and documentation of the fish diversity in selected tributaries of Chambal Riverine system in Rajasthan state including studies on threats to various species of the fishes.
- ii. To develop the database of the fishes and their distribution in the selected tributaries of Chambal Riverine system in Rajasthan state.
- iii. To prepare digital and updated Inventory of Ichthyofauna in the entire area of study.

iv. Assessment of the threatened/endangered fish faunal species in the entire area of study.

Outcome: A total of 58 species of fishes were recorded from the Chambal riverine system, of which 42 species of fish were recorded from Banas River followed by 33 species from Pabati River, 31 species from Kali Sindh River, 18 species from Parwan River, 16 species from Brahmani River, 9 species from Ahu River and 7 species from Mej River. Carps were dominant in total catch followed by catfishes, snakehead/murrels fishes and other minor fishes. Minnows & minor carps were observed to be commonly found in most of the water bodies but, commercial fishes were noticed very less in the total fish catch, probably due to rampant and unregulated fishing. Digital and updated Inventory of Ichthyofauna in the entire area of study has been prepared.

Most of the fish species reported from the rivers are under Least Concern category of IUCN except *Cyprinus carpio* which is under Critically Endangered and *Ompok bimaculatus*, *Wallago attu*, *Bagarius bagarius* & *Anguilla bengalensis* are included under Near Threatened category.

STUDIES ON FAUNAL DIVERSITY OF NARAYAN SAROVAR WILDLIFE SANCTUARY, GUJARAT 03

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: Two surveys were conducted and 2,933 specimens collected belonging to Insecta, Arachnida, Gastropoda, Pisces, Crustacea, Amphibia and Reptilia. Among them, 6 species of fishes, 7 species of Amphibians and 17 species of Reptiles identified and 144 species of Birds and 18 species of Mammals observed.

04 STUDIES ON DIVERSITY OF POLLINATING BEES (APOIDEA: HYMENOPTERA) OF SEMI-ARID AND DESERT ECOSYSTEM



Megachile sp. on Calotropis

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

Period: April 2018 to March 2021

Status: Ongoing

Objectives:

- i. To collect adult bees (Hymenoptera) through intensive and extensive faunistic surveys from the semi-arid and desert ecosystem of Rajasthan.
- ii. To study the taxonomy based on some important morphological features including genitalic characters with a view to review the pollinating bees of study area.
- iii. 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.
- iv. To record the present distributional status of

different bee species from the study area.

Progress: Two faunal surveys were undertaken and 1,739 specimens of pollinating bees collected. From the collections, 17 species of bees under 9 genera were identified and 142 metaphors of different kinds of pollen grains attached with different parts of the bees (Apoidea) were studied using Scanning Electron Microscope to analyse the linkage between flowering plants and pollinating bees. Distributional status and the comparative inventory of bee species from the study area have been updated. The diversity of host plants of pollinating bees has been prepared and updated.

STUDIES ON FAUNAL DIVERSITY OF PURNA WILDLIFE SANCTUARY, GUJARAT 05

Investigators: Dr. Sanjeev Kumar & Scientific Staff

Period: April 2019 to March 2021

Status: Initiated

Objectives:

i. Inventorization and documentation of faunal diversity of Purna WL Sanctuary, Gujarat.



A view of Purna WLS

ii. Assessment of the threatened/endangered faunal species of the Purna of the sanctuary.

Progress: Two surveys were conducted and 5048 specimens belonging to Chilopoda, Diplopoda, Insecta, 76 Crustacea, Myriapoda, Arachnida, Decapoda, Gastropoda, Pisces, Amphibia and Reptilia collected. From the collections, two each species of Lepidoptera, Collembola, Hemiptera and nine species of Coleoptera, 18 species of Fishes, 6 species of Amphibia and 18 species of Reptiles were identified. A total of 72 species of birds and 12 species of mammals were also observed.

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, thirteen 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 4,10,980 (Identified specimens: 2,17,775 Unidentified specimens: 1,93,205) specimens including 339 type specimens available in the NZC of NRC. So far, two GSDP courses have been completed successfully. 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, thirty-five Programmes and about 850 research papers in various National and International journals. The Centre has executed three programmes during the year 2019-20, of which two were completed and one is ongoing.

FAUNA OF AGROECOSYSTEM HARYANA AND PUNJAB 01

Investigators: Officer-In-Charge & Scientific staff

Period: April 2017 to March 2019

Status: Completed

Objective: Compilation of information based on collections, reports and published data.

Outcome: The study recorded 53 species of Nematoda, 95 species of Lepidoptera, 78 species of Orthoptera, 33 species of Odonata, 11 species of Annelida, 9 species of Amphibia, 27 species of Reptilia, 171 species of Aves and 14 species of Mammals.



Peacock Pansy, *Junonia almana* (Linnaeus, 1758)

FAUNA OF UTTAR PRADESH BIRD SANCTUARIES 02



Oriental Darter, *Anhinga melanogaster* (Pennant, 1769)

Investigators: Officer-In-Charge & Scientific staff

Period: April 2017 to March 2020

Status: Completed

Objectives: Faunistic survey to Uttar Pradesh Bird Sanctuaries and to compile the data in the form of publication, Conservation Area series.

Outcome: The study recorded 318 faunal species

belonging to 232 genera under 108 families of 40 orders of vertebrates and invertebrates comprising 14 species of Nematoda, 41 species of Lepidoptera, 16 species of Odonata, 12 species of Annelida, 20 species of Pisces, 6 species of Amphibia, 12 species of Reptilia, 185 species of Aves and 12 species of Mammals.

03 FOREST INSECT DIVERSITY OF NORTH-WESTERN HIMALAYAS

Investigators: Officer-In-Charge & Scientists

Period: April 2018 to March 2021

Status: Ongoing

Objectives:

i. To identify the forest Insect diversity through surveys and collection in different habitat and zones of study areas.

ii. To prepare inventory/checklist of forest Insects along with their abundance.

Progress:

Two surveys were conducted and 1,775 examples were collected. 46 species of Lepidoptera and 32 species of Odonata identified so far.

SOUTHERN REGIONAL CENTRE 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 two biosphere reserves, seven tiger reserves, 9 National Parks and 31 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. The centre has completed documentation of several protected areas of the region and few are ongoing. Recently, the flagship programme on Long Term Ecological Observatories (LTEO) of Govt. of India is sanctioned to the centre. During 2019-20, 70 postgraduate students participated in 15 days' intensive internship programme. The centre is a recognized research centre under Madras University for conducting Ph.D. Currently eight students are registered for Ph.D. degree. Total holding of the Centre comprises 4,62,594, of which 1,93,462 are named specimens, 2,67,105 unnamed and 2027 are Type specimens. Six programmes were executed by the centre during the year 2019-20.

FAUNA OF POINT CALIMERE WILDLIFE SANCTUARY, TAMIL NADU 01



Flock of Painted Storks, *Mycteria leucocephala* (Pennant, 1769)

Investigators: Officer in Charge and Scientific Staff.

Period: April 2015 to March 2018

Status: Completed

Objective: To document the fauna of Point Calimere Wildlife Sanctuary

Outcome: The study recorded seven species of Rotifera, four species of Cladocera, six species of Ostracoda, 10 species of Odonata, 12 species of Orthoptera, 13 species of Fishes, 15 species of Amphibia, 42 species of Reptiles, 189 species of birds and 31 species of mammals.

Significant findings: Important habitat for several species of migratory birds and endangered mammals like Black buck were recorded.

LESSER KNOWN FAUNA OF CAUVERY ESTUARY, TAMIL NADU 02

Investigators: Officer-in-Charge and scientific staff

Period: April 2015 to March 2018

Status: Completed

Objective: To document lesser known fauna of Cauvery Estuary.

Outcome: The study documented 4 species of Cnidaria, six species of Echinodermata, 29 species of Rotifera, 41 species of Crustacea, 21 species of Odonata and 29 species of Orthoptera.

DNA BARCODING OF SELECTED FAUNAL GROUPS/SPECIES 03

Investigator: Dr. Ranjana

Period: April 2018 to March 2021

Status: Ongoing

Objectives: To create DNA barcode of fauna of India.

Progress: A total of 59 sequences of DNA barcode were generated and submitted in NCBI comprising 12 species of mammals, two species of Pisces, three species of Odonata, two species of Crustacea, one species of Araneae and one species of Hemiptera.

FAUNA OF MEGHAMALAI WILDLIFE SANCTUARY AND ADJOINING LANDSCAPES, TAMIL NADU 04

Investigators: Officer-in-Charge & 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: Two surveys were conducted in the different ranges viz., Megamalai, Chinnamannur, Cumbum East and Gudalur Ranges of Meghamalai Wildlife Sanctuary and collected 5,706 specimens belonging to 15 faunal groups. One new species of Odonata has been described.



Pachliopta hector Linnaeus, 1758

05 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: Three Survey tour was conducted. Development of species signature profiles was done using DNA barcode gene COI and Cytochrome b gene to discriminate different species. 137 sequences COI, 120 sequences Cytb, 137 sequences of Control Region (CR) of MtDNA was generated from 160 individuals (pellets) of

Blackbuck. Data analysis was done for the state Tamil Nadu, Karnataka, Telangana, Andhra Pradesh. The result provide evidence that the blackbuck in different geographic locations has distinct populations structure due to habitat fragmentation after the formation of Western and Eastern Ghats and population expansion after the separation.

FAUNA OF CONSERVATION AREA: FAUNA OF AGASTHYAMALAI BIOSPHERE RESERVE 06

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 Agasthyamalai Biosphere Reserve.

Progress: Four surveys were conducted and



Ratufa indica Erexleben, 1777

8,334 specimens of 17 faunal groups were collected. One new species of Odonata, *Gomphidia podhigai* n. sp. has been described from the Agasthyamalai Biosphere Reserve.

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 55 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

GANGETIC PLAINS REGIONAL CENTRE, PATNA, BIHAR

and revisionary studies. Total holding include 1,44,942 specimens, comprising 51,563 named specimens and 93,379 unnamed specimens. Apart from this 12 Type specimens are housed in the centre. The Centre carried out three research programmes during 2019-20.

FAUNA OF LAWALONG WILDLIFE SANCTUARY, CHATRA, JHARKHAND 01

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 42 species of Zooplankton, 24 species of Butterflies, 78 species of Moths, 14 species of Mollusca, seven species of Amphibia and 8 species of Reptiles were identified from the collections, besides observation on 86 species of Birds and 17 species Mammals made during the survey.

FAUNAL DIVERSITY OF RAJGIR (PANT) WLS RAJGIR AND BUDHA WLS, GAYA 02



View of Rajgir WLS

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: Identified 42 species of Zooplankton, 64 species of Butterflies, 65 species of Moths, 21 species of Mollusca, 11 species of Amphibia and 32 species of Reptiles, besides observation on 119 species of Birds and 14 species Mammals were made during the surveys conducted.

03 FAUNA OF GAUTAM BUDHA WILDLIFE SANCTUARY, BIHAR



Alexandrine parakeet, *Psittacula eupatria* Linnaeus, 1766

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 28 species of Zooplankton, 26 species of Butterflies, 65 species of Moths, 19 species of Mollusca, 7 species of Amphibia and 7 species of Reptiles, besides observation on 26 species of Birds and 13 species Mammals were made during the survey.

High Altitude Regional Centre was established in September 1968, under the fourth Five Year Plan of the Government of India, with the main objective of exploring the Himalayan fauna. The jurisdiction of the centre includes the mountainous state of Himachal Pradesh, Union Territories Jammu & Kashmir and Ladakh of the North Western Himalaya. They are located between 300 22' 40"N - 370 6' N latitudes and between 720 30' 20" E - 790 04' 20" E longitudes and spread over an area of 2,77,909 sq.km. Owing to vast altitudinal variation from 600m 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 ranges lie the Pir Panjal ranges in the region. The state Himachal Pradesh and two Union territories i.e. Jammu & Kashmir and Ladakh falling in its jurisdiction includes 09 National Parks, 43 Wildlife Sanctuaries, 37 Conservation Reserves, One Biosphere Reserve and 07 Ramsar sites. There are a total of 35,269 specimens of identified collection and 1,65,848 specimens of unidentified collection present in the centre. HARC has been recognized as research institute for Ph.D programme by the University of Jammu and Maharaja Agrasen University, Solan. The Centre was involved in four research programmes during 2019-20 of which one completed and three ongoing.

HIGH ALTITUDE REGIONAL CENTRE, SOLAN, HIMACHAL- PRADESH

FAUNAL RESOURCES OF SANGLA VALLEY, DISTRICT KINNAUR (H.P.) 01



View of Sangla valley near Chitkul

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

Period: April 2015 to March 2019

Status: Completed

Objective: To study and inventorize the faunal diversity of Sangla Valley, district Kinnaur (Himachal Pradesh).

Outcome: The studies document the presence of 292 species belonging to 13 major faunal groups in the Sangla Valley. These include 44 species of Protozoa, 06 species of Oligochaeta, 09 species of Odonata, 37 species of Orthoptera, 14 species of Coleoptera, 37 species of Butterflies, 22 species of Moths, 04 species of Pisces, 07 species of Herpetofauna, 68 species of birds and 22 species of mammals.

Significant findings:

9 species of Protozoa and one species of Coleoptera are new record to India, while 2 species of Coleoptera are new records to the state of Himachal Pradesh and one species of Lepidoptera is new record from North-West Himalaya.

FAUNAL DIVERSITY OF THE STATE OF JAMMU AND KASHMIR 02



Pseudois nayaur (Hodgson, 1833)

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: One extensive survey was undertaken and collected 466 examples of 18 faunal groups and observed the rare and threatened fauna like Himalayan marmot, Kiang, Black necked Crane, Pika, Woolly hare and heard of Blue Sheep.

GRASSLAND ECOSYSTEM: FAUNAL DIVERSITY OF TEMPERATE AND ALPINE GRASSLANDS OF THE HIMALAYA: PHASE-1: (H.P.) 03



Junonia orithya (Linnaeus, 1758)

Investigators: Officer-in-Charge and Scientists

Period: April, 2018- March, 2021

Status: Ongoing

Objectives:

- To survey and explore the faunal diversity of temperate and Alpine grasslands of Himachal Pradesh.
- Taxonomic studies of the fauna collected.
- Documentation of the fauna of Temperate and Alpine Grasslands of Himachal Pradesh.

Progress: Local surveys were conducted and 310 examples pertaining to 21 faunal groups were collected. A total of 83 species identified belonging to 8 faunal groups and observed 63 species of birds and 11 species of mammals.

04 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:

- 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: Through field surveys undertaken, Ephemeroptera, Plecoptera and Trichoptera from riverine ecosystem were collected. In addition to that, collected late instar larval mayflies for

rearing. A total of 474 specimens of Ephemeroptera, Plecoptera and Trichoptera have been identified and digitized. In 433 specimens collected, they were under 5 family and 16 species of Ephemeroptera; 17 specimens of Plecoptera under 01 family and 2 species of Plecoptera and 24 specimens under 2 family and 2 species Trichoptera. Successfully reared three species of family Baetidae (Ephemeroptera) to study the larva and imago association/correlation

Marine Biology Regional Centre was established on 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 in 2.02 million sq km EEZ of India - from reef types such as fringing, barrier and atolls, to seagrasses, mangroves, estuaries, sand dunes, salt marshes and extensive beaches in addition to the oceanic habitats, submerged reefs and mounts. Since the time of inception, a total of 112 research programmes have been completed by the scientists under the Annual Programmes of Research and a few externally funded projects. Currently the centre has 08 ongoing programmes of which 3 are externally funded. This centre is a recognized centre for Ph.D. studies under the Madras University and 13 students have received their doctoral degrees so far. Presently, 05 students have been pursuing their PhD. The centre holds a total of 1,27,922 specimens under National Zoological Collections of which 1,14,622 are named and 19 Types specimens.

MARINE BIOLOGY REGIONAL CENTRE, CHENNAI, TAMIL NADU

STATUS SURVEY OF SEA TURTLES OF CHENNAI COAST 01

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

Period: April 2017 to March 2019

Status: Completed

Objective: To assess the status of Sea turtles of Chennai coast.

Outcome: Eight regular nesting sites from Pulicat to Alamparai were identified and two new nesting sites were identified near Kadalur and Chinnakuppam areas near the Palar river mouth.

The newly found nesting sites were notified to the Department of Environment and Forests, Tamil Nadu. A Total of 87 dead turtles were observed at the sampling localities from December 2016 to March 2017, where the highest numbers were observed between Pulicat and Calm beach locality, at a distance of 2.53 km, in the northern part of the Chennai coast, and between Kanathur and Neelankarai beach in the southern part of the Chennai coast. The reasons for mortality identified were: Mechanical injury and incidental catch in the fishing nets and developmental activities including construction works near nesting sites, flood lighting and stray dogs.

Significant finding: Hawksbills (*Eretmochelys imbricata*) were not reported to nest along the coast of Chennai, however, a sub-adult was reported near Panaiyur fishing village. This was the first report of hawksbill sea turtle for this location.

CORAL REEF DWELLING POLYCLADS OF GULF OF MANNAR BIOSPHERE RESERVE, TAMIL NADU 02



Thalayari Island

Investigators: Dr. P. Padmanaban & Mr. R. Rajendra Kumar

Period: April 2016 to March 2019

Status: Completed

Objectives: To assess the taxonomy and mapping of distribution of Polyclad fauna in Gulf of Mannar.

Outcome: Eight species identified belonging to two family and five genera. The species *Pseudoceros indicus*, *P. prudhoei* *Pseudobiceros uniaborensis*, and *Prosthiostomum* sp. were common in Shingle and Thalayari islands. The species *Phirkoceros katoj*, *Pseudoceros bicolor* were rare and *Thysanozoon brochii* and *Pseudoceros galatheensis* are new to mainland Gulf of Mannar. The polyclad species distribution was very high in Thalayari Island of Keelakarai group when compared to Mandapam and Tuticorin group.

03 FAUNA OF WEST COAST - MEIOFAUNA WITH SPECIAL REFERENCE TO FREE-LIVING MARINE NEMATODES

Investigator: Dr. G. Sivaleela

Period: April 2017 to March 2020

Status: Ongoing

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

Progress: A total of 1,297 free-living marine nematode specimens were collected from sandy, muddy, rocky and mangroves habitats from which identified 108 species under 19 families and 54 genera were identified. The genera *Gammanema* *Draconema*, *Paradraconema*, *Calomicrolaimus* belonging to the families *Selachinematidae* and *Cyartonematidae* respectively were new distributional records from this coast. A total of 11 species were studied using Scanning Electron Microscope to understand the finer characters. Meanwhile, taxonomic results shows that family Xyalidae is the most diverse family with three species followed by family *Chromadoridae* (2 species).

POPULATION STUDIES OF COMMERCIALLY VIABLE SEA CUCUMBER SPECIES IN GULF OF MANNAR MARINE NATIONAL PARK AND PALK BAY 04

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: Two surveys were undertaken to Gulf of Mannar and Palk Bay. A total of 8 species of sea cucumbers were encountered in the present study. The population density (n/ha) estimates conducted on the commercially viable species *Holothuria scabra* was: 37.3 n/ha (average) in the seagrass habitats of Palk bay and 4.5 n/ha in GoM. The peak in population density was observed in the month of April, whereas the lowest values were observed in October. The morphometric and gonadal studies conducted on 240 specimens of *H. scabra* revealed 109 males, 78 females and 53 of them of indeterminate sex. The analyses revealed that *H. scabra* was sexually active throughout the year. Reproductively matured individuals (brooders) were found throughout the study period with the peak in April and spent individuals being dominant during August and November.

FAUNA OF GULF OF MANNAR - REEF FISHES 05

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 337 specimens were collected of which 90 species of Reef fishes were identified and registered.



Abudefduf vaigiensis (Quoy & Gaimard 1825)

06 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: Initiated

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: 48 species under 21 genera have been identified and registered.

MORPHOLOGY AND MOLECULAR TAXONOMIC STUDIES OF MARINE SPONGES OF LAKSHADWEEP 07

Coordinator: Dr. G. Sivaleela

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

Period: April-2019- March-2022

Status: Initiated

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: Two surveys were conducted and 722 specimens of sponges collected of which 26 species of sponges were identified. Highest



Paratettilla bacca Selenka 1867

species diversity was recorded at Agatti, Androth and Kadamath islands. *Axinella carteri* is a new distributional record from Lakshadweep coast, while *Dragmacidon coccinea* is a new distributional record to India.

ANDAMAN AND NICOBAR RESEARCH CENTRE, 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. 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 07 in-house projects and 02 grant-in-aid projects. Coral reefs and their associated faunal communities are given special attention. Holdings of the Centre comprise 1,43,238 specimens with 56,263 named

and 86,975 unnamed specimens. More than 4,000 visitors from mainland as well as foreigners witnessed regional museum of the Centre during this reporting period, out of which more than 1,000 students from various colleges, school of this islands. During the period 3 books, 31 research papers, 24 book chapters were published

FAUNAL DIVERSITY OF ANDAMAN AND NICOBAR ISLANDS: MARINE AND TERRESTRIAL FAUNA OF PAGET GROUP OF ISLANDS 01

Coordinators: Dr. C. Sivaperuman & Dr. C. Raghunathan

Period: April 2016 to March 2019

Status: Completed

Objectives:

- To describe the marine fauna of Paget group of Islands
- To describe the terrestrial fauna of Paget group of Islands

Outcome: A total of 624 species including 98 species of scleractinian corals, 8 species of sea anemones, 25 species of octocorals, 13 species of hydrozoans, 24 species of sponges, 46 species of molluscs, 18 species of opisthobranchs, 4 species of polyclads, 20 species of crabs, 9 species of shrimps, 2 species of lobsters, 23 species of echinoderms, 12 species of ascidians, 175 species of fishes, 17 species of Bryozoa. 56 species of birds; 28 species of butterflies; 12 species of Odonates, 11 species of reptiles & amphibians; 19 species of spiders and 4 species of mammals were identified.

Significant findings: The North Andaman group of Islands are one of the richest parts of Andaman and Nicobar Islands in terms of faunal diversity. For the effective conservation and sustainable utilisation of the faunal resources, all the islands of North Andaman archipelago have to be managed in a more efficient manner. The careful management strategies and habitat improvement programmes need to be implemented in order to protect the faunal

diversity depletion in this region. As this island group is the habitat for many endangered and endemic species, it is very essential to look into site requirements and habitat preferences of various species in an integrated manner while preparing management plans.



Parthenos sylvia (Cramer, 1775)

02 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 432 specimens of marine fauna collected and identified belonging to 11 faunal groups, while 1,757 specimens of terrestrial fauna were collected and identified belonging to 587 species in 21 faunal groups. Observation was made on 37 species of birds.



Melihaea calidonica (Grasshoff, 1999)

FAUNAL DIVERSITY OF ANDAMAN AND NICOBAR ISLANDS: FAUNAL DIVERSITY IN THE AGRO-ECOSYSTEM IN ANDAMAN ISLANDS 03

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: Total 2,413 specimens were collected from the surveys. Identified 19 species of reptiles, 9 species of amphibians, 35 species of butterflies, 31 species of spiders, 37 species of moths and 6 species of odonata were identified. Observed 7 species of mammals and 78 species of birds during the field surveys.

04 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: One survey was conducted and a total of 711 specimens were collected and 147 species identified belonging to 14 species of Coleoptera, 49 of Hemipteran, 5 of Diptera, 69 of Lepidoptera and 10 species of Odonata.

STATUS OF CORALS AND ASSOCIATED MACROFAUNA & MARINE FISHES OF SOUTH REEF ISLAND AND INTERVIEW ISLAND WILDLIFE SANCTUARIES, MIDDLE ANDAMAN

05



Acanthurus leucosternon Bennett, 1833

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: A total of 1415 specimens were collected including poriferans, cnidarians,

platyhelminthes, sipunculans, annelids, arthropods, 27 specimens of byrozoans, molluscs, echinoderms and chordates. A total of 341 species including 67 species of scleractinian corals, 8 species of octocorals, 164 species of fishes and 1 species of mammal were identified.

Significant findings: Observation was made on dead inter-tidal reef zone of Interview Island, newly recruited corals, on healthy reef habitat at South Reef Island. One species of fish was recorded as new distributional record to Indian waters.

06 FAUNAL EXPEDITION TO GREAT NICOBAR BIOSPHERE RESERVE



Long-tailed Macaque, *Macaca fascicularis umbrosa* (Miller 1903)

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.

iii. To recommend suitable conservation measures for the management of faunal communities in the Great Nicobar Biosphere Reserve especially endemic, endangered and threatened species.

iv. To identify the gap areas in our knowledge on the faunal information pertaining to the Great Nicobar Biosphere Reserve.

Progress: A total of 7,166 specimens were collected from 26 localities of evergreen forests of Great Nicobar BR. Identification includes 19 species of odonata, 34 species of butterflies and 30 species of moths, besides, observed 131 species of birds and 6 species of mammals.

Significant findings: 13 new species belonging to 8 groups have been described and 9 species forms new record to Indian fauna.

DIVERSITY, DISTRIBUTION AND TAXONOMY OF THE TERRESTRIAL FAUNA OF ANDAMAN GROUP OF ISLANDS 07

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: One survey was conducted and a total of 117 specimens were collected and identified 147 species belonging to 14 species of Coleoptera, 49 of Hemipteran, 5 of Diptera, 69 of Lepidoptera and 10 species of Odonata.

EXPLORATION OF MARINE FISHES OF NICOBAR GROUP OF ISLANDS 08

Investigator: Dr. Bineesh. K. K.

Period: April 2019 to March 2022

Status: Initiated

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 313 specimens were collected under 11 families. A total of 266 species including 18 species of sharks, 32 species of rays, 16 species of Gobiids, 19 species of eels, 11 species of ponyfishes, 4 species of Caesionids, 9 species of Nemipterids, 5 species of Gerriids were identified.

Significant findings: Two new species were confirmed and two species of fishes was recorded as new distributional record to Indian waters.

09 FAUNAL DIVERSITY OF ANDAMAN AND NICOBAR ISLANDS: FAUNAL DIVERSITY IN THE GRASSLAND ECOSYSTEM IN ANDAMAN & NICOBAR ISLANDS



Cyrestis tabulade Nicéville, 1883

Investigator: Dr. C Sivaperuman

Period: April 2018 to March 2021

Status: Ongoing

Objectives:

i. 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 880 specimens were collected from field surveys and identified. 26 species of spiders, 35 species of butterflies, 17 species of moths, 3 species of amphibians and 10 species of reptiles and observed 58 species of birds.

Significant findings showed that ground-dwelling spiders were often observed as the most diverse and numerically abundant group of predatory arthropods in grasslands. Four very rare species of butterflies were observed, viz. Blue Tiger *Tirumala limniace exotica*, Dark Blue Tiger *Tirumala septentrionis septentrionis*, Nicobar Red lacewing *Cethosia bibles nicobarica* and Nicobar Bush brown *Mycalesis manii*. The food plants of adult butterflies were limited *Chromolaena odorata* (L) R. M. King dominated in every survey site. Milkweed butterflies (Subfamily Daninae) were found in all the habitat due to the abundance of Milkweed plants (*Crotalaria retusa* L.) and other flowering plants.

TAXONOMY, DISTRIBUTION, DIVERSITY AND CURRENT STATUS OF CHONDRICHTHYANS FROM ANDAMAN AND NICOBAR ISLANDS 10

Investigator: Dr. Bineesh. K. K.

Period: April 2019 to March 2022

Status: Initiated

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: A total of 66 specimens were collected under 8 families including 12 specimens of Narcinidae, 4 specimens of Rajidae, 16 specimens of Eridacnidae, 13 specimens of Proscyllidae, 3 specimens of Scylliorhinidae, 6 specimens of Hemigaleidae, 8 specimens of Anacanthobatidae, and 4 specimens of Dasyatidae. A total of 57 species under 7 orders and 25 families were observed and identified.



Triaenodon obesus (Ruppell, 1837)

SUNDERBAN REGIONAL CENTRE, 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 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, Sajnakhali 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. In 2010, SBRC planned to establish more facilities for the office for better scientific and administrative management, and from January 2012 onwards the office was shifted to a new building at No 1 Dhigirpar, Canning Town. The total holdings of this Centre is 52,566 specimens which include 8,858 identified specimens and 43,708 unidentified specimens.

FAUNAL DIVERSITY OF SAGAR ISLAND 01 WEST BENGAL, INDIA

Coordinator: Officer-in-Charge

Investigators: Dr. 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, India.

Progress: A total of 2026 specimens belonging to 23 groups were collected. Apart from this Avifauna 25 species was also documented from the Island. 59 specimens belonging to 12 species of molluscs, specimens belonging to 9 species of amphibian and reptilian were identified.



View of Agroecosystem

TAXONOMY AND ECOLOGY OF HETEROBRANCH SLUGS (MOLLUSCA, GASTROPODA, HETEROBRANCHIA) OF INDIA 02

Investigator: Dr. Sreeraj, C. R.

Period: April 2019 to March 2022

Status: Initiated

Objectives:

i. To understand the diversity and distribution of heterobranch slugs in the mangrove

ecosystem of India.

ii. To understand the ecological role of these slugs in the ecosystem.

Progress: During the survey around 428 specimens belonging to 5 groups were collected. Among the collection 13 specimens belonging to 4 species of fishes and 10 species slugs were identified.

Significance Findings: One alien species of slug was identified from Sagar Island namely *Levicaulis haroldi* Dundee, 1980 and the manuscript is communicated for the same.

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 the all the freshwater ecosystems including wetlands of National and International (Ramsar sites) importance. The NZC holdings of the centre comprises 1,02,014 including 39,369 identified and 65,645 unidentified specimens. Identification and advisory services of faunal groups particularly fishes, molluscs, 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 463 barcode sequences of 202 species to NCBI and BOLD. The centre has published 22 books and more than 250 research papers in various reputed journals. The Centre is recognised by the Osmania University, Hyderabad for pursuing Ph.D in Zoology at FBRC. At present two research scholars have registered for doctoral research at FBRC, ZSI, Hyderabad.

FRESHWATER BIOLOGY REGIONAL CENTRE, HYDERABAD, TELANGANA

FAUNA OF EASTERN GHATS- RIVERINE AND HILL STREAM FISHES & MOLECULAR CHARACTERIZATION 01

Investigator: Dr. Boni Amin Laskar

Period: April 2017 to March 2020

Status: Ongoing

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

Progress: Two field surveys were conducted and 2010 examples of fish specimens were sampled, identified 1431 examples of fishes belonging to 90 species under 67 genera and 34 families. DNA barcoded 42 sequences of fishes with 56 sequences. Interesting observations include lesser known catfish, *Clupisoma bastari* Datta & Karmakar, from Godavari River basin, endangered species, *Puntius cauveriensis* (Hora, 1937), from Cauveri River at Namakkal and *Channa kelaartii* Gunther 1861 from Yelagiri Hills, Tamil Nadu, which is known to be distributed in Sri Lanka.

FAUNISTIC STUDIES ON AMRABAD AND KAWAL TIGER RESERVE, TELANGANA 02



Tirumala limniace (Cramer, 1775)

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: Two faunistic surveys were conducted and 10,614 examples of fauna collected. Identification include 24 species of Aquatic Coleoptera, 6 species Aquatic Hemiptera 53 of Lepidoptera, 2 of Crab, 4 of Prawn, 47 of Mollusca and 18 species of Fishes.

03 FAUNA OF EASTERN GHATS- FRESHWATER OSTRACODS

Investigator: Dr. M. Karuthapandi

Period: April 2018 to March 2021

Status: Ongoing

Objective: Taxonomic studies on freshwater Ostracods of Eastern Ghats.

Progress: One field survey was conducted. During the survey totally 1223 examples belonging to 44 species were collected and identified.

04 DIVERSITY, DISTRIBUTIONAL PATTERN AND ASSEMBLAGE OF FISHES OF DECCAN PENINSULAR, INDIA

Investigator: Dr. S. S. Jadhav

Period: April 2019 to March 2022

Status: Initiated

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

Progress: One survey was conducted. 102 species of fishes from Godavari River from Telangana and Andhra Pradesh were collected.

05 FAUNA OF INDIA: STUDY ON THE BLATTODEA FAUNA OF INDIA

Investigator: Dr. S. Prabakaran

Period: April 2019 to March 2022



Allacta kalakadensis Prabakaran, Senraj and Lucanas, 2019

Status: Initiated

Objective: To prepare a monograph on fauna of India Blattodea

Progress: One survey was conducted and a new species *Allacta kalakadensis* Prabakaran et.al.2019 has been described and published.

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 Diaprinae (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

WESTERN GHATS REGIONAL CENTRE, KOZHIKODE, KERALA

Biosphere Reserve (Joint programme with SRC ZSI, Chennai, Chennai), Fauna of Lakshadweep Islands (Joint programme with ZSI Kolkata) and Fauna of India: Family Vespidae (Insecta: Hymenoptera) are the research programmes currently ongoing in the Centre. The NZCs maintained in the Centre contain 40,899 named and 1,22,091 unnamed specimens. The collection also includes 648 holotypes and 636 paratypes. The Centre is recognized as a Research Centre for conducting research leading to Ph. D. degree of the University of Calicut.

RICE ECOSYSTEMS OF KERALA-PHASE 1 01



Diplacodes trivialis (Rambur, 1842)

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: Ongoing

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

Progress: Major Rice ecosystems of Kerala were explored for collection of faunal samples by conducting local surveys and various faunal groups of vertebrata and invertebrate were collected. Identification include 154 species of Hymenoptera, 37 species of Odonata, 104 of Lepidoptera (butterflies), 10 of Mantodea, 65 of Arachnida (Araneae), 12 of freshwater Mollusca and 15 species freshwater crabs. Apart of this, 14 species of Reptiles 175 species of Birds, and 26

species of Mammals were also observed. Two male morphs of spiders recorded for the first time from India.

02 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: Two surveys were conducted to Uttarakhand and Karnataka states. Identification of Vespidae includes 353 examples belonging to 54 species of which 9 species are new record for the Uttarakhand state, while, 4 species are new record for the Karnataka state.



Polistes (Gyrostoma) olivaceus (De Geer, 1773)

Estuarine Biology Regional Centre, Gopalpur-on-sea, Ganjam 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 include estuaries and mangrove ecosystem of India which are extended throughout the country along both east and west coasts and the jurisdiction of the Centre is covering all estuaries and associated mangrove ecosystem of the country. Total holdings of the Centre include 85,146 specimens, of which 50,145 are named and 35,001 are unnamed specimens and 21 Type specimens.

ESTUARINE BIOLOGY REGIONAL CENTRE, GOPALPUR- ON-SEA, ODISHA

CURRENT STATUS OF FAUNAL DIVERSITY OF RUSHIKULYA ESTUARY, ODISHA 01

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, 22 of Crustacea and 66 species of Mollusca.

02 FAUNAL DIVERSITY OF TAMPARA LAKE, CHHATRAPUR, GANJAM, ODISHA



Halcyon smyrnensis (Linnaeus, 1758)

Investigators: Dr. A. Mohapatra, Mr. A. Mahapatra, 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 Tampura Lake

Progress:

A total of 6349 specimens were collected from local surveys belonging to 7 faunal groups. So far identified 2379 specimens comprising Osteichthyes, Amphibia, Arachnida, Crustacea, Gastropoda, Insecta and Reptilia. Observations were made on Birds and Mammals.

FAUNAL DIVERSITY OF DHAMARA ESTUARY, ODISHA 03



View of Dhamara port

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: Two surveys were conducted. Totally 4818 examples were collected from the survey and identification include of 951 examples belonging to seven faunal groups (Lice, Crabs, Prawns, Mantis Shrimps, Horse- Shoe crabs, Sea cucumber and Fishes).

04 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: Initiated

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.

Arunachal Pradesh (26° 40' - 29° 27' North, 91° 35' - 97° 24' East) 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 5,000 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 possess 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 12,000 sq. km. Holdings of the Centre include 38,234 specimens of which 11,397 specimens are named and 26,837 are unnamed.

ARUNACHAL PRADESH REGIONAL CENTRE, ITANAGAR

FAUNA OF DIHANG-DIBANG BIOSPHERE RESERVE, ARUNACHAL PRADESH 01

Investigators: Dr. B. Sinha, Scientists from HQ & Rcs

Period: April 2016 to March 2019

Status: Ongoing

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

Progress: Total 1475 specimens were collected belonging to 37 faunal groups. Identification includes 3 species of Cladocera, 5 species of Rotifers, 9 of Coleoptera, 9 of Ephemeroptera and 3 species of Pisces. Observations include 105 species of Birds and 30 species of Mammals.



Malinyee landscape, DDBR

FAUNAL INVENTORIZATIONS OF LAND SNAILS OF ARUNACHAL PRADESH, INDIA 02

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

Period: April 2018 to March 2021

Status: Ongoing

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

Progress: Two surveys were conducted and collected 778 specimens of land snails. 182 specimens were identified belonging to 40 species.

STUDY OF MILLIPEDES (MYRIAPODA: DIPLOPODA) DISTRIBUTION IN LOWER SUBANSIRI & PAPUM PARE DISTRICT OF ARUNACHAL PRADESH 03

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: One extensive survey and eight local surveys were conducted. A total of 227 examples of diplopoda were collected. One species of diplopoda forms the first report from the North Eastern region of India.

04 STUDIES ON CLADOCERAN DIVERSITY IN THE PROTECTED AREAS OF WESTERN ARUNACHAL PRADESH

Investigator: Dr. B. Sinha

Period: April 2019 to March 2022

Status: Initiated

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

Progress: Altogether 6 surveys including 2 local surveys conducted collected 59 plankton samples from different lentic and lotic bodies of 7 protected areas of western Arunachal Pradesh. A total of 42 Cladocera specimens were extracted and identified under 13 species belonging to 9 genera and 6 families.



Larva Waterfall

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 7,517 kilometer. 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 53,243 specimens of which 31,453 specimens of named collection and 21,790 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, Andhra Pradesh, Gulf of Mannar, Pichavaram, Tamil Nadu, Lakshadweep Union Territory, Pondicherry, Odisha and West Bengal along with studies on diversity, taxonomic and associated fauna from different ecosystems. Currently, there are three ongoing Annual Research Programmes in the centre. 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 students, research scholar from different reputed institutions/universities visited the marine aquarium and museum of the centre.

MARINE AQUARIUM & REGIONAL CENTRE, DIGHA, WEST BENGAL

DISTRIBUTION, DIVERSITY AND TAXONOMY OF THE ZOOPLANKTON FROM THE DIGHA COAST, EAST COAST OF INDIA 01

Investigators: Dr. S. Balakrishnan

Period: April 2017 to March 2020

Status: Ongoing

Objectives:

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

Progress: Two local surveys were conducted. Total 74 examples belonging 21 species of zooplanktons under 16 genera and 13 families were identified.

Investigator: Dr. J.S. Yogesh Kumar

Period: April 2017 to March 2020

Status: Ongoing

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

Progress: Local surveys were conducted and 677 examples collected comprising Cnidaria, Echinoderm, Mollusca, Arthropoda, Polychaeta and Bryozoan. 6 species of soft corals identified forms first report from Digha coast.

Progress: One extensive survey and eight local surveys were conducted. A total of 227 examples of diplopoda were collected. One species of diplopoda forms the first report from the North Eastern region of India.

DIVERSITY AND DISTRIBUTION OF OCTOCORALS AND ASSOCIATED FAUNA ALONG THE DIGHA COAST OF INDIA 02

03 SEAWEED AND SEAGRASS ASSOCIATED MARINE FAUNAL DIVERSITY ALONG THE EAST COAST OF INDIA

Investigator: Dr. S. Balakrishnan

Period: April 2019-March 2022 (3 Years)

Status: Initiated

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: Local surveys were conducted and collected 965 examples of seaweed and seagrass associated marine fauna comprising Mollusca, Lepas, Polychaete, Shrimp, Crab, Barnacles, Hydrozoa, Fishes, Echinodermata, Sponge and Chitodon. Identification includes 16 species belonging to Mollusca, Hexanauplia, Polychaeta, Hydrozoa, Actinopterygi, and Polyplacophora. *Epinephelus radiatus* (Day, 1868) forms first record from Parangipettai, Tamil Nadu.



Lituarina hicksoni Thomson and Simpson, 1909

CORAL REEF ASSOCIATED FAUNAL SURVEY ALONG EAST COAST OF INDIA 04



Yarada beach_East Coast

Investigator: Dr. J.S. Yogesh Kumar

Period: April 2019 to March 2022

Status: Initiated

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

Progress: Two surveys were conducted and 810 specimens were collected. Identified 20 species belonging to Cnidaria, Mollusca and Echinodermata. Besides, coral and reef associated fauna recruitment plates deployed in two sites (Mandapam group and Keelakari group of Islands), Gulf of Mannar Islands for three years monitoring.

05 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:

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

Progress: One extensive and five local surveys were conducted and collected 144 specimens including Arthropoda, Echinodermata and Mollusca. 31 water samples were collected from different survey locations and analysed for various water quality parameters. Correlation of water parameters with the species distribution along the survey places was also observed.

ANNUAL REPORT **2019-2020**

EXTERNALLY FUNDED PROJECTS

Besides departmental programmes, ZSI scientists were also involved in 31 externally funded projects sanctioned by more than 20 Agencies. These projects dealt with Taxonomy and Biodiversity Documentation, Biosystematics, Preparation of Pictorial Guides, 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, etc. in different ecoregions of our country.

STUDY AND DOCUMENTATION OF BIODIVERSITY OF DALMA WLS AND SARANDA FORESTS 01



Muntiacus muntjak Zimmermann 1780

Funding Agency: Jharkhand Biodiversity Board

Principal Investigator: Dr. Kailash Chandra

Co-Investigator: Dr. Navneet Singh & Dr. Gopal Sharma

Period: April 2017 to September 2019

Sanctioned at: GPRC, ZSI-Patna

Status: Completed

Objective: To study the faunal diversity of Dalma Wildlife Sanctuary and Saranda Forest Division, Jharkhand.

Outcome: A total of 140 species comprising 9 faunal groups were recorded from Sarandon forest, besides observations were made on 159 species of Birds and 22 species of Mammals. The fauna recorded from Dalma forest include 438 species belonging to 11 faunal groups and observed 285 species of Birds and 19 species of Mammals.

PICTORIAL GUIDE TO AMPHIBIANS, REPTILES AND MAMMALS OF EAST KOLKATA WETLANDS 02

Funding Agency: East Kolkata Wetlands Management Authority of the Dept of Environment, WB Govt

Investigator: Dr. Kaushik Deuti, Dr. P.G.S. Sethy & Dr. C. Venkataraman

Period: July 2019 to December 2019

Sanctioned at: HQ, ZSI-Kolkata

Status: Completed

Objective: To document all the Amphibians, Reptiles and Mammals of East Kolkata Wetlands

Outcome: Based on five local surveys conducted, a book on Pictorial Guide to Amphibians, Reptiles and Mammals of East Kolkata Wetlands published and released.

BIOSYSTEMATICS OF MAYFLIES (INSECTA: EPHEMEROPTERA) OF INDIA 03

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

Investigator: Dr.K.A. Subramanian

Period: April 2017 to March 2020

Sanctioned at: SRC, ZSI-Chennai

Status: Completed

Objectives:

- Study on the biosystematics of families Leptophlebiidae, Ephemeridae, Hepatageniidae and Baetidae (Insecta: Order Ephemeroptera)
- Taxonomical description and identification of diagnostic characters of the larval and adult stages of species of above mentioned families
- Study on the patterns of distribution of the species within India.
- Capacity building among students on



Afronurus kumbakkaraensis Venkataraman & Sivaramakrishnan, 1989

Ephemeroptera Taxonomy by conducting trainings and workshops.

v. Development of online internet resources for Ephemeroptera of India

Outcome: Surveys were undertaken in Western Ghats, Central India, Eastern Himalaya and Andaman and Nicobar islands. Taxonomic study and digitization of 40 species completed. 72 Species, 37 Genera and 12 Families identified from field surveys and National Zoological Collections and described 8 new species to science. Standardized protocol for DNA extraction from identified species and sequenced COI, 16S and 28S genes of 46 species.

Significant findings: One new genus, six new species published, 12 new records to India, and 10 species reported after 50 years.

04 STUDIES ON THE MOTH FAUNA OF PACHMARHI BIOSPHERE RESERVE- AN ASSESSMENT OF THE SPECIES RICHNESS, RELATIVE ABUNDANCE AND DISTRIBUTION AS ENVIRONMENTAL INDICATORS

Funding Agency: MoEF&CC

Investigator: Dr. S. Sambath

Period: June 2016 to June 2019

Sanctioned at: CZRC, ZSI-Jabalpur

Status: Completed

Objectives:

- i. To determine the species composition and relative abundance of moth population across different season and habitat in Pachmarhi Biosphere Reserve
- ii. To determine the microhabitat associations, host plant relationships and to relate moth species composition to vegetation across the different habitat
- iii. To prepare the distribution map of the moth fauna using GIS techniques

Outcome: Four surveys were conducted. A total of 1145 morphospecies were collected and 139 species recorded, 51 species belonging to Erebidae, 25 species to Crambidae, 16 species to Noctuidae, 16 species to Geometridae, 7 species to Nolidae. 5 species each to Notodontidae, 4 species to Euteliidae, 3 species to Sphingidae and Pyralidae, 2 species to Bombycidae, and one species each to Yponomeutidae, Cossidae, Thyrididae, Hyblaeidae, Drepanidae, Lasiocampidae and Uraniidae.

Significant findings: During the course of study, 121 species belonging to 95 genera were added to the moth fauna of Pachmarhi Biosphere Reserve.

TAXONOMY, DIVERSITY AND DISTRIBUTION OF ACTINARIA (SEA ANEMONES), POLYCLADIDA AND SIPUNCULA IN ANDAMAN AND NICOBAR ISLANDS 05



Pseudoceros goslineri Newman & Cannon, 1994

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

Investigator: Dr. C. Raghunathan

Period: October 2016 to September 2019

Sanctioned at: ANRC, ZSI-Port Blair

Status: Completed

Objectives:

- Studies on taxonomical exploration of Actinaria (Sea Anemones), Polycladida and Sipuncula in Andaman and Nicobar Islands.
- Studies on diversity and distribution pattern of Actinaria (Sea Anemones), Polycladida and Sipuncula in Andaman and Nicobar Islands.

Outcome: Marine faunal surveys were conducted to Mahatma Gandhi Marine National Park, Wandoor, Rangat, Long Island, Parnasala Ritchie's Archipelago and Nancowry Group. A total of 165 species of Molluscs; 10 species of sea anemones; one corallimorpharia; one Echuira and 18 species of Heterobranchs were identified.

06 PREPARATION OF COMPREHENSIVE MANAGEMENT ACTION PLAN GREAT NICOBAR BIOSPHERE RESERVE

Funding Agency: Department of Environment and Forests, ANI

Investigator: Dr. C. Sivaperuman

Period: July 2016 to June 2018

Sanctioned at: ANRC, ZSI-Port Blair

Status: Completed

Objectives:

- To assess the distribution, diversity and density of fauna communities of Great Nicobar Biosphere Reserve
- To assess and predict the impact on faunal components of the proposed area

Outcome: A coffee table book on the Faunal Resources of Great Nicobar Biosphere Reserve published. Bibliography of Great Nicobar Biosphere Reserve is submitted for publication.

TAXONOMY OF TETTIGONIIDAE (INSECTA: ORTHOPTERA) OF INDIA 07

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

Investigator: Dr. D. Suresh Chand

Period: December 2016 to November 2019

Sanctioned at: HQ, ZSI-Kolkata

Status: Completed

Objectives: Taxonomy of Tettigoniidae of India

Outcome: Surveys were conducted in four different states namely Odisha, Bihar, Jharkhand and West Bengal in different Agroclimatic zones, grasslands, waste land and forest ecosystem. 23 species of tettigoniids under 14 genera under 5 subfamilies were identified.

DEVELOPMENT OF BIOLARVICIDE FOR MOSQUITO CONTROL 08

Funding Agency: Industrial R&D project funded by BGES Inc. Kolkata

Investigator: Dr. D. S. Suman

Period: July 2018 to July 2019

Sanctioned at: HQ, ZSI-Kolkata

Status: Completed

Objectives:

- Estimation of different essential botanical oils for larvicidal efficacy
- Chemical characterization
- Formulation development
- Laboratory and small scale field evaluations for larvicide development

Progress: Several essential plant oils including citronella, clove, pine, eucalyptus were evaluated for mosquito larvicidal efficacy against different species including *Aedes aegypti*, *Aedes albopictus*, *Anopheles stephensi*, *Anopheles subpictus* and *Culex quinquefasciatus*. Citronella, eucalyptus and pine oils have been chemically characterized using GC-MS analysis. Several

formulations were developed and evaluated in the laboratory and small field tests.

Significant findings: Development of novel larvicidal formulations of essential oils for various mosquitoes, laboratory and field evaluations of the products, and a patent publication.

09 CONSERVATION AND MANAGEMENT OF CORAL REEFS IN LAKSHADWEEP - LONG-TERM MONITORING PROGRAMME



Stretch of massive forms bleached in Minicoy lagoon Lakshadweep

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

- iii. To understand the recovery and resilient adaptations of reefs
- iv. To understand the connectivity within and between reefs and associated habitats
- v. To make an assessment of resources, utilisation needs and conservation
- vi. To investigate the feasibility of improving functional capacity through restoration measures

Progress: The monitoring observations were carried in Kavaratti, Agatti, Bangaram, Kalpeni and Minicoy atolls. The size-class observations showed that most of the coral colonies were between 5 and 15 cm, where colony sizes >15 cm were poor in number. The bleaching stress correlated to different size-classes showed that colonies of the size ranges from 10-15 cm were bleached more in number. The species-wise cover estimations revealed that the most dominant genera were Porites, Platygyra and Pocillopora, and the most dominant species as Porites lutea, which has large colonies of up to 6 meters in the lagoons. The changes or shifts in species cover from 2016-19 was indicated by 0.65 % increase for Montipora (due to dominance cover of Montipora digitata), whereas species of Porites, Platygyra, Acropora and Lobophyllia had a decrease in cover of 0.5%, 0.2% and 0.3% respectively.

Three stations each in the reefs of Kadmat, Kavaratti were sampled for Zooxanthellae variability. The colonies were tagged and 3 pieces of 1-5 cm in size were collected from each colony (one for molecular study and two for zooxanthellae density estimation) at one point in the colony. The tagged colonies were also monitored for bleaching response. The method for zooxanthellae extraction has been standardized and pilot molecular study was carried out for zooxanthellae clade identification, from 4 species of corals. Apart from this, studies were also made on diseases occurrence in corals, on coral restoration, coral spawning, recruitment of corals, Scleractinian diversity and Fish diversity.

10 DIVERSITY, DISTRIBUTION AND STATUS OF FRESHWATER FISHES OF JALDHAKA RIVER, WEST BENGAL, INDIA

Funding Agency: West Bengal Biodiversity Board

Investigator: Dr. L Kosygin Singh

Period: June 2017 to May 2020

Sanctioned at: HQ, ZSI-Kolkata

Status: Ongoing

Objectives:

- i. To study the diversity, distribution & status of freshwater fishes of Jaldhaka River
- ii. To assess the market potentiality and livelihood opportunities for the local people

Progress: Conducted 4 surveys and collected more than 880 specimens. A total of 52 species of freshwater fishes belonging to 31 genera were identified. Cypriniformes forms the largest order and Cyprinidae forms the largest family recorded.

11 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: Ongoing

Objectives:

- i. Spatio- temporal variation of micro-zooplankton 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

Progress: During the survey, 40 microzooplankton samples were collected belonging to Ciliophora, Dinoflagellata, Radiolaria, Foraminifera, copepodites, diatoms. 28 mesozooplankton samples were also collected. Identification includes 48 species of ciliates, 84 species of dinoflagellates and 157 species of microzooplanktons.

Significant findings: The phenomenon of Epibiosis was observed in the coastal waters of Bay of Bengal during the summer monsoon survey. Ciliate epibionts were found adhering on the surface of diatoms, copepods and ostracods. Two new records of ciliates were reported.

ANT DIVERSITY AS INDICATOR OF DIFFERENT HABITATS IN WEST BENGAL 12



Collection locality at Neora valley National Park

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:

i. To explore different habitats for ant communities and diversity in all agro - ecological regions of West Bengal.

ii. To note the habitat wise association of Ant communities and calculate the diversity indices.

iii. To find out distribution patterns of ant species.

Progress: 197 species were identified belonging to 7 subfamilies (Formicinae, Dolichoderinae, Dorylinae, Ectatomminae, Pseudomyrmecinae, Ponerinae, and Myrmicinae). One new species, one genus new record to India, many rare species and habitat preference of one genus in Himalayan ecosystem have been recorded.

13 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:

i. Baseline knowledge about the faunal resources and Forest fire hot spot identification for long term monitoring in two districts of one states (Mizoram)

ii. Development of forest fire management site specific calendar at each forest management unit

iii. Development of network of professional & stakeholders in all 2 districts of state to combat forest fire

iv. Capacity enhancement of forest departments & others in 2 districts (150 persons)

Progress: During the reporting period reconnaissance surveys were conducted in the Forested habitats of Mamit and Aizwal districts of the state of Mizoram. The samples were collected systematically. During the period a total of 103 trails/transects covering 614 kms were walked, 117 plots were marked in the study area for habitat characterization, 43 camera traps were installed for 960 trap nights. 935 biological samples (scats, pellets, hair, feather, broken egg shells etc.) were collected about 2559 examples of different insects were collected. Information on socio-economic condition of forest dependent fringe people and ethno-zoology was collected through questionnaire surveys of n=137 respondents of n=14 villages at both sites. Soil samples from the four different soil horizons were dug up and collected from 87 out of 117 identified locations in the study landscape. One state level training workshops was conducted for capacity building of 160 individuals through hands on training and lectures from experts on forest fire management.

DISTRIBUTION AND POPULATION ASSESSMENT OF STRIPED HYENA (*HYAENA HYAENA*), INDIAN WOLF (*CANIS LUPUS PALLIPES*), GOLDEN JACKAL (*CANIS AUREUS*), LEOPARD CAT (*PRIONAIIRULUS 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. Vanketraman, Dr. Lalit Kumar Sharma, Dr. Mukesh Thakur

Period: January 2018 to December 2021

Sanctioned at: HQ, ZSI-Kolkata

Status: Ongoing

Objectives:

i. 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

ii. Population estimates of the study species using camera traps and DNA based analysis in the intensive study sites

iii. To generate quality data on landscape genetic parameters (gene flow, population connectivity, fragmentation) of the selected species in the study landscape

iv. Identification of wildlife-human conflict zones in the study area with reference the four species (Striped Hyena, Indian Wolf, Golden Jackal and Wild boar)

Progress: Field surveys have been conducted in four districts of South Bengal region with respect to data collection on distribution of the selected species. A total of 1770 questionnaire interviews were conducted in these districts. The maximum numbers of interviews were conducted in Purulia district (813) and minimum in Burdwan (50). A total of 200 transects have been surveyed by walking a distance of 900.46 km in all the 53 ranges of fifteen forest divisions.

During the reporting period information on species presence, abundance, human-wildlife conflict, non-invasive samples for DNA analysis have been collected. So far distribution, relative abundance of the selected species has been assessed. The human-wildlife conflict zones have been identified in the study landscape. The presence of Striped Hyena was reported from the very few places such as Muraddi, Shyampur, Shiulibari, Nandua, Aakhduara, Keliabali of Kangsabati North forest division, Baghbinda, Chaitanyadih, Rangamati, Gopalpur, Nischintapur of Purulia forest division, Hurhure of Bankura North and Kansachora, Sidhagora of Bankura South forest division. Based on the questionnaire survey in West Midnapore district,

respondents of Dahi village observed the presence of Striped Hyena. No signs of Leopard cat were found in any of the surveyed districts.

CONSERVATION OF THREATENED VERTEBRATE FAUNA IN INDIAN HIMALAYAN REGION THROUGH LONG-TERM MONITORING AND CAPACITY BUILDING

15

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

Principal Investigator: Dr. Kailash Chandra

Nodal Officer: Dr. Lalit Kumar Sharma

Co-Investigators: Dr. Vikash Kumar, Dr. Mukesh Thakur & Dr. Komud Tyagi

Period: January 2018 to December 2021

Sanctioned at: HQ, ZSI-Kolkata

Status: Ongoing

Objectives:

- i. To assess and monitor threatened vertebrate fauna in the IHR and developing spatial database
- ii. To study the population viability of selected threatened species in IHR for developing long-term conservation strategies
- iii. 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
- iv. 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.
- v. Investigating whether ethno-zoological knowledge and practices can be a conservation measure for threatened vertebrate fauna in IHR

Progress: 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 an total cameras trap night of 18864 in the selected grids of 10x10 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.

ASSESSMENT OF MOTHS (LEPIDOPTERA) AS SIGNIFICANT POLLINATORS IN THE HIMALAYAN ECOSYSTEM OF NORTH - EAST INDIA 16

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

Investigator: Dr. Navneet Singh

Period: April 2018 to March 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: Four surveys were conducted for the data collection. A total of 8,922 moth samples belonging to 21 families were collected. Apart from this, 187 plant samples belonging to 19 families were collected as reference samples.

Status: Ongoing

Objectives:

- Surveillance
- Life table
- Molecular studies

Progress:

Aedes and other mosquitoes were collected from Delhi, Rajasthan (Kota) and West Bengal (Kolkata). A 15 days local survey was conducted in Kolkata to identify the potential habitats of *Aedes albopictus*, *Aedes aegypti* and *Ae. vittatus* mosquitoes for the surveillance. Larval collections were made in these areas and colonies were established in laboratory. Life table studies on survival and reproductive potentials were conducted on different strains. DNA isolation and PCR has been performed for COI and 16s rRNA genes.

Significant findings: A significant trend was observed in life-table traits to understand ecological evolution in different strains.

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 17

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

18 DIVERSITY OF WATER-STRIDERS (HEMIPTERA: GERRIDAE) FROM PRINCIPAL ESTUARIES OF EASTERN COAST OF INDIA

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

Investigator: Dr Swetapadma Dash

Period: April 2018 to April 2021

Sanctioned at: HQ, ZSI-Kolkata

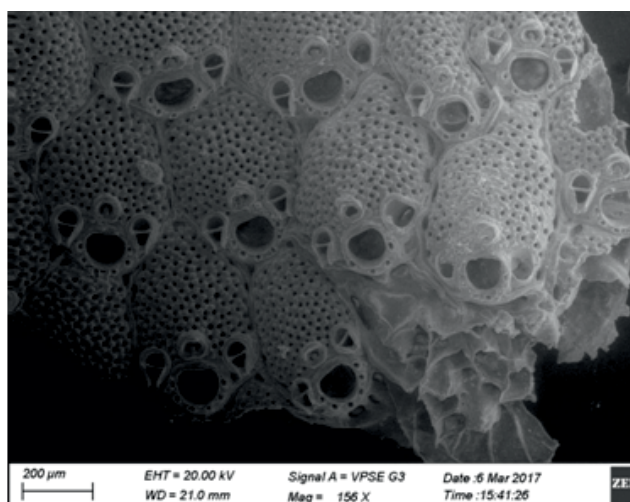
Status: Ongoing

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

Progress: A total of three surveys covering the states of West Bengal, Odisha and Tamil Nadu were conducted. and collected 776 specimens belonging to the family Gerridae. Five species of water striders were identified, most of which were a new record to at least one of the regions they were collected from and one was a new record to Indian waters.

STUDIES ON THE BRYOZOANS IN INDIAN REEFS 19



Microporella mazatlanica (Soule, Chaney & Morris, 2003)

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

Investigator: Dr. C. Venkatraman

Period: August 2018 to July 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
- To determine the qualitative and quantitative distribution of bryozoans in Gulf of Mannar Biosphere Reserve

Progress: Field survey was continued to explore the bryozoans in Gulf of Mannar Biosphere Reserve. A total of 50 species was identified. Of

which 15 species were recorded for the first time in Indian coastal waters. Apart from the exploration studies encrusting bryozoans were attempted by installing artificial structure in four different sites viz. Reef & sea grass in to different localities in GoMBR and physico-chemical parameters (Atmospheric temperature, salinity, turbidity and pH) was monitored during this period.

20 ASSESSMENT OF AMPHIBIAN DIVERSITY OF CENTRAL INDIA AND IDENTIFICATION OF CRYPTIC SPECIES USING INTEGRATIVE TAXONOMIC APPROACH



Minervarya agricola (Jerdon, 1853)

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

Investigator: Dr. S. Sailo

Period: September 2018 to July 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

iii. To develop strategies for conservation of amphibians in these areas.

Progress: Nine species of amphibians were identified. *Minervarya kalinga* (Raj et al. 2018), was recorded for the first time from the states of Madhya Pradesh and Chhattisgarh.

TAXONOMIC STUDIES ON FAMILY NOLIDAE (LEPIDOPTERA) FROM NORTH EAST INDIA 21



Carea angulata Fabricius, 1793

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:

- i. To undertake intensive and extensive collection-cum-survey tours to different/unexplored areas of North East India for the collection of adult Nolid moths
- ii. 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

iii. To study diversity of family Nolidae from North East India and to describe new taxa, if any

iv. To provide a comprehensive Checklist of family Nolidae from North East India

v. To work out zoogeographical affinities of studied taxa based on data with adjoining areas/regions

Progress:

Three surveys conducted. A total of 1300 examples representing family Nolidae have been collected and preserved in Insect storage cabinets. Thirty seven species of moths have been identified.

Significant finding:

A Checklist of subfamily Nolinae (Lepidoptera: Nolidae) from India is published. One genus and two species have been recorded for the first time from India. A new species, *Porcellanola sikkima* sp. nov., has been submitted for publication.

22 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:

Two biorock structures were successfully installed. A workshop to the reef researchers and managers of India was organized. Proved the suitability of Biorock technology in the restoration of coral reefs, in a highly turbid environment for the first time.

HEALTH ASSESSMENT OF INDIAN CORALS AND CORAL REEFS 23

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 total of 413 examples of corals belonging to 21 species 17 genera and six families were identified and searched for their condition. Pink spot (Multifocal) disease, White Spot disease, Boring sponge infection, Bleach, Trematodiasis infected, Barnacle infested, Bleached, Blenned bitten, corals were spotted. Traumatized Corals with unknown causative agents like Invertebrate bites, unknown fish bites, Erosion in live coral portions were noticed along with corals having tumors.

Sanctioned at: HARC, ZSI-Solan

Status: Initiated

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:

Surveys were conducted in 11 different localities. Prepared description, diagnostic characters, photographs, of eight new species belonging to the genus *Labiobaetis*. Successfully reared three species of Baetidae family to study the larvae and imago association/correlation.



Labiobaetis soldani (Kubendran et al., 2014)

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 24

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

Investigator: Dr. T. Kubendran

Period: April 2019 to March 2022

MICROSTRUCTURE, INDIVIDUAL AND SUB-SPECIES VARIATIONS OF SONG IN INDIAN ROBIN *COPSYCHUSFULICATA* (FAMILY: MUSCICAPIDAE)

25



Indian Robin, *Copsychus fulicatus* (Linnaeus, 1766)

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: Initiated

Objectives:

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

Progress: Field recordings were conducted on 18 individuals in Doon valley, from April to June, 2019 along with behavioural and ecological correlates. Recordings were carried out with the help of Marantz PMD 670 sound recorder and Sennheiser Microphone. Analysis of the data revealed that most songs were discrete type, composed of strophes (structural units), having frequency range 1.03 to 8.00 kHz, preceded and followed by temporal gaps ranging 6.34 to 0.61 sec. Monosyllabic occasional whistles were also

identified. In a song bout, usually same type of strophe was repeated several times in stereotyped manner with minor structural variations of elements before the switching on another type of strophe. Most strophes were composed of 2 to 5, both simple and complex, often dissimilar structured elements. Two categories of songs were identified on the basis of their acoustical features and context of production. Type A songs were simple, stereotyped, spontaneous and common, while type-B songs were rare, female oriented and more complex than type-A.

26 TAXONOMIC STUDIES ON PYRALIDAE (PYRALOIDEA: LEPIDOPTERA) OF NORTH EAST INDIA



Sacada dzonguensis Singh, Kirti & Ranjan, 2020

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: Initiated

Objectives:

- i. To collect Pyralid moths through intensive and extensive collection-cum-survey tours to the different/unexplored areas of North East India
- ii. To establish permanent plots at different altitudes for long term monitoring of environmental quality through collection of Pyralid moths
- iii. To identify the collected species of family Pyralidae and assign them to various taxa according to the latest trends in taxonomy
- iv. 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
- v. To provide a comprehensive checklist of family Pyralidae from North East India

Progress: Three field surveys were conducted. A total of 4,600 specimens were collected. All the specimens were stretched. Identification of 2150 specimens was completed.

DELIMITING SPECIES BOUNDARIES IN PEST AND VECTOR THRIPS (THYSANOPTERA: THIRIPIDAE) FROM INDIA 27

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: Initiated

Objectives:

- i. Exhaustive survey, morphological identification, and morphometric analysis of pest and vector species of thrips (*Frankliniella schultzei*, *Scirtothrips dorsalis*, *Thrips palmi* and *Thrips tabaci*)
- ii. Identification of cryptic species using multiple molecular markers of different

populations of these thrips species.

- iii. Delineation of species boundaries using multiple species delimitation methods and description of these cryptic species.

Progress: One survey of Uttarakhand State was conducted. More than 200 specimens collected and are subjected to morphological and molecular Taxonomy.

28 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: Initiated

Objectives:

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

Progress: Review of literatures and purchase of equipment under progress.

29 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: Initiated

Objectives:

i. 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.

ii. To generate DNA barcodes (ribosome and mitochondrial genes) and perform molecular analyses of ciliates identified from the proposed area.

iii. To evaluate the water quality of proposed aquatic ecosystems based on ciliate community structure

Progress: Initiated literature review on ciliate taxonomy and ecology from the conserved habitats of Himachal Pradesh in order to generate a base-line data.

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.

Progress: For achieving the proposed objectives of the project study area has been systematically divided into grids and these grids were stratified based on the habitat type. A 10km segment of river with 5km on both the sides on proposed bridge has been selected for the surveys. After the reconnaissance surveys the research team is systematically sampling the area for collection information on faunal elements in the study area. A team of two researchers is working in the areas since last six months of implementation and collected systematic data on species composition and abundance of major taxon.

BIODIVERSITY ASSESSMENT AND IMPACT MANAGEMENT PLAN FOR CONSTRUCTION OF BRIDGE ACROSS GANGA BETWEEN SULTANGANJ (BHAGALPUR DISTRICT) AND AGUWANI GHAT (KHAGARIA DISTRICT) IN BIHAR 30

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 & Dr. Prabhakar Rai

Period: August 2019 to July 2020

Sanctioned at: HQ, ZSI-Kolkata

Status: Initiated

Objectives:

i. Assessment of faunal biodiversity of the landscape

31 INTERESTING MOVEMENT AND HABITAT USE OF OLIVE RIDLEY SEA TURTLES (*LEPIDOCHELYS OLIVACEA*) ALONG ODISHA COAST, INDIA



Olive Ridley turtles, *Lepidochelys olivacea* (Eschscholtz, 1829)

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: Initiated

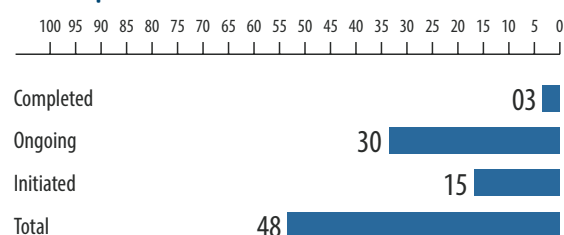
Objectives:

- 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

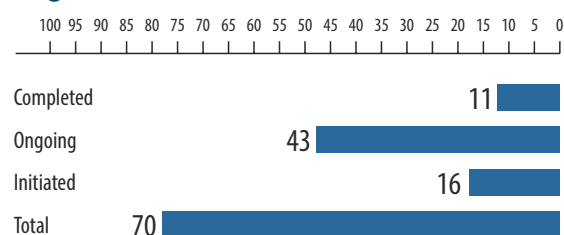
Progress: Recruitment of one JRF for the project has been initiated. Field work will begin for necessary data collections from sites in Odisha coast.

Scientific Programmes 2019-2020 : At a glance

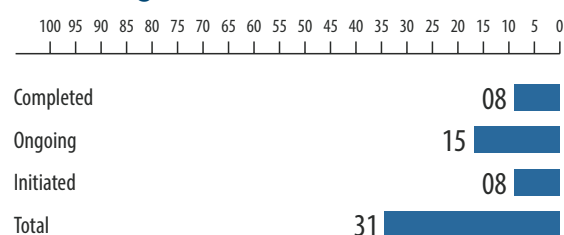
Headquarters ZSI



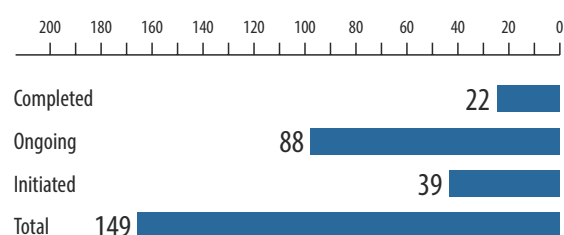
Regional Centres



Externally Funded



Grand Total



ANNUAL REPORT **2019-2020**

Field Survey Division manages the overall surveys carried out by the different scientific divisions of Headquarters as well as Regional Centers. This year 119 surveys were conducted by the scientists of Headquarters and Regional Centres.

SURVEYS

DETAILS OF SURVEYS CONDUCTED DURING THE YEAR 2019-2020

	Details of Surveys	Head Quarters	Regional Centre
1.	State & Union Territories Level Survey	12	08
2.	Ecosystems:		
	2a. Marine/Island ecosystem:	02	08
	2b. Fresh Water ecosystem:	03	01
	2c. North-East:	-	01
	2d. Fauna of Eastern Ghat (Tropical Rain Forest)/Western Ghat :	01	04
	2e. Estuarine ecosystem:	-	01
	2f. Mangrove ecosystem:	-	01
	2g. Himalayan Ecosystem:	-	03
	2h. Desert ecosystem:	-	01
	2i. Agro ecosystem:	03	01
	2j. Deccan Peninsula:	02	02
	2k. North-West Himalaya:	-	01
3.	Protected / Conservation Areas	14	28
4.	Status Survey of Endangered Species	02	01
5.	Ecological and Behavioural Studies	01	01
6.	Taxonomic Studies	09	06
7.	Other studies (insect pollinators of West Bengal)	02	-
	TOTAL	51	68
	Grand Total	119	

Faunal Identifications: Altogether 1,20,015 specimens belonging to 8,912 species have been identified by the scientists of ZSI Headquarters and Regional Centres ranging from microscopic to the highly evolved organisms.

ANNUAL REPORT 2019-2020

NEW DISCOVERIES

Discovering new species increases the faunal resource of our country and ZSI had played major role in discovering new species.

Scientists of ZSI have described 5,017 new species since its inception.

This year another 128 new species were described and 64 new records to India have been added.

During 2019, 128 new species were described by the scientists of ZSI belonging to different faunal groups:

Five new species of Nematoda, 15 species of Hymenoptera, 19 new species of Coleoptera, 13 new species of Hemiptera, 7 new species of Orthoptera, 11 new species of Lepidoptera, 6 new species of Trichoptera, 1 new species of Diptera, 3 new species of Ephemeroptera, 2 new species of Isoptera, 2 new species of Odonata, 6 new species of Collembola, 5 new species of Arachnida, 3 new species of Crustacea, 1 new species of Echinodermata, 1 new species of Mollusca, 15 new species of Pisces, 7 new species of Amphibia, 7 new species of Reptilia were described

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).

NEW DISCOVERIES

129

SPECIES
DESCRIBED BY ZSI

05 NEW SPECIES OF NEMATODA

1. *Clavicauda indicus* Haldar, Gantait & Rizvi
2. *Gyrincola dehradunensis* Maity, Rizvi, Bursey & Chandra
3. *Miodorylaimus istvani* Sen
4. *Scutellonema bengalensis* Sen
5. *Sicaguttur kailashi* Haldar, Gantait & Rizvi

15 SPECIES OF HYMENOPTERA

1. *Aulacus sahyadriensis* Kumar, Smith & Binoy
2. *Dicranorhina dinesani* Mawadda, Girish Kumar & Sureshan
3. *Dicranorhina georgei* Mawadda, Girish Kumar & Sureshan
4. *Dicranorhina sreeramani* Mawadda, Girish Kumar & Sureshan
5. *Knemodynerus gusenleitneri* Kumar, Carpenter & Schwarz

6. *Kudakrumia rangnekari* Kumar, Lelej, Das, Raveendran & Loktionov
7. *Lasiochalcidia narendrani* Binoy, Sureshan, Santosh & Nasser
8. *Melitta (Melitta) indica* Saini, Chandra & Kumar
9. *Metacolus parasinicus* Khanday, Sureshan, Buhroo, Ranjith & Tselikh
10. *Methocha keralaensis* Hanima, Kumar & Sureshan
11. *Neapterolelaps paraeneiceps* Binoy & Sureshan
12. *Neoceratobaeus dwitius* Sunita & Rajmohana
13. *Paratelenomus anu* Rajmohana, Sachin, Talamas, Shamyasree, Jalali & Rakshit
14. *Thaumasura indica* Binoy & Sureshan
15. *Tiphia kashmirensis* Hanima, Kumar, Sureshan & Sheikh

19 NEW SPECIES OF COLEOPTERA

1. *Amphicrossus adustipennis* Dasgupta & Pal
2. *Amphicrossus brunneus* Dasgupta & Pal
3. *Amphicrossus kabitae* Dasgupta & Pal
4. *Bellitudo aokii* Pal
5. *Carpophilus (Ecnomorphus) jahari* Dasgupta & Pal
6. *Colobicones gibbosus* Pal
7. *Corticaria kamalae* Pal
8. *Corticarina bakralinga* Pal
9. *Corticarina bishista* Pal
10. *Corticarina paharee* Pal
11. *Corticarina prashanta* Pal
12. *Corticaromus chandrai* Pal
13. *Europs cribricollis* Pal
14. *Sarmyodus nicobarensis* Majumder, Drumont, Chandra & Dubey
15. *Stephostethus bisinuaticollis* Pal
16. *Stephostethus foveatus* Pal
17. *Stephostethus sinuaticollis* Pal
18. *Stephostethus tibialis* Pal
19. *Trachypholis foveolata* Pal

13 NEW SPECIES OF HEMIPTERA

1. *Aericerus meghalayensis* Dubey
2. *Asialeurodes nicobarica* Dubey
3. *Dialeurodes pongamiae* Sundararaj & Vimala
4. *Halys mudigerensis* Salini
5. *Mesovelvia andamana* Jehamalar, Chandra & Polhemus
6. *Mesovelvia bispinosa* Jehamalar, Chandra & Polhemus
7. *Mesovelvia brevia* Jehamalar, Chandra & Polhemus

8. *Mesovelvia dilatata* Jehamalar, Chandra & Polhemus
9. *Mesovelvia isiasi* Jehamalar, Chandra & Polhemus
10. *Mesovelvia occulta* Jehamalar, Chandra & Polhemus
11. *Mesovelvia tenuia* Jehamalar, Chandra & Polhemus
12. *Pealius satakshiae* Dubey & Singh
13. *Pushpaleyrodes glandulus* Sundararaj & Vimala

07 NEW SPECIES OF ORTHOPTERA

1. *Allacta kalakadensis* Prabakaran, Senraj & Lucanas
2. *Hedotettix mainpurensis* Gupta & Chandra
3. *Hedotettix torengensis* Gupta & Chandra
4. *Hilloxya elongatus* Kumar, Chandra & Saini
5. *Sikkimiana arunachalensis* Chandra, Kumar, Saini & Ghosh
6. *Sphingonotus (Sphingonotus) changlangensis* Gupta, Chandra & Husemann
7. *Xestophrys namtseringa* Kumar, Chandra & Saini

11 NEW SPECIES OF LEPIDOPTERA

1. *Aholcocerus arorai* Yakovlev & Singh
2. *Cyana neopuer* Singh, Bhattacharyya & Volynkin
3. *Dolgoma xanthoma* Singh, Kirti, Datta, Joshi & Volynkin
4. *Mustilizans zolotuhini* Chandra, Singh, Kumar, Ranjan, Caleb, Gayen, Das & Dey
5. *Nadeloides nubilus* N. Singh, Kirti, Chandra, H. Singh & Ranjan
6. *Parasa neoherbifera* Katewa & Pathania

7. *Parvuspina tawaghatensis* Singh, Kirti & Datta
8. *Teuloma falsinebulosa* Singh, Kirti, Datta, Joshi & Volynkin
9. *Teuloma microoblitterans* Singh, Kirti, Datta, Joshi & Volynkin
10. *Teuloma neooblitterans* Singh, Kirti, Datta, Joshi & Volynkin
11. *Toccolosida nigraregina* Singh, Chandra, Kirti & Ranjan

06 NEW SPECIES OF TRICHOPTERA

1. *Chimarra golitarensis* Pandher & Parey
2. *Chimarra kamengensis* Pandher & Parey
3. *Chimarra kanchenjungaensis* Pandher & Parey
4. *Chimarra serrata* Pandher
5. *Lepidostoma kjeri* Parey & Pandher
6. *Nyctiophylax malickyii* Pandher

01 NEW SPECIES OF DIPTERA

1. *Astochia venkataramani* Roy, Parui, Mitra & Chakraborty

03 NEW SPECIES OF EPHEMEROPTERA

1. *Cincticostella ranga* Martynov, Selvakumar, Subramanian, Sivaramakrishnan, Chandra, Palatov, Sinha & Jacobus
2. *Cincticostella richardi* Martynov, Selvakumar, Subramanian, Sivaramakrishnan, Chandra, Palatov, Sinha & Jacobus
3. *Isonychia (Isonychia) moyarensis* Vasanth, Selvakumar, Subramanian, Babu & Sivaramakrishnan

02 NEW SPECIES OF ISOPTERA

1. *Krishnacapritermes dineshan* Amina, Rajmohana, Dinesh, Asha, Sinu & Mathew
2. *Krishnacapritermes manikandan* Amina, Rajmohana, Dinesh, Asha, Sinu & Mathew

02 NEW SPECIES OF ODONATA

1. *Cyclogomphus flavoannulatus* Rangnekar, Dharwadkar, Sadasivan & Subramanian
2. *Gomphidia podhigai* Babu & Subramanian

06 NEW SPECIES OF COLLEMBOLA

1. *Acanthurella satkosiaensis* Mandal, Suman & Bhattacharya
2. *Cyphoderopsis gorumaraensis* Mandal, Suman & Bhattacharya
3. *Hypogastrura satkosiaensis* Mandal & Arbea.
4. *Lepidocyrtoides malabaricus* Mandal, Suman & Bhattacharya
5. *Lepidocyrtus (Cinctocyrtus) satkosiaensis* Mandal, Suman & Bhattacharya
6. *Sinella jaldaparaensis* Mandal, Suman & Bhattacharya

04 NEW SPECIES OF ARACHNIDA

1. *Indopadilla darjeeling* Caleb, Sankaran, Nafin & Acharya
2. *Jerzego sunillimaye* Sanap, Caleb & Joglekar
3. *Pancorius nagaland* Caleb, Bera, Acharya & Kumar
4. *Theridion odisha* Prasad, Tyagi, Caleb & Kumar

03 NEW SPECIES OF CRUSTACEA

1. *Acanthopotamon horai* Pati, Mitra & Yeo
2. *Arcithelphusa tumpikkai* Pati, Sujila & Devi
3. *Carcinoplax mistio* Ng & Mitra

01 NEW SPECIES OF ECHINODERMATA

1. *Indophiaderma ganapatii* Sastry, Marimuthu & Rajan

01 NEW SPECIES OF MOLLUSCA

1. *Macrochlamys leggeae* Sajan, Tripathy, Chandra & Sivakumar

15 NEW SPECIES OF PISCES

1. *Aborichthys iphipaniensis* Kosygin, S.D. Gurumayum, P. Singh & B.R. Chowdhury
2. *Aborichthys kailashi* Shangningam, Kosygin, Sinha & Gurumayum
3. *Aborichthys pangensis* Shangningam, Kosygin, Sinha & Gurumayum
4. *Channa toraensis* Dey, Nur, Raychowdhury, Sarkar, Singh & Barat
5. *Exostoma kottelati* Darshan, Vishwanath, Abujam & Das
6. *Garra magnacavus* Shangningam, Kosygin & Sinha
7. *Garra ranganensis* Tamang, Sinha, Abujam & Kumar
8. *Garra simbalbaraensis* Rath, Shangningam & Kosygin
9. *Glossanodon macrocephalus* Bineesh, Nashad, Kumar & Endo
10. *Glyptothorax gopii* Kosygin, Das, Singh & Chowdhury
11. *Gymnothorax andamanensis* Mohapatra, Kiruba Sankar, Praveenraj & Mohanty

12. *Gymnothorax smithi* Sumod, Mohapatra, Sanjeevan, Kishor & Bineesh
13. *Pethia arunachalensis* Shangningam, Kosygin & Chowdhury
14. *Physoschistura ranikhetensis* Singh & Das
15. *Psilorhynchus bichomensis* Shangningam, Kosygin & Gopi

07 NEW SPECIES OF AMPHIBIA

1. *Astrobatrachus kurichiyana* Vijayakumar, Pyron, Dinesh, Torsekar, Srikanthan, Swamy, Stanley, Blackburn & Shanker
2. *Fejervarya marathi* Phuge, Dinesh, Andhale, Bhakare & Pandit
3. *Liurana himalayana* Saikia & Sinha
4. *Liurana indica* Saikia & Sinha
5. *Liurana minuta* Saikia & Sinha
6. *Microhyla eos* Biju, Garg, Kamei & Maheswaran
7. *Sphaerotheca magadha* Prasad, Dinesh, Das, Swamy, Shinde & Vishnu

07 NEW SPECIES OF REPTILIA

1. *Ahaetulla laudankia* Deepak, Narayanan, Sarkar, Dutta & Mohapatra
2. *Dravidogecko douglasadamsi* Chaitanya, Giri, Deepak, Datta Roy, Murthy & Karanth
3. *Dravidogecko janakiae* Chaitanya, Giri, Deepak, Datta Roy, Murthy & Karanth
4. *Dravidogecko meghamalaiensis* Chaitanya, Giri, Deepak, Datta Roy, Murthy & Karanth
5. *Dravidogecko septentrionalis* Chaitanya, Giri, Deepak, Datta Roy, Murthy & Karanth
6. *Dravidogecko smithi* Chaitanya, Giri, Deepak, Datta Roy, Murthy & Karanth
7. *Dravidogecko tholpalli* Chaitanya, Giri, Deepak, Datta Roy, Murthy & Karanth



Tocolosida nigraregina Singh, Kirti & Ranjan, 2019



Jerzego sunillimaye Sanap, Caleb & Joglekar, 2019



Indophioderma ganapatii Sastry, Marimuthu & Rajan, 2019



Macrochlamys leggeae Sajan, Tripathy, Chandra & Sivakumar, 2019

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NEW RECORDS TO INDIA

Gastrotricha

1. *Lepidochaetus zelinkai* (Grünspan, 1908)

Amoebozoa

2. *Cyclopyxis leidy* Couteaux et Chardez, 1981

Ciliophora

3. *Cyrtolophosis muscicola* Stokes, 1885
4. *Leptopharynx costatus* Mermod, 1914
5. *Dileptus beersi* Jones, 1956
6. *Pseudomonilicaryon falciforme* (Kahl, 1931) Vďácný & Foissner, 2012
7. *Rimaleptus mucronatus* (Penard, 1922) Vďácný et.al.2011
8. *Diophrys oligothrix* Borror, 1965
9. *Ephelota gigantea* Noble, 1929

10. *Ephelota plana* Wailes, 1925
11. *Monomicrocaryon balladyna* (Song & Wilbert, 1989) Foissner, 2016
12. *Urosoma karinae* (Ehrenberg, 1833) Berger, 1999
13. *Rigidosticha italiensis* Bharti, Kumar & Terza, 2016
14. *Anteholosticha intermedia* (Bergh, 1889) Berger, 2006

Cercozoa

15. *Assulina quadratum* Van Oye, 1958

Nematoda

16. *Allodorylaimus piracicabensis* (Lordello, 1955) Andrassy, 1986
17. *Aporcelaimellus baeticus* Sergio et.al. 2013
18. *Xiphinema parachambersi* Maria, Ye, Yu & Gu, 2018

Cnidaria

19. *Melithaea delicata* (Hickson, 1940)
20. *Melithaea retifera* (Lamarck, 1816)
21. *Dendronephthya mucronata* Putter, 1900
22. *Dendronephthya savignyi* Ehrenberg, 1843

Arachnida

23. *Neobrettus tibialis* (Proszynski, 1978)
24. *Schenkella aurantia* Kanesharatnam & Benjamin, 2018

Orbatida

25. *Notopthiracarus* (*Calypthothiracarus*) *pavidus pavidus* Berlese, 1913
26. *Heptacarus neotropicus* Mahunka, 1985

27. *Gymnodamaeus glaber* Kunst
28. *Litholestes altitudinus* Grandjean, 1951
29. *Orthozetes dispar* Balogh, 1962
30. *Lasiobelba remota* Aoki, 1965
31. *Scheloribates giganteus* Hammer, 1961
32. *Peloribates grandis* Willman, 1930

Diptera

33. *Spilomyia manicata* (Rondani, 1865)

Ephemeroptera

34. *Cincticostella bifurcata* Xie, Jia, Chen, Jacobus & Zhou, 2009
35. *Cincticostella braaschi* Jacobus & McCafferty, 2008
36. *Cincticostella insolta* (Allen, 1971)

Hemiptera

37. *Dialeurotrachelus cambodiensis* Takahashi, 1942
38. *Paraleyrodes minei* Iaccarino, 1990

Hymenoptera

39. *Stigmus convergens* Tsuneki, 1954
40. *Metacolus sinicus* Yang, 1996
41. *Roptrocerus mirus* (Walker, 1834)
42. *Katamenes dimidiatus watsoni* Meade-Waldo, 1910
43. *Katamenes flavigularis* (Bluthgen, 1951)
44. *Knemodynerus complanatus complanatus* Giordani Soika, 1994

Lepidoptera

45. *Euaspa motokii* Koiwaya, 2002

Tricoptera

46. *Chimarra flaviventris* Kimmins, 1957

Thysanoptera

47. *Scirtothripsitum* Ng, Mound & Azidah, 2014

Mollusca

48. *Anadara consociata* (E.A. Smith, 1885)
49. *Anadara troscheli* (Dunker, 1882)
50. *Aplysia juliana* Quoy & Gaimard, 1832
51. *Goniobranchus cavae* (Eliot, 1904)
52. *Pseudoliotia henjamensis* (Melvill & Standen, 1903)
53. *Dendrodoris albobrunnea* Allan, 1933
54. *Thecacera pacifica* (Bergh, 1884)
55. *Elysia nealae* Ostergaard, 1955
56. *Oxytesta shanensis* (Godwin-Austen, 1883)
57. *Austenia resplendens* (Nevill, 1877)
58. *Cyclostrema ocrinium* Melvill & Standen, 1901

Echinodermata

59. *Cenometra bella* (Hartlaub, 1890)
60. *Fromia nodosa* A. M. Clark, 1967
61. *Fromia pacifica* H. L. Clark
62. *Ophiothrix (Ophiothrix) marginata* Koehler

Pisces

63. *Ophichthus machidai* McCosker, Ide et Endo, 2012
64. *Bembradium magnoculum* Kishimoto, Kawai, Tashiro et Aungtonya, 2019

ANNUAL REPORT
2019-2020

PUBLICATIONS

4 DEPARTMENTAL
JOURNAL

34 BOOKS

150 RESEARCH ARTICLES
(SCI JOURNALS)

136 BOOK CHAPTERS

158 RESEARCH ARTICLES
(INTERNATIONAL/NATIONAL
JOURNAL)

482 TOTAL

TOTAL PUBLICATION BY ZSI (IN HOUSE)

JOURNAL

(Records of Zoological Survey of India; 4 ISSUES: 60 ARTICLES)

1. Volume 119 (Issue 1): 14 articles.
2. Volume 119 (Issue 2): 9 articles.
3. Volume 119 (Issue 3): 14 articles.
4. Volume 119 (Issue 4): 23 articles.

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3. Maity, A., Naskar, A. and Banerjee, D. 2019. Diversity of Horse Flies (Insecta: Diptera: Tabanidae) from different geo-climatic regions of West Bengal. *Rec. zool. Surv.*

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14. Chandra, K. & Sivaperuman, C. 2019. *Mesmerising Fauna of Great Nicobar*. Zool.

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15. Chandra, K., Gopi, K.C., Mishra S.S. & Raghunathan, C. (Editors) 2019. *Faunal Diversity of Mangrove Ecosystems in India*. 1-736. Published by Zool. Surv. India.: 1-736.
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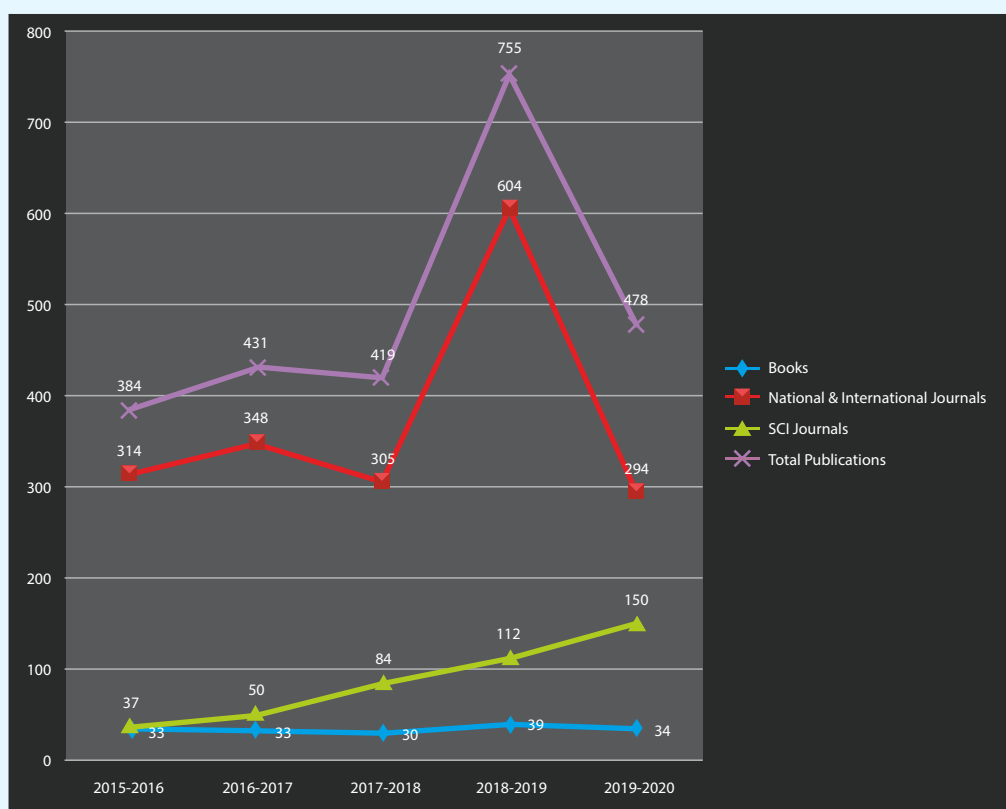
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PUBLICATIONS BY ZSI DURING THE LAST FIVE YEARS



ANNUAL REPORT
2019-2020

**DIGITAL SEQUENCE
INFORMATION (DSI)**

ZSI is enriching the information on DNA barcodes and solving many taxonomic queries and generated 5,054 barcodes.

During 2019-2020: Barcodes submitted 1,325; Species Barcoded: 384

**DNA BARCODES
SUBMITTED
TO BOLD/NCBI**

DSI generated during 2019-2020

Faunal Groups	Number of Barcodes submitted to BOLD/NCBI	Number of species
Protozoa: Ciliata	5	5
Bacteria Associated With Ciliate	1	1
Dinoflagellata (Algae)	1	1
Platyhelminthes	1	1
Bryozoa	1	1
Cnidaria	7	3
Crustacea	34	25
Araneae	289	62
Thysanoptera	72	41
Hemiptera	145	43
Odonata	13	3
Blattodea (Termites)	61	12
Blattodea (Cockroaches)	6	6
Lepidoptera	13	4
Coleoptera	4	4
Mollusca	4	3
Pisces	183	102
Amphibia	7	5
Reptilia	81	25
Aves	3	3
Mammalia	384	34
Total	1,315	384

DNA BARCODES SUBMITTED TO BOLD/NCBI IN 2019-2020

Sl. No.	SPECIES NAME	SPECIMEN CODE	BOLD/NCBI
Centre For DNA Taxonomy, Molecular Systematics Division, ZSI, Kolkata			
HEMIPTERA			
1.	<i>Amemboa lyra</i> (Paiva, 1918)	Hem_34	ADY3433
2.	<i>Aquarius adelaidis</i> (Dohrn, 1860)	Hem_124A, Hem_124B, Hem_124C, Hem_117A	ADL7312
3.	<i>Aquarius paludum</i> (Fabricius, 1794)	Hem_134D, Hem_134B, Hem_134E	AAI7450
4.	<i>Carbula biguttata</i> (Fabricius, 1794)	Hem_173	ADM6825
5.	<i>Chimarrhometra orientalis</i> (Distant, 1879)	Hem_136D, Hem_104A	ADY2982, AAV0104
6.	<i>Chimarrhometra yunnanensis</i> Ye, Zhou and Bu, 2016	Hem_135D, Hem_119A, Hem_135A, Hem_135B, Hem_119B	ADY2982, ADY1051, ADY2982
7.	<i>Cylindrostethus productus</i> (Spinola, 1840)	Hem_126B, Hem_126A, Hem_160E	ADO7852
8.	<i>Dysdercus</i> sp.	MT-960	AAM4528
9.	<i>Enithares hungerfordi</i> Brooks, 1948	Hem_188	ACQ8044
10.	<i>Eysarcoris guttiger</i> (Thunberg 1783)	Hem_25B, Hem_172E,	ADM6825, ADY4475
11.	<i>Eysarcoris montivagus</i> Distant, 1904	Hem_178	ADY4475
12.	<i>Halys</i> sp.	MT-928	ZSIV012-20
13.	<i>Heterobates rihandi</i> (Pradhan, 1950)	Hem_148E, Hem_148A, Hem_150A, Hem_150B, Hem_150C, Hem_150D, Hem_150E, Hem_116C, Hem_116A, Hem_116B	ADY4202, ADY2982
14.	<i>Hydrometra greeni</i> Kirkaldy, 1898	Hem_2C, Hem_121B, Hem_121A	ADB8815, ADY1934
15.	<i>Iphita limbata</i> Stal, 1870	Hem_37	ADM5996
16.	<i>Leptocoris</i> sp.	MT-929	AAX5360
17.	<i>Limnogonus fossarum</i> (Fabricius, 1775)	Hem_30B, Hem_30C, Hem_30D, Hem_30E, Hem_30F	ADM6360
18.	<i>Mesovelia vittigera</i> Horvath, 1895	Hem_169B, Hem_161A, Hem_169C, Hem_169A	ACP4845, ADY6181
19.	<i>Metrocoris darjeelingensis</i> Basu Polhemus and Subramanian, 2016	Hem_32B, Hem_12B	ADM5995, ADM6360
20.	<i>Metrocoris deceptor</i> Basu, Polhemus and Subramanian, 2016	Hem_106C, Hem_106A, Hem_106B, Hem_106D	ADG0714

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21.	<i>Metrocoris murtiensis</i> Basu, <i>Polhemus and Subramanian, 2016</i>	Hem_120B, Hem_112B, Hem_115B, Hem_115C, Hem_113B, Hem_113A, Hem_112A, Hem_130A, Hem_129A, Hem_149A, Hem_149B	ADY1051, ADO8756, ADX9059
22.	<i>Micronecta decorata</i> Lundblad, 1933	Hem_167B	ACC8586
23.	<i>Micronecta quadristrigata</i> Breddin, 1905	Hem_165B	ADY3683
24.	<i>Neogerris parvulus</i> (Stal 1860)	Hem_145A, Hem_145D, Hem_145C, Hem_3C, Hem_3F, Hem_3E, Hem_118B, Hem_118A	ADL8996
25.	<i>Nychia sappho</i> Kirkaldy, 1901	Hem_163D, Hem_163C	ADY4670
26.	<i>Paracopium cingalense</i> (Walker, 1873)	Hem_177	ACQ2797
27.	<i>Parastrachia nagaensis</i> Distant, 1908	Hem_171	ADY0852
28.	<i>Piezodorus hybneri</i> (Gmelin, 1790)	Hem_107B	ADY5640
29.	<i>Ptilomera assamensis</i> Hungerford and Matsuda, 1965	Hem_74B	ADM5396
30.	<i>Ptilomera laticaudata</i> Hardwicke, 1823	Hem_111A, Hem_111B, Hem_111C, Hem_125C, Hem_125B, Hem_138E, Hem_114C, Hem_114A, Hem_151	ADM5396
31.	<i>Ranatra elongata</i> Fabricius, 1790	Hem_154D, Hem_154E, Hem_154B, Hem_154A, Hem_109E, Hem_109C, Hem_109B	ABX2414
32.	<i>Rhagovelia sumatrensis</i> Lundblad 1933	Hem_123E, Hem_123B, Hem_128A, Hem_109D, Hem_123D, Hem_128B	ADM6360
33.	<i>Sigara distorta</i> (Distant, 1910)	Hem_166B, Hem_166A, Hem_164	ADY1161
34.	<i>Spilostethus</i> sp.	MT-954	AAV0111
35.	<i>Urolabida</i> sp.	MT-958	AEB2943
36.	<i>Ventidius sushmae</i> Gupta, 1981 Araneae (Spiders)	Hem_33E, Hem_33B	ADY1525
37.	<i>Araneus mitificus</i> (Simon, 1886)	AA_1727, AA_2485, AA_2615	ADF2585, AEC3380, AEC2878
38.	<i>Arctosa indica</i> Tikader and Malhotra, 1980	AA_2563, AA_2565, AA_2575, AA_2439, AA_2379	AEC4994, AEC4995
39.	<i>Argiope anasuja</i> Thorell, 1887	AA_1758, AA_1715	ACB2926

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40.	<i>Argiope pulchella</i> Thorell, 1881	AA_1716, AA_1836	AEC7531
41.	<i>Bianor angulosus</i> (Karsch, 1878)	AA_2427	AEB4527
42.	<i>Camaricus formosus</i> Thorell, 1887	AA_2589, AA_2591	ADG6782
43.	<i>Carrhotus viduus</i> (Koch, 1346)	AA_1676, AA_1729, AA_1838	ADI4292
44.	<i>Cheiracanthium insigne</i> Cambridge, 1874	AA_2481, AA_2480, AA_1684	ADL9949, AEC3041
45.	<i>Coleosoma floridanum</i> Banks, 1900	AA_2497	AAV1727
46.	<i>Crossopriza lyoni</i> (Blackwall, 1867)	AA_1688, AA_2601	AAG2795
47.	<i>Cyclosa hexatuberculata</i> Tikader, 1982	AA_1704	ADD8756
48.	<i>Cyrtophora cicatrosa</i> (Stoliczka, 1869)	AA_1695, AA_1700	ACQ6199
49.	<i>Draposa oakleyi</i> (Gravely, 1924)	AA_1967, AA_1949, AA_1953, AA_1970, AA_1971, AA_1987, AA_1986, AA_1989, AA_1993, AA_1995, AA_1976, AA_2444, AA_2349, AA_1926, AA_2374, AA_2375, AA_2376, AA_1988, AA_2403, AA_2431, AA_1973, AA_2432, AA_2503, AA_2505, AA_2510, AA_2512, AA_2516, AA_2535, AA_2537, AA_2346, AA_1697, AA_1939, AA_1938, AA_1972, AA_1978, AA_1991, AA_1951, AA_1998, AA_1999	AEC4612, AEC3607, AEC1978, ABX7398, AEC4063, AEC1978, ADL9149
50.	<i>Eriovixia excelsa</i> (Simon, 1889)	AA_1662	AAQ0105
51.	<i>Eriovixia laglaizei</i> (Simon, 1877)	AA_1728, AA_1746, AA_1752	AEC1993
52.	<i>Evarcha flavocincta</i> (Koch, 1848)	AA_2419, AA_2554, AA_2569	AEC5861
53.	<i>Gasteracantha hasselti</i> Koch, 1837	AA_2642	ADB4780
54.	<i>Gasteracantha kuhli</i> Koch, 1837	AA_1775, AA_1777, AA_1779	ACQ5948
55.	<i>Hasarius adansoni</i> (Audouin, 1826)	AA_1696, AA_1652, AA_1654	AAW0165
56.	<i>Hersilia savignyi</i> Lucas, 1836	AA_1680, AA_1681	AEC2734
57.	<i>Heteropoda venatoria</i> (Linnaeus, 1767)	AA_1750	ACN9567
58.	<i>Hippasa greenalliae</i> (Blackwall, 1867)	AA_2399	ACR6388
59.	<i>Hyllus semicupreus</i> (Simon, 1885)	AA_2464, AA_2467, AA_1733, AA_2323, AA_1673	ACS2280
60.	<i>Langona alfensis</i> Heciak and Proszynski, 1983	AA_2423, AA_2428, AA_2430	AEC4692
61.	<i>Leucauge celebesiana</i> (Walckenaer, 1841)	AA_1760, AA_1762	ACH2718
62.	<i>Leucauge decorata</i> (Blackwall, 1864)	AA_2318, AA_2320, AA_2322	AAG8516
63.	<i>Lycosa terrestris</i> Butt, Anwar and Tahir, 2006	AA_2325, AA_2328, AA_2347, AA_2391, AA_2352, AA_2358, AA_2359, AA_2368, AA_2369, AA_2398, AA_2401, AA_2407,	AEC5990, AEC5988, AAO2150, AEC3706, ADL6452

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		AA_2408, AA_2410, AA_2409, AA_2434, AA_2437, AA_2442, AA_2443, AA_2514, AA_2531, AA_2543, AA_2418, AA_2411, AA_2412, AA_2433, AA_1927, AA_2447, AA_2445, AA_1946, AA_1947, AA_1948, AA_1980, AA_1994, AA_1992, AA_1965, AA_1941, AA_2547, AA_2544, AA_2541, AA_1985, AA_2415, AA_2395, AA_2370, AA_2371, AA_2327, AA_2406, AA_1963, AA_2438, AA_1943, AA_1955, AA_1956	
64.	<i>Menemerus bivittatus</i> (Dufour, 1831)	AA_2448	AAL7843
65.	<i>Neoscona nautical</i> (Koch, 1875)	AA_1691, AA_1734	ACI2573
66.	<i>Neoscona theisi</i> (Walckenaer, 1841)	AA_1698, AA_1699	ACM3489
67.	<i>Nephila pilipes</i> Fabricius, 1793	AA_1785A	AAW4519
68.	<i>Opadometa fastigata</i> (Simon, 1877)	AA_1772, AA_1774	ABY1733
69.	<i>Orsinome vethi</i> (Hasselt, 1882)	AA_2634, AA_2635	AEC2501, AEC2500
70.	<i>Oxyopes birmanicus</i> Thorell, 1887	AA_1674, AA_1675, AA_2550	ACW8679, ADI4857
71.	<i>Oxyopes hindostanicus</i> Pocock, 1901	AA_2609, AA_2548, AA_2319, AA_2533, AA_2525, AA_2476, AA_2334, AA_2337, AA_2393, AA_2449, AA_2529, AA_2593, AA_1679	AAO1990
72.	<i>Oxyopes javanus</i> Thorell, 1887	AA_1712, AA_1702, AA_2451, AA_2488, AA_1743	ACW9232
73.	<i>Oxyopes shweta</i> Tikader, 1970	AA_2472, AA_2499	ADK4086
74.	<i>Pardosa birmanica</i> Simon, 1884	AA_2344, AA_1979, AA_2436, AA_2435, AA_2440, AA_1937, AA_1975, AA_1997	AEC4666
75.	<i>Pardosa parathompsoni</i> Wang and Zhang, 2014	AA_2397, AA_2539, AA_2545, AA_2546	AEC5988
76.	<i>Pardosa pseudoannulata</i> (Boesenberg and Strand, 1906)	AA_2553, AA_2557, AA_2558, AA_2559, AA_2560, AA_2564, AA_2567, AA_2568, AA_2570, AA_2571, AA_2572, AA_2414, AA_2405, AA_2345, AA_2350, AA_2351, AA_2373, AA_2366, AA_2382, AA_2381, AA_2383, AA_2386, AA_2396, AA_2446	AAO2149

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77.	<i>Pardosa pusiola</i> (Thorell, 1891)	AA_1732, AA_1736, AA_1744, AA_1738	AEC4085, ADF3532
78.	<i>Pardosa sumatrana</i> (Thorell, 1892)	AA_2365, AA_2378, AA_2380	ADF4185, AEC5179, AEC1546
79.	<i>Peucetia viridana</i> (Stoliczka, 1869)	AA_2453, AA_2478, AA_1692	ACM0853
80.	<i>Phintella vittata</i> (Koch, 1846)	AA_1755	ACR1776
81.	<i>Plebs himalayaensis</i> (Tikader, 1975)	AA_1876	ACI8675
82.	<i>Plexippus paykulli</i> (Andouin, 1827)	AA_2470, AA_1678, AA_1846, AA_2506	ABY9390, AEC3605
83.	<i>Plexippus petersi</i> (Karsch, 1878)	AA_2652	AAH6923
84.	<i>Rhene albiger</i> (Koch, 1848)	AA_2501	ADD7823
85.	<i>Scytodes thoracica</i> (Latreille, 1804)	AA_2616	ADG4510
86.	<i>Siler semiglaucus</i> (Simon, 1901)	AA_1844, AA_1824	ADI4920
87.	<i>Stenaelurillus arambagensis</i> (Biswas and Biswas, 1992)	AA_2515, AA_2520, AA_2522, AA_2523, AA_2524, AA_2527, AA_2530, AA_2534, AA_2577, AA_2578, AA_2580, AA_2581, AA_2582, AA_2583, AA_2590, AA_2587, AA_2603, AA_2596	AEC6370, ABX7343, AEC6370
88.	<i>Telamonia dimidiata</i> (Simon, 1899)	AA_1745, AA_1668, AA_1670, AA_1671, AA_1686, AA_1690, AA_1724, AA_1742	ACG1123
89.	<i>Tetragnatha mandibulata</i> Walckenaer, 1841	AA_2317, AA_2588	AAK2567
90.	<i>Thelacantha brevispina</i> (Doleschall, 1857)	AA_2620	AEB1518
91.	<i>Theridion odisha</i> Prasad, Caleb, Tyagi and Kumar, 2019	AA_1694	AEC2576
92.	<i>Thiania bhamoensis</i> Thorell, 1887	AA_1667, AA_1669	AEC5254, AEC4322
93.	<i>Thomisus granulifrons</i> Simon, 1906	AA_1835, AA_1837	AEC4789
94.	<i>Thomisus unidentatus</i> Dippenaar-Schoeman and van Harten, 2007	AA_1781, AA_1782A	AAP4819
95.	<i>Thyene imperialis</i> (Rossi, 1846)	AA_2624, AA_2621	AAO2153
96.	<i>Tylorida striata</i> (Thorell, 1877)	AA_2622, AA_2623	ADG8135, AEC5823
97.	<i>Wadicosa fidelis</i> (Cambridge, 1872)	AA_1944	AAG7456
98.	<i>Xysticus joyantius</i> Tikader, 1968	AA_1689, AA_1687, AA_1659	ADF4849
THYSANOPTERA			
99.	<i>Allelothrips brunneus</i> (Faure, 1941)	TH_2637	AEC5265
100.	<i>Ayyaria chaetophora</i> Karny, 1927	TH_2634, TH_2635	ADM3629
101.	<i>Bamboosiella bicoloripes</i> Ananthakrishnan, 1957	TH_2823	AEC3492
102.	<i>Bamboosiella semiflava</i> Okajima, 1995	TH_2657, TH_2479A	AEC1667

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103.	<i>Biltothrips minutes</i> (Bhatti, 1967)	TH_2708, TH_2563, TH_2564, TH_2565, TH_2566	ACL7167
104.	<i>Bolacothrips striatopennatus</i> (Schmutz, 1913)	TH_2636, TH_2638	AEC2487
105.	<i>Bregmatothrips brachycephalus</i> (Shumsher, 1942)	TH_2630, TH_2631	ADO8047
106.	<i>Caliothrips impurus</i> (Priesner, 1928)	TH_2628, TH_2629	ADM0406
107.	<i>Dendrothripoides innoxius</i> (Karny, 1914)	TH_2642, TH_2643	ACZ0271
108.	<i>Dolichothrips indicus</i> (Hood, 1919)	TH_2609	ADN6369
109.	<i>Dolichothrips reuteri</i> (Karny, 1920)	TH_2610	AEC6337
110.	<i>Euphysothrips subramanii</i> (Ramakrishna and Margabandhu, 1939)	TH_2700, TH_2701	ADM4550, ADM3981
111.	<i>Frankliniella intonsa</i> (Trybom, 1895)	TH_2535	AAF6737
112.	<i>Frankliniella occidentalis</i> (Pergande, 1895)	TH_2569, TH_2594, TH_2595, TH_2598, TH_2601	AAF6737
113.	<i>Frankliniella schultzei</i> (Trybom, 1910)	TH_2633,	AAN6620
114.	<i>Franklinothrips vespiformis</i> (Crawford, 1909)	TH_2641	ACD8336
115.	<i>Gastrothrips acutulus</i> Bagnall, 1927	TH_2680	AEC5668
116.	<i>Gigantothrips elegans</i> Zimmermann, 1900	TH_2605, TH_2608	ADN6493
117.	<i>Gynaikothrips uzeli</i> (Zimmermann, 1900)	TH_2602, TH_2603	AEC5994, ADI4159
118.	<i>Helionothrips kadaliphilus</i> (Ramakrishna and Margabandhu, 1931)	TH_2699	AEC6384
119.	<i>Heliothrips haemorrhoidalis</i> (Bouché, 1833)	TH_2710	AAE5223
120.	<i>Hydatothrips aureus</i> Bhatti, 1973	TH_2717	AEC3532
121.	<i>Liothrips takahashii</i> (Moulton, 1928)	TH_2592	ACT5830
122.	<i>Mesothrips jordani</i> Zimmermann, 1900	TH_2590, TH_2591	ADL8084
123.	<i>Mymarothrips garuda</i> Ramakrishna and Margabandhu, 1931	TH_2716	AEC1785
124.	<i>Neohydatothrips plynopygus</i> (Karny, 1925)	TH_2786	ADO3786
125.	<i>Paithrips circularis</i> Nonaka and Jangvitaya, 1994	TH_2827	AEC1815
126.	<i>Podothrips ferrugineus</i> Okajima, 1978	TH_2661, TH_2662, TH_2675, TH_2677, TH_2687,	AEC5685
127.	<i>Podothrips lucasseni</i> (Kruger, 1890)	TH_2706	ADM2190
128.	<i>Podothrips sasacola</i> Kurosawa, 1940	TH_2656	AEC5615
129.	<i>Praepodothrips causiapeltus</i> Reyes, 1994	TH_2658, TH_2659, TH_2660, TH_2678, TH_2686	AEC1811
130.	<i>Priesneriola oneillae</i> Ananthakrishnan, 1964	TH_2707	ADL9766

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131.	<i>Scirtothrips dorsalis</i> Hood, 1919	TH_2649, TH_2650, TH_2702, TH_2703	ACV7644, AAZ8518
132.	<i>Scolothrips rhagebianus</i> Priesner, 1950	TH_2653	ADM5751
133.	<i>Selenothrips rubrocinctus</i> (Giard, 1901)	TH_2681	ACN6317
134.	<i>Thrips hawaiiensis</i> (Morgan, 1913)	TH_2619	AAZ8516
135.	<i>Thrips palmi</i> Karny, 1925	TH_2617	AAE7913
136.	<i>Trichromothrips assamensis</i> Tyagi and Kumar, 2017	TH_2567, TH_2587	ADE2191, AEC5657
137.	<i>Trichromothrips similis</i> (Ananthakrishnan, 1968)	TH_2780	AEC3058
138.	<i>Trypactothrips rutherfordi</i> (Bagnall, 1915)	TH_2790, TH_2820	AEA5367
139.	<i>Zaniothrips ricini</i> Bhatti, 1967	TH_2784	AEC4555
REPTILIA			
SNAKES			
140.	<i>Amphiesma stolatum</i> (Linnaeus, 1758)	KS11	ACH7834
141.	<i>Argyrogena fasciolata</i> (Shaw, 1802)	AS17, AURS20, NS3, KS13, KS8, KS1, AS20, ZSS56	ADL6703
142.	<i>Atretium schistosum</i> (Daudin, 1803)	AS13, AS14, AS26	AEA9858
143.	<i>Boiga forsteni</i> (Duméril, Bibron and Duméril, 1854)	AS24, KS26, AS6	ADL8066
144.	<i>Bungarus caeruleus</i> (Schneider, 1801)	AS2, AS4, AS21, AS22, NS1, KS5	ADL7139
145.	<i>Bungarus fasciatus</i> (Schneider, 1801)	KS4	ADL6410
146.	<i>Coelognathus helena helena</i> Thakur, 2011	AS11, AS12, AS19, KS25	ADL6540
147.	<i>Coelognathus helena monticollaris</i> (Schulz, 1992)	ZSS50, NS7, SGB17, SGB18	ADL6540
148.	<i>Cyclophiops major</i> (Gunther, 1858)	SGB5	ADL7454
149.	<i>Daboia russelii</i> (Shaw and Nodder, 1797)	ZSS61, AURS1, AS28	AAW7156, ACA0539
150.	<i>Echis carinatus</i> (Schneider, 1801)	ZSS57, AS7, KS6, KS7, SGB13	AAX9797
151.	<i>Eryx conicus</i> (Schneider, 1801)	ZSS63, NS9	ADL6090
152.	<i>Eryx johnii</i> (Russel, 1801)	ZSS54, ZSS55, AS15, AS16, AS25, KS3, SGB15, SGB19	ADL6553
153.	<i>Gonyosoma prasinum</i> (Blyth, 1854)	NS4	ADL6103
154.	<i>Indotyphlops braminus</i> (Daudin, 1803)	AS30	ADL7598
155.	<i>Lycodon aulicus</i> (Linnaeus, 1758)	KS9, KS27, KS14, AS27, AS9, AS10, AS18, KS2	ADL8075
156.	<i>Macropisthodon plumbicolor</i> (Cantor, 1839)	NS10	ADL8559
157.	<i>Naja naja</i> (Linnaeus, 1758)	ZSS58, AURS3, AS29	ACH1921
158.	<i>Ophiophagus hannah</i> Cantor, 1836	KS17	AAI1098
159.	<i>Ptyas mucosa</i> (Linnaeus, 1758)	ZSS70, AS8, SGB1, KS19	ABV2864
160.	<i>Python molurus</i> (Linnaeus, 1758)	NS16, ZSS71	ACA0539

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161.	<i>Xenochrophis piscator</i> (Schneider, 1799)	KS23, KS24, KS22, SGB22, SGB3, SGB8,ZSS62	ADL9078
Lizard			
162.	<i>Varanus</i> sp.	MT-1737, MT-1738	ZSIWF044-19, ZSIWF045-19
Turtle			
163.	<i>Chelonia mydas</i> (Linnaeus, 1758)	MT-1342	ZSIWF041-19
MAMMALIA			
164.	<i>Ailurus fulgens</i> Geoffroy Saint-Hilaire and Cuvier, 1825	AF-39, AF-50, AF-40, AF-51, AF-52, RP -16i, RP -23b, RP -33b, AF-45, RP-18, RP-30, RP-34, RP-36, RP-51, RP-52, RP-50, RP-58, RP-61, RP-48, RP-98, RP-2, RP-21, RP-35, RP-35i, RP-64, MT-2163, MT-2161, MT-2165, MT-2167, MT-2370, MT-2374, MT-2164, MT-2159, MT-2160, MT-2162, MT-2363, MT-2278b	ZSIV051-19, ZSIV052-19, ZSIV055-19, ZSIV053-19, ZSIV068-19, ZSIV069-19, ZSIV070-19, ZSIV071-19, ZSIV101-20, ZSIV102-20, ZSIV103-20, ZSIV104-20, ZSIV105-20, ZSIV106-20, ZSIV107-20, ZSIV108-20, ZSIV109-20, ZSIV110-20, ZSIV111-20, ZSIV112-20, ZSIV113-20, ZSIV114-20, ZSIV115-20, ZSIV116-20, ZSIV117-20, ZSIV118-20, ZSIV119-20, ZSIV120-20, ZSIV121-20, ZSIV122-20, ZSIV123-20, ZSIV124-20, ZSIV125-20,

Sl. No.	SPECIES NAME	SPECIMEN CODE	BOLD/NCBI
Centre For DNA Taxonomy, Molecular Systematics Division, ZSI, Kolkata			
			ZSIV126-20, ZSIV127-20, ZSIV128-20
165.	<i>Axis axis</i> (Erxleben, 1777)	MT-2036	ZSIWF052-19
166.	<i>Canis lupus</i> Linnaeus, 1758	MT- 1181, MT- 1620, MT- 1605, MT- 1370, MT- 1118, MT- 1499, MT- 1126, MT- 1130, ZS-298, ZS-295, ZS-185, ZS-368, ZS-358, ZS-297, ZS-303, ZS-44, ZS-118, ZS-485, ZS-389, ZS-292, ZS-113, ZS-188, ZS-382, ZS-257-186, ZS-41, ZS-004, ZS-526, ZS-270	ZSILG081-19, ZSILG085-19, ZSILG087-19, ZSILG091-19, ZSILG082-19, ZSILG088-19, ZSILG092-19, ZSILG106-19, ZSILG109-19, ZSILG124-19, ZSILG083-19, ZSILG089-19, ZSILG107-19, ZSILG110-19, ZSILG084-19, ZSILG086-19, ZSILG105-19, ZSILG108-19, ZSILG090-19, ZSILG126-19, ZSILG044-19
167.	<i>Canis lupus familiaris</i> Linnaeus, 1758	MT- 1467, MT- 1127, MT- 1123	ZSISM012-19, ZSISM014-19, ZSISM015-19
168.	<i>Canis lupus lupus</i> (Linnaeus, 1758)	MT- 1132, MT- 1476	ZSISM011-19, ZSISM013-19
169.	<i>Capra sibirica</i> Pallas, 1776	ZS-125, ZS-242, ZS-570, ZS-511, ZS-122, ZS-502, ZS-397, MT-1580, MT-1592, MT-1591, MT-1588, ZS-242, MT-1579, MT-1565, MT-1572, MT-1568, MT-1569, MT-1573, MT-1598, MT-1599, MT-1562, MT-1577, MT-1585, MT-1589, ZS-227, ZS-240, MT-1566, MT-1585, MT-1570, MT-1574, MT-1582, MT-2414, MT-2415	ZSILG033-19, ZSILG037-19, ZSILG039-19, ZSILG041-19, ZSILG030-19, ZSILG038-19, ZSILG040-19, ZSIV129-19, ZSIV130-19, ZSIV131-19, ZSIV132-19,

Sl. No.	SPECIES NAME	SPECIMEN CODE	BOLD/NCBI
Centre For DNA Taxonomy, Molecular Systematics Division, ZSI, Kolkata			
			ZSIV133-19, ZSIV134-19, ZSIV135-19, ZSIV136-19, ZSIV137-19, ZSIV138-19, ZSIV139-19, ZSIV140-19, ZSIV141-19, ZSIV142-19, ZSIV143-19, ZSIV144-19, ZSIV145-19, ZSIV146-19, ZSIV147-19, ZSIV148-19, ZSIV149-19, ZSIV150-19, ZSIV151-19, ZSIV152-19, ZSIV153-19, ZSIV154-19, ZSIV129-20, ZSIV130-20, ZSIV131-20, ZSIV132-20, ZSIV133-20, ZSIV134-20, ZSIV135-20, ZSIV136-20, ZSIV137-20, ZSIV138-20, ZSIV139-20, ZSIV140-20, ZSIV141-20, ZSIV142-20, ZSIV143-20, ZSIV144-20, ZSIV145-20, ZSIV146-20, ZSIV147-20,

Sl. No.	SPECIES NAME	SPECIMEN CODE	BOLD/NCBI
Centre For DNA Taxonomy, Molecular Systematics Division, ZSI, Kolkata			
			ZSIV148-20, ZSIV149-20, ZSIV150-20, ZSIV151-20, ZSIV152-20, ZSIV153-20, ZSIV154-20
170.	<i>Capricornis</i> sp.	ZS-030, ZS-489, ZS-175, ZS-28	ZSILG024-19, ZSILG015-19, ZSILG036-19, ZSILG023-19
171.	<i>Felis chaus</i> Schreber, 1777	MT- 1364, MT- 1384, MT- 1180, MT- 1369, MT- 1481, MT- 1466, MT- 1600, MT- 1377, MT- 1383, MT- 1618, MT- 1601, MT- 1602	ZSISM008-19, ZSISM010-19, ZSISM001-19, ZSISM002-19, ZSISM003-19, ZSISM004-19, ZSISM005-19, ZSISM006-19, ZSISM007-19, ZSISM009-19, ZSISM024-19, ZSISM026-19
172.	<i>Macaca ensis</i> (McClelland, 1840)	MK2	ZSIV061-19
173.	<i>Macaca leucogenys</i> Li, Zhao and Fan, 2015	MT-2274, MT-2275, MT-2276, MT-2277, MT-2278	ZSIV092-20, ZSIV093-20, ZSIV094-20, ZSIV095-20, ZSIV096-20
174.	<i>Macaca munzala</i> Sinha <i>et al.</i> , 2005	MMJ2, MT-1070, MT-1068, MT-1065, MT-1067, MT-1073, MT-1078, MT-1080, MT-1084, MT-2178, MT-2181, MT-2180, MT-2171, MT-2177, MT-1066, MT-2186, MT-2182, MT-2185, MT-1398, MT-2169, MT-2189	ZSIV058-19, ZSIV059-19, ZSIV060-19, ZSIV062-19, ZSIV063-19, ZSIV064-19, ZSIV065-19, ZSIV066-19, ZSIV067-19, ZSIV079-20, ZSIV080-20, ZSIV081-20,

Sl. No.	SPECIES NAME	SPECIMEN CODE	BOLD/NCBI
Centre For DNA Taxonomy, Molecular Systematics Division, ZSI, Kolkata			
			ZSIV082-20, ZSIV083-20, ZSIV084-20, ZSIV085-20, ZSIV086-20, ZSIV087-20, ZSIV088-20, ZSIV089-20, ZSIV090-20, ZSIV091-20, ZSIV097-20, ZSIV098-20, ZSIV099-20, ZSIV100-20
175.	<i>Manis pentadactyla</i> Linnaeus, 1758	MT-1647, MT-1648, MT-2033, MT-2033	ZSIWF046-19, ZSIWF047-19, ZSIWF051-19
176.	<i>Moschus chrysogaster</i> Hodgson, 1839	ZS-523	ZSILG018-19
177.	<i>Muntiacus</i> sp.	ZS-1069, ZS-1624, ZS-1689, ZS-1749	ZSILG143-19, ZSILG144-19, ZSILG145-19, ZSILG146-19
178.	<i>Muntiacus vaginalis</i> (Boddaert, 1785)	ZS-1114	ZSILG147-19
179.	<i>Panthera leo</i> (Linnaeus, 1758)	MT-1337	ZSIWF040-19
180.	<i>Panthera pardus</i> (Linnaeus, 1758)	MT- 1539	ZSIWF043-19
181.	<i>Panthera uncia</i> (Schreber, 1775)	ZS-073, ZS-548, ZS-341	ZSILG131-19, ZSILG132-19, ZSILG045-19
182.	<i>Prionailurus bengalensis</i> (Kerr, 1792)	ZS-529	ZSILG048-19
183.	<i>Prionailurus planiceps</i> (Vigors and Horsfield, 1827)	MT- 1622	ZSISM023-19
184.	<i>Pseudois nayaur</i> Hodgson, 1833	ZS-096, ZS-098, ZS-123, ZS-130, ZS-133, ZS-079, ZS-563, ZS-080, ZS-093, ZS-091, ZS-097, ZS-124, ZS-128, ZS-106, ZS-081, ZS-087, ZS-089, ZS-090, ZS-092, ZS-094, ZS-095, ZS-100, ZS-102, ZS-105, ZS-119, ZS-120, ZS-121, ZS-126, ZS-127, ZS-129,	ZSILG020-19, ZSILG027-19, ZSILG029-19, ZSILG031-19, ZSILG035-19, ZSILG042-19, ZSILG043-19, ZSILG021-19, ZSILG025-19, ZSILG017-19,

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Centre For DNA Taxonomy, Molecular Systematics Division, ZSI, Kolkata			
		ZS-132, ZS-171, ZS-173, ZS-182, ZS-232, ZS-236, ZS-286, ZS-284, ZS-291, ZS-509, ZS-546, ZS-562, ZS-328	ZSILG026-19, ZSILG028-19, ZSILG032-19, ZSILG034-19, ZSILG049-19, ZSILG050-19, ZSILG051-19, ZSILG052-19, ZSILG053-19, ZSILG054-19, ZSILG055-19, ZSILG056-19, ZSILG057-19, ZSILG058-19, ZSILG059-19, ZSILG060-19, ZSILG061-19, ZSILG062-19, ZSILG063-19, ZSILG064-19, ZSILG065-19, ZSILG066-19, ZSILG067-19, ZSILG068-19, ZSILG069-19, ZSILG070-19, ZSILG071-19, ZSILG072-19, ZSILG073-19, ZSILG074-19, ZSILG075-19, ZSILG076-19, ZSILG078-19
185.	<i>Sus scrofa</i> Linnaeus, 1758	MT-2035, MT- 2038	ZSIWF053-19, ZSIWF049-19
186.	<i>Sus scrofa domesticus</i> Erxleben, 1777	MT-2497	ZSIWF054-19
187.	<i>Ursus arctos</i> Linnaeus, 1758	ZS-161, ZS-420, ZS-165, ZS-405, ZS-250, ZS-419	ZSILG096-19, ZSILG095-19, ZSILG118-19, ZSILG117-19, ZSILG119-19,

SI. No.	SPECIES NAME	SPECIMEN CODE	BOLD/NCBI
Centre For DNA Taxonomy, Molecular Systematics Division, ZSI, Kolkata			
			ZSILG046-19
188.	<i>Ursus thibetanus</i> G. Cuvier, 1823	MT- 853, MT- 854, MT- 850, MT- 856, MT- 101, BEAR-2, BEAR-7, MT- 2037, MT- 2039	ZSIV072-19, ZSIV073-19, ZSIV074-19, ZSIV075-19, ZSIV076-19, ZSIV077-19, ZSIV078-19, ZSIWF048-19, ZSIWF050-19
189.	<i>Vulpes vulpes</i> (Linnaeus, 1758)	ZS-200, ZS-183, ZS-361, ZS-273, ZS-002, ZS-444, ZS-530, ZS-447, ZS-423, ZS-222, ZS-522, ZS-198, ZS-440, ZS-223, ZS-001, ZS-597, ZS-076, ZS-003, ZS-466, ZS-390, ZS-525, ZS-386, ZS-138, ZS-109, ZS-197, ZS-364	ZSILG097-19, ZSILG100-19, ZSILG103-19, ZSILG112-19, ZSILG114-19, ZSILG116-19, ZSILG120-19, ZSILG122-19, ZSILG093-19, ZSILG098-19, ZSILG101-19, ZSILG104-19, ZSILG099-19, ZSILG094-19, ZSILG102-19, ZSILG111-19, ZSILG113-19, ZSILG115-19, ZSILG121-19, ZSILG123-19, ZSILG125-19, ZSILG127-19, ZSILG128-19, ZSILG129-19, ZSILG130-19, ZSILG047-19
AVES			
190.	<i>Vanellus indicus</i> (Boddaert, 1783)	MT-2480, MT-2481	ZSIWF055-19, ZSIWF056-19
FISHES			
191.	<i>Acanthocobitis</i> sp.	LKS-184	ZSIVP210-20

Sl. No.	SPECIES NAME	SPECIMEN CODE	BOLD/NCBI
Centre For DNA Taxonomy, Molecular Systematics Division, ZSI, Kolkata			
192.	<i>Bagarius bagarius</i> (Hamilton, 1822)	LKS-216	ZSIVP181-20
193.	<i>Botia</i> sp.	LKS-146, LKS-208, LKS-209, LKS-229	ZSIVP160-20, ZSIVP175-20, ZSIVP176-20, ZSIVP187-20
194.	<i>Cabdio morar</i> Hamilton, 1822	LKS-309, LKS-311, LKS-248, LKS-249	ZSIVP193-20, ZSIVP194-20, ZSIVP1203-20, ZSIVP204-20
195.	<i>Cirrhinus reba</i> (Hamilton, 1822)	LKS-201, LKS-288	ZSIVP173-20, ZSIVP200-20
196.	<i>Clupisoma prateri</i> Hora, 1937	MT-1000	ABA9729
197.	<i>Crossocheilus latius</i> (Hamilton, 1822)	MT-1041	ADZ0448
198.	<i>Cyprinus carpio</i> Linnaeus, 1758	LKS-304, LKS-319	ZSIVP190-20, ZSIVP196-20
199.	<i>Cyprinus</i> sp.,	LKS-251	ZSIVP205-20
200.	<i>Garra</i> sp.	LKS-103, MT-997	ZSIVP156-20, AAY8310
201.	<i>Glossogobius giuris</i> (Hamilton, 1822)	MT-1039	ABA9422
202.	<i>Gudusia chapra</i> (Hamilton, 1822)	LKS-156	ZSIVP169-20
203.	<i>Labeo</i> sp.	LKS-087, LKS-088, LKS-320, LKS-321	ZSIVP144-20, ZSIVP145-20, ZSIVP197-20, ZSIVP198-20
204.	<i>Minimugil cascasia</i> (Hamilton, 1822)	LKS-091, LKS-101, LKS-151	ZSIVP146-20, ZSIVP155-20, ZSIVP164-20
205.	<i>Ompok bimaculatus</i> (Bloch, 1794)	LKS-233	ZSIVP188-20
206.	<i>Oreochromis aureus</i> (Steindachner, 1864)	MT-998	AAC9904
207.	<i>Osteobrama cotio</i> (Hamilton, 1822)	LKS-221, LKS-317	ZSIVP185-20, ZSIVP195-20
208.	<i>Platanista</i> sp.	LKS-219, LKS-306	ZSIVP183-20, ZSIVP192-20
209.	<i>Rita rita</i> (Hamilton, 1822)	LKS-085, LKS-217, LKS-295, LKS-269	SIVP143-20, Z ZSIVP182-20, ZSIVP201-20, ZSIVP208-20
210.	<i>Salmostoma bacaila</i> (Hamilton, 1822)	LKS-098, MT-1049, MT-1053, LKS-299	ZSIVP152-20, AAE3074, ZSIVP202-20
211.	<i>Salmostoma</i> sp.	LKS-240	ZSIVP189-20

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212.	<i>Schistura corcia</i> (Hamilton, 1822)	LKS-148, LKS-153	ZSIVP161-20, ZSIVP166-20
213.	<i>Sperata seenghala</i> (Sykes, 1839)	MT-1001	AAE2393
214.	<i>Systomus sarana</i> (Hamilton, 1822)	LKS-097	ZSIVP151-20
DNA BARCODE GENERATED FOR HIGHER TAXA			
	Caprinae	ZS-086, ZS-027	ZSILG016-19, ZSILG022-19
	Actinopterygii	LKS-092, LKS-094, LKS-095, LKS-096, LKS-106, LKS-144, LKS-157, LKS-158, LKS-214, LKS-215, LKS-220, LKS-223, LKS-305, LKS-286, LKS-252, LKS-266, LKS-165	ZSIVP147-20, ZSIVP148-20, ZSIVP149-20, ZSIVP150-20, ZSIVP158-20, ZSIVP159-20, ZSIVP170-20, ZSIVP171-20, ZSIVP179-20, ZSIVP180-20, ZSIVP184-20, ZSIVP186-20, ZSIVP191-20, ZSIVP199-20, ZSIVP206-20, ZSIVP207-20, ZSIVP209-20
	Cyprinidae	LKS-100, LKS-099, LKS-104, LKS-149, LKS-150, LKS-152, LKS-154, LKS-155, LKS-159, LKS-205, LKS-212, LKS-213	ZSIVP154-20, ZSIVP153-20, ZSIVP157-20, ZSIVP162-20, ZSIVP163-20, ZSIVP165-20, ZSIVP167-20, ZSIVP168-20, ZSIVP172-20, ZSIVP174-20, ZSIVP177-20, ZSIVP178-20
	Insecta	MT-1403, MT-1404, MT-1407, MT-1408, MT-1409, MT-1410, MT-1415, MT-1540, MT-1541	AEB3288, AEB7024, AEB1921, AEB1596, AAP6105, AEA9404, ZSIIV005-19, ZSIIV008-19,

Sl. No.	SPECIES NAME	SPECIMEN CODE	BOLD/NCBI
Centre For DNA Taxonomy, Molecular Systematics Division, ZSI, Kolkata			
			ZSIIV009-19
	Heteroptera	MT-961, MT-935, MT-943	ZSIIV017-20, ZSILG014-19, ZSIIV016-20
	Urostylididae	MT-940	AEB2943
PROTOZOOLOGY SECTION			
PROTOZOA: CILIATA			
215.	<i>Urostyla grandis</i> Ehrenberg, 1830	Pt 4701/4	MN873015
216.	<i>Holostichides</i> n. sp.	Pt 4507	MN879408
217.	<i>Rigidostichaitaliensis</i> Bharti, Kumar and La Terza, 2016	Pt 47621/5	MN879411
218.	<i>Tetmemena bifaria</i> (Stokes, 1887) Berger, 2001	Pt 4717/1	MN879410
219.	<i>Levicoleps</i> sp.	-	MT271853
PLATYHELMINTHES			
220.	<i>Stenostomum sphagnetorum</i> Papi in Luther, 1960	-	MN879409
221.	<i>Leptothrix</i> sp.	-	MT265259
WESTERN REGIONAL CENTRE, PUNE			
LEPIDOPTERA: MOTH			
222.	<i>Olepa</i> sp.	ZSI-WRC L: 2150, 2149, 2151, 2148, 2152, 2155, 2154, 2145, 2029, 2028	MT318101, MT318100, MT318102, MT318103, MT318104, MT318106, MT318105, MT318099, MN822127, MN822126
AMPHIBIA			
223.	<i>Megophrys periosa</i> Mahony, Kamei, Teeling, and Biju, 2018	V/A/NERC: 1526, 1527	MT355837, MT355838
INSECTA: ISOPTERA			
224.	<i>Dicuspiditermes achankovili</i> Verma, 1985	M28, M27	MT272760, MT272750
225.	<i>Dicuspiditermes</i> sp.	M4, M26	MN511306.1, MT272755
226.	<i>Homalotermes pilosus</i> (Mathur and Thapa, 1962)	TN42.3, TN42.1, TN42.2	MT272758, MT272753, MT272747

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227.	<i>Indocapritermes aruni</i> Chhotani, 1997	M31	MT272742
228.	<i>Krishnacapritermes dineshan</i> Amina and Rajmohana, 2019	M9, M13, M12, M11, M10	MN507708.1, MN507712.1, MN507711.1, MN507710.1, MN507709.1
229.	<i>Krishnacapritermes thakuri</i> Chhotani, 1997	M3, M5, M6, M7, M15, M55, M57, M2, M16, M8, M56, M20, M18, M19, M14, M1, M54	MN507715.1, MN507718.1, MN507719.1, MN507722.1, MN507723.1, MN507725.1, MN507714.1, MN507726.1, MN507720.1, MN507724.1, MN507729.1, MN507727.1, MN507728.1, MN507721.1, MN507713.1, MN507716.1, MT272758
230.	<i>Labioapritermes distortus</i> (Silvestri, 1922)	S722, S721	MT272752, MT272744, MT272756, MT272743
231.	<i>Odontotermes obesus</i> (Rambur, 1842)	M21, M22, M23, M24, M25, M35, M40, M45, M50, M52	MN511308.1, MN511309.1, MN511310.1, MN511311.1, MN511312.1, MN511313.1, MN511314.1, MN511315.1, MN511316.1, MN511317.1
232.	<i>Pericapritermes topslipensis</i> Thakur, 1976	M32, M42, M47, M51, M37	MT272741, MT272745, MT272749, MT272761,

SI. No.	SPECIES NAME	SPECIMEN CODE	BOLD/NCBI
			MT272762
233.	<i>Procapritermes keralai</i> (Chhotani and Ferry, 1995)	S821, S822	MT272757, MT272748
234.	<i>Pseudocapritermes fletcherii</i> (Holmgren and Holmgren, 1917)	S923, S72	MT272754, MT272746, MT272751
235.	<i>Rinacapritermes</i> sp.	M39, M44, M34, M59, S921, S521	MT274291, MT274292, MT274296, MT274295, MT274294, MT274293
SOUTHERN REGIONAL CENTRE, CHENNAI			
MAMMALS			
236.	<i>Antilope cervicapra</i> (Linnaeus, 1758)	ZSI/SRC: B-75, B-1, B-15, B-18, B-20, B- 21, B-25-28	MN125148- MN125158, MN877055- MN877162, MN943097- MN943223, MN943224- MN943233, MN943496
237.	<i>Axis axis</i> (Erxleben, 1777)	ZSI/SRC: B-70-78	MN481553- MN481559
238.	<i>Bos gaurus</i> (Smith, 1827)	ZSI/SRC B-85	MN10270813
239.	<i>Bos indicus</i> Linnaeus, 1758	ZSI/SRC B-110, ZSI/SRC B-116, ZSI/SRC B-115, ZSI/SRC B-87	MN481560- MN481564
240.	<i>Boselaphus tragocamelus</i> (Pallas, 1766)	ZSI/SRC B-83, ZSI/SRC B-61, ZSI/SRC B-64	MN10270814
241.	<i>Bubalus bubalis</i> (Linnaeus, 1758)	ZSI/SRC: B-400, B-401	MN481546, MN481547
242.	<i>Capra hircus</i> (Linnaeus, 1758)	ZSI/SRC B-111-114	MN102709, MN102712
243.	<i>Moschiola indica</i> (Gray, 1852)	ZSI/SRC: B-82, B-82B	MN481548, MN481549
244.	<i>Muntiacus muntjak</i> (Zimmermann, 1780)	ZSI/SRC: B-19, B-05, B-47	MN125159- MN125161
245.	<i>Ovis aries</i> Linnaeus, 1758	ZSI/SRC B-106, ZSI/SRC B-284, ZSI/SRC B-285	MN102715, MN537880, MN537881

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246.	<i>Rucervus duvaucelii</i> (G. Cuvier, 1823)	ZSI/SRC: B-54, B-59, B-63, B-65, B-67	MN125162- MN125166
247.	<i>Sus scrofa</i> Linnaeus, 1758	ZSI/SRC: B-145-147	MN481550- MN48152
248.	<i>Ursus thibetanus laniger</i> Pocock, 1932	ZSI/SRC: B-86	MN125178
CRUSTACEA			
249.	<i>Litopenaeus vannamei</i> (Boone, 1931)	ZSI/SRC: P-1, P-2	MN392931, MN392932
250.	<i>Fenneropenaeus indicus</i> (Milne-Edwards, 1837)	ZSI/SRC: P-4	MN392933
ARACHNIDA			
251.	<i>Oxyopes hindostanicus</i> Pocock, 1901	ZSI/SRC: I-170	MN392913
INSECTA: ODONATA			
252.	<i>Brachythemis contaminata</i> (Fabricius, 1793)	ZSI/SRC: BC-17-18, BC-22-23, BC-37-40	MN392914 - MN392921
253.	<i>Diplacodes trivialis</i> (Rambur, 1842)	ZSI/SRC: DT-33-36	MN392922- MN392925
254.	<i>Ledra dorsalis</i> Walker, 1851	ZSI/SRC: LD-24	MN392927
255.	<i>Neurobasis chinensis</i> (Linnaeus, 1758)	ZSI/SRC: NC-20	MN392926
PISCES			
256.	<i>Decapterus russelli</i> Ruppell, 1830	ZSI/SRC: NF-1, NF-21	MN392928, MN392929
257.	<i>Sardinella gibbosa</i> (Bleeker, 1849)	ZSI/SRC: NF-3	MN392930
MARINE AQUARIUM AND REGIONAL CENTRE			
DINOFLAGELLATA			
258.	<i>Symbiodinium</i> sp.		MN921648
CNIDARIA : ALCYONACEA			
259.	<i>Pseudopterogorgia</i> sp.		MN921650, MN921651, MN921652
260.	<i>Menella</i> sp.		MT080827, MT080829
261.	<i>Echinogorgia</i> sp.		MT080828, MT080830
ARTHROPODA: CRUSTACEA			
262.	<i>Albunea groeningi</i> Boyko, 2002	A6785	MN905327, MN905328
263.	<i>Biarctus sordidus</i> (Stimpson, 1860)	A6545	MN737111.1
264.	<i>Eutrichocheles modestus</i> (Herbst, 1796)	A6840	MN933767.1
BRYOZOA			
265.	<i>Biflustra savartii</i> (Audouin, 1826)	B6898	MN921649

Sl. No.	SPECIES NAME	SPECIMEN CODE	BOLD/NCBI
FRESHWATER BIOLOGY REGIONAL CENTRE, HYDERABAD			
ACTINOPTERYGII			
266.	<i>Aborichthys boutanensis</i> (McClelland, 1842)	FBRC_ZSI: DNA346	MK962530
267.	<i>Aborichthys kempfi</i> Chaudhuri, 1913	FBRC_ZSI: DNA344, DNA345	MK962528, MK962529
268.	<i>Acentrogobius nebulosus</i> (Forsskal, 1775)	FBRC_ZSI: F3111_DNA418, F3111A_DNA422	MK962523, MK962525
269.	<i>Ambassis ambassis</i> (Lacepede, 1802)	FBRC_ZSI: F3109_DNA409	MK962520
270.	<i>Arius arius</i> (Hamilton, 1822)	FBRC_ZSI: F3057_DNA389, FBRC_ZSI: F3057A_DNA424	MK902712
271.	<i>Arothron immaculatus</i> (Bloch and Schneider, 1801)	FBRC_ZSI: F3072_DNA416	MK902727
272.	<i>Badis badis</i> (Hamilton, 1822)	FBRC_ZSI: DNA539_F3132, DNA626_F3316	MN395842, MT118101
273.	<i>Bangana dero</i> (Hamilton, 1822)	FBRC_ZSI: DNA516_F3153, DNA527_F3181	MN255386, MN395839
274.	<i>Barbodes carnaticus</i> (Jerdon, 1849)	FBRC_ZSI: F3156_DNA523B, DNA524_F3156	MN605602, MN255389
275.	<i>Chanda nama</i> (Hamilton, 1822)	FBRC_ZSI: DNA636_F3326	MT118111
276.	<i>Channa gachua</i> (Hamilton, 1822)	FBRC_ZSI: UN9604_DNA582, DNA621_F3317	MN685707, MT118102
277.	<i>Chanos chanos</i> (Forsskal, 1775)	FBRC_ZSI: F3064_DNA399	MK902719
278.	<i>Cirrhinus reba</i> (Hamilton, 1822)	FBRC_ZSI: F3186_DNA525	MN605603
279.	<i>Cynoglossus macrostomus</i> Norman, 1928	FBRC_ZSI: F3108_DNA404	MK962519
280.	<i>Danio rerio</i> (Hamilton, 1822)	FBRC_ZSI: DNA628_F3318	MT118103
281.	<i>Devario malabaricus</i> (Jerdon, 1849)	FBRC_ZSI: DNA529_F3158	MN255391
282.	<i>Elops machnata</i> (Forsskal, 1775)	FBRC_ZSI: F3070_DNA413	MK902725
283.	<i>Favonigobius gymnauchen</i> (Bleeker, 1860)	FBRC_ZSI: F3076_DNA423	MK902731
284.	<i>Gambusia holbrooki</i> Girard, 1859	FBRC_ZSI: DNA547_F3146	MN255395
285.	<i>Garra gotyla</i> (J.E. Gray, 1830)	FBRC_ZSI: DNA350	MK962531
286.	<i>Garra kempfi</i> Hora, 1921	FBRC_ZSI: DNA351	MK962532
287.	<i>Garra lissorhynchus</i> (McClelland, 1842)	FBRC_ZSI: DNA352	MK962533
288.	<i>Garra maclellandi</i> (Jerdon, 1849)É	FBRC_ZSI: DNA528_F3182	MN395840
289.	<i>Garra mullya</i> (Sykes, 1839)	FBRC_ZSI: DNA642_F3331	MT118116
290.	<i>Gerres erythroureus</i> (Bloch, 1791)	FBRC_ZSI: F3123_DNA408	MN106716
291.	<i>Gerres macracanthus</i> Bleeker, 1854	FBRC_ZSI: F3121_DNA403	MN106714
292.	<i>Glossogobius giuris</i> (Hamilton, 1822)	FBRC_ZSI: DNA625_F3315	MT118100
293.	<i>Glossogobius giuris</i> (Hamilton, 1822)	FBRC_ZSI: F3058_DNA391	MK902713
294.	<i>Gymnostomus ariza</i> (Hamilton, 1807)	FBRC_ZSI: DNA509_F3148	MN255380

Sl. No.	SPECIES NAME	SPECIMEN CODE	BOLD/NCBI
295.	<i>Hemibagrus punctatus</i> (Jerdon, 1849)	FBRC_ZSI: DNA508_F3187	MN395835
296.	<i>Hypselobarbus kolus</i> (Sykes, 1839)	FBRC_ZSI: DNA645_F3333	MT118118
297.	<i>Labeo boggut</i> (Sykes, 1839)	FBRC_ZSI: DNA631_F3321	MT118106
298.	<i>Labeo calbasu</i> Hamilton, 1822	FBRC_ZSI: DNA517_F3178	MN395836
299.	<i>Labeo dyocheilus</i> McClelland, 1839	FBRC_ZSI: DNA518_F3179	MN395837
300.	<i>Labeo fisheri</i> Jordan and Starks, 1917	FBRC_ZSI: DNA279i_F2866	MN234133
301.	<i>Labeo porcellus</i> (Heckel, 1844)	FBRC_ZSI: DNA282i_F2867	MN234134
302.	<i>Lepidocephalichthys guntea</i> (Hamilton, 1822)	FBRC_ZSI: DNA638_F3327	MT118112
303.	<i>Lepidocephalichthys thermalis</i> (Valenciennes, 1846)	FBRC_ZSI: UN9623_DNA580	MN685705
304.	<i>Lutjanus argentimaculatus</i> (Forsskal, 1775)	FBRC_ZSI: F3065_DNA402	MK902720
305.	<i>Lutjanus johnii</i> (Blotch, 1792)	FBRC_ZSI: F3056_DNA387	MK902711
306.	<i>Mastacembelus armatus</i> (Lacepede, 1800)	FBRC_ZSI: DNA513_F3150, DNA522_F3155	MN255383, MN255388
307.	<i>Minimugil cascasi</i> (Hamilton, 1822)	FBRC_ZSI: F3122_DNA405	MN106715
308.	<i>Monodactylus argenteus</i> (Linnaeus, 1758)	FBRC_ZSI: F3106_DNA398	MK962515
309.	<i>Moolgarda perusii</i> (Valenciennes, 1836)	FBRC_ZSI: F3069_DNA412	MK902724
310.	<i>Mystus cavasius</i> (Hamilton, 1822)	FBRC_ZSI: DNA514_F3151	MN255384
311.	<i>Mystus gulio</i> (Hamilton, 1822)	FBRC_ZSI: F3073_DNA417, F3077_DNA425	MK902728, MK902732
312.	<i>Mystus malabaricus</i> (Jerdon, 1849)	FBRC_ZSI: DNA519_F3154	MN255387
313.	<i>Mystus montanus</i> (Jerdon, 1849)	FBRC_ZSI: DNA521_F3180	MN395838
314.	<i>Nematalosa nasus</i> (Bloch, 1795)	FBRC_ZSI: F3110_DNA410, F3110A_DNA415	MK962521, MK962522
315.	<i>Nuchequula gerreoides</i> (Bleeker, 1851)	FBRC_ZSI: F3105_DNA397	MK962514
316.	<i>Ompok bimaculatus</i> (Bloch, 1794)	FBRC_ZSI: DNA512_F3149	MN255382
317.	<i>Oreochromis mossambicus</i> (Peters, 1852)	FBRC_ZSI: F3067_DNA407	MK902722
318.	<i>Parambassis ranga</i> (Hamilton, 1822)	FBRC_ZSI: DNA635_F3325	MT118110
319.	<i>Pethia conchoni</i> (Hamilton, 1822)	FBRC_ZSI: DNA530_F3159	MN255392
320.	<i>Pethia ticto</i> (Hamilton, 1822)	FBRC_ZSI: DNA629_F3319	MT118104
321.	<i>Pethia conchoni</i> (F. Hamilton, 1822)	FBRC_ZSI: F3024_DNA470	MK860775
322.	<i>Planiliza macrolepis</i> (Smith, 1846)	FBRC_ZSI: F3068_DNA411, F3068A_DNA400	MK902723, MK962516
323.	<i>Platycephalus indicus</i> (Linnaeus, 1758)	FBRC_ZSI: F3060_DNA393	MK902715
324.	<i>Plotosus canius</i> (Hamilton, 1822)	FBRC_ZSI: F3061_DNA394, F3061A_DNA390	MK902716, MK962513
325.	<i>Poecilia reticulata</i> W. Peters, 1859	FBRC_ZSI: F3026_DNA474A, F3026_DNA474B	MK860777, MK860778
326.	<i>Psammogobius biocellatus</i> (Valenciennes, 1837)	FBRC_ZSI: F3074_DNA419	MK902729

Sl. No.	SPECIES NAME	SPECIMEN CODE	BOLD/NCBI
327.	<i>Pterocryptis indicus</i> (Datta, Barman and Jayaram, 1987)	FBRC_ZSI: DNA364i, DNA364ii, DNA473i, DNA473ii	MK962534, MK962535, MK962536, MK962537
328.	<i>Puntius amphibious</i> (Valenciennes, 1842)	FBRC_ZSI: DNA634_F3324, DNA639_F3328, DNA648_F3334	MT118109, MT118113, MT118119
329.	<i>Puntius sophore</i> (Hamilton, 1822)	FBRC_ZSI: DNA630_F3320	MT118105
330.	<i>Puntius bimaculatus</i> (Bleeker, 1863)	FBRC_ZSI: F3249_DNA581	MN685706
331.	<i>Rasbora dandia</i> (Valenciennes, 1844)	FBRC_ZSI: DNA632_F3322	MT118107
332.	<i>Rasbora daniconius</i> (F. Hamilton, 1822)	FBRC_ZSI: F3023_DNA472	MK860776
333.	<i>Rhynchorhamphus malabaricus</i> Collette, 1976	FBRC_ZSI: F3071_DNA414	MK902726
334.	<i>Sargocentron rubrum</i> (Forsskal, 1775)	FBRC_ZSI: F3104_DNA388	MK962512
335.	<i>Schistura denisoni</i> (F. Day, 1867)	FBRC_ZSI: UN9604_DNA583	MN685708
336.	<i>Siganus canaliculatus</i> (Park, 1797)	FBRC_ZSI: F3062_DNA395	MK902717
337.	<i>Sperata sp</i>	FBRC_ZSI: DNA510	MN255381
338.	<i>Sphyraena putnamae</i> Jordan and Seale, 1905	FBRC_ZSI: F3075_DNA420	MK902730
339.	<i>Systomus sarana</i> (Hamilton, 1822)	FBRC_ZSI: DNA515_F3152	MN255385
340.	<i>Systomus spilurus</i> (Gunther, 1868)	FBRC_ZSI: DNA641_F3330, DNA633_F3323	MT118115, MT118108
341.	<i>Systomus subnasutus</i> (Valenciennes, 1842)	FBRC_ZSI: DNA507_F3147	MN255379
342.	<i>Terapon puta</i> Cuvier, 1829	FBRC_ZSI: F3066_DNA406	MK902721
343.	<i>Thryssa polybranchialis</i> Wongratana, 1983	FBRC_ZSI: F3112_DNA426	MK962527
344.	<i>Tor khudree</i> (Sykes, 1839)	FBRC_ZSI: DNA526_F3157	MN255390
345.	<i>Tor tor</i> (Hamilton, 1822)	FBRC_ZSI: DNA640_F3329, DNA644_F3332	MT118114, MT118117
346.	<i>Triacanthus nieuhoi</i> Bleeker, 1852	FBRC_ZSI: F3063_DNA396, F3063A_DNA421	MK902718, MK962524
347.	<i>Upeneus sulphureus</i> Cuvier, 1829	FBRC_ZSI: F3107_DNA401, F3107A_DNA401A	MK962517, MK962518
348.	<i>Zebrias synapturoides</i> (Jenkins, 1910)	FBRC_ZSI: F3059_DNA392	MK902714
AMPHIBIA			
349.	<i>Fejervarya mudduraja</i> Kuramoto, Joshy, Kurabayashi and Sumida, 2007	FBRC_ZSI: DNA531, DNA532	MN255393, MN255394
350.	<i>Euphlyctis cyanophlyctis</i> (Schneider, 1799)	FBRC_ZSI: DNA538	MN395841
351.	<i>Minervarya mudduraja</i> (Kuramoto, Joshy, Kurabayashi, and Sumida, 2008)	FBRC_ZSI: AmphUN9565_DNA533	MN605604
352.	<i>Euphlyctis cyanophlyctis</i> (Schneider, 1799)	FBRC_ZSI: AmphUN9605_DNA537	MN605605

Sl. No.	SPECIES NAME	SPECIMEN CODE	BOLD/NCBI
AVES			
353.	<i>Francolinus pondicerianus</i> (Gmelin, 1789)	FBRC_ZSI: DNA578	MN685709
354.	<i>Argya affinis</i> (Jerdon, 1845)	FBRC_ZSI: DNA579	MN685710
MOLLUSCA: BIVALVIA			
355.	<i>Parreysia favidens</i> (Benson, 1862)	FBRC_ZSI: DNA175_INV1576	MN197474
356.	<i>Lamellidens marginalis</i> (Lamarck, 1819)	FBRC_ZSI: DNA337_INV1945, DNA339_INV1945i	MN197475, MN197476
MOLLUSCA: CEPHALOPODA			
357.	<i>Sepiella inermis</i> (Van Hasselt, 1835)	FBRC_ZSI: DNA494_INV2297	MN197473
INSECTA (COCKROACH)			
358.	<i>Indoapterolampra rugosiuscula</i> Anisyutkin, 2014	FBRC_ZSI: DNA498_INS1464	MN225973
359.	<i>Neostylopyga rhombifolia</i> (Stoll, 1813)	FBRC_ZSI: DNA500_INS1465	MN225974
360.	<i>Periplaneta americana</i> (Linnaeus, 1758)	FBRC_ZSI: DNA502_INS1466	MN225975
361.	<i>Platynectes</i> sp.	FBRC_ZSI: DNA454_UN8958	MN225957
362.	<i>Pseudoglomeris glomeris</i> (Saussure, 1863)	FBRC_ZSI: DNA457_INS1104	MN225968
363.	<i>Tachyura</i> sp.	FBRC_ZSI: DNA455_UN8873	MN225958
INSECTA COLEOPTERA			
364.	<i>Cybister guerini</i> Aube, 1838	FBRC_ZSI: INSUN9607_DNA554	MN605606
365.	<i>Dineutus indicus</i> Aube, 1838	FBRC_ZSI: DNA553_INS1548	MN393289
366.	<i>Dineutus indicus</i> Aube, 1838	FBRC_ZSI: DNA460_UN8268	MN225959
367.	<i>Hyphydrus separandus</i> Regimbart, 1895	FBRC_ZSI: DNA463_UN8460	MN225962
INSECTA : HEMIPTERA			
368.	<i>Anisops</i> sp.	FBRC_ZSI: DNA467_UN9096	MN225965
369.	<i>Cylindrostethus productus</i> Mayr, 1865	FBRC_ZSI: DNA_654_UN_10197	MN939473
370.	<i>Enithares</i> sp.	FBRC_ZSI: DNA_651_UN_10179, DNA_652_UN_10179	MN939471, MN939472
371.	<i>Heleocoris</i> sp.	FBRC_ZSI: DNA465_UN8907	MN225963
372.	<i>Metrocoris</i> sp.	FBRC_ZSI: DNA466_UN9096	MN225964
373.	<i>Notonecta</i> sp.	FBRC_ZSI: INSUN9577_DNA555, FBRC_ZSI: DNA_655_UN_10146	MN605607, MN939474
374.	<i>Ptilomera agroides</i> Schmidt, 1926	FBRC_ZSI: DNA461_UN8346, FBRC_ZSI: DNA_650_UN_10179	MN225960, MN939470
INSECTA: LEPIDOPTERA (BUTTERFLIES)			
375.	<i>Junonia almanac</i> (Linnaeus, 1758)	FBRC_ZSI: INS1426_DNA567	MN685711

Sl. No.	SPECIES NAME	SPECIMEN CODE	BOLD/NCBI
376.	<i>Euchrysops cnejus</i> (Fabricius, 1798)	FBRC_ZSI: INS1335_DNA570	MN685712
377.	<i>Eurema andersonii</i> (Moore, 1866)	FBRC_ZSI: INS1333_DNA577	MN685713
CRUSTACEA: DECAPODA			
378.	<i>Barytelphusa guerini</i> (Milne-Edwards, 1853)	FBRC/ZSI/INV: 2283, DNA556, INV2284	MN393290
379.	<i>Caridina chauhani</i> Chopra and Tiwari, 1949	FBRC/ZSI/INV/2394	MN921226
380.	<i>Caridina kempii</i> Jaliha, Shenoy and Sankolli, 1984	FBRC/ZSI/INV/: 2462, 2461, 2392	MN921224, MN921225, MN921227
381.	<i>Macrobrachium kistnense</i> (Rathbun, 1904)	FBRC/ZSI/INV/2479	MN921222
382.	<i>Macrobrachium malcolmosonii</i> (Milne-Edwards, 1844)	FBRC/ZSI/INV/2402	MN921229
383.	<i>Macrobrachium rosenbergii</i> De Man, 1897	FBRC/ZSI/INV/2401	MN921228
384.	<i>Oziotelphusa bouvieri</i> (Rathbun, 1904)	FBRC/ZSI/INV: 2479, 2460	MN225971, MN605601, MN921223
385.	<i>Spiralothelphusa wuellerstorfi</i> (Heller, 1862)	FBRC/ZSI/INV: 2482, 2258, 2257, 2480, 2256	MN225969, MN605608, MN225972, MN605600, MN225970
CRUSTACEA: MALACOSTRACA			
386.	<i>Armadillidium</i> sp.	FBRC_ZSI: DNA382_UN8047	MN225956
387.	<i>Caridina chauhani</i> Chopra and Tiwari, 1949	FBRC_ZSI: DNA_603_INV_2394	MN921226
388.	<i>Caridina kempii</i> Jaliha, Shenoy and Sankolli, 1984	FBRC_ZSI: DNA_600_INV_2462, DNA_601_INV_2461, DNA_604_INV_2392	MN921224, MN921225, MN921227
389.	<i>Macrobrachium kistnense</i> (Tiwari, 1952)	FBRC_ZSI: DNA_599_INV_2460	MN921223
390.	<i>Macrobrachium malcolmosonii</i> (Milne-Edwards, 1844)	FBRC_ZSI: DNA_607_INV_2402	MN921229
391.	<i>Macrobrachium rosenbergii</i> De Man, 1879	FBRC_ZSI: DNA_606_INV_2401	MN921228
392.	<i>Oziotelphusa bouvieri</i> (Rathbun, 1904)	FBRC_ZSI: DNA491_UN8825	MN225971
393.	<i>Oziotelphusa bouvieri</i> (Rathbun, 1904)	FBRC_ZSI: NVUN8825_DNA491, DNA_493_INV_2479	MN605601, MN921222
394.	<i>Portunus pelagicus</i> (Linnaeus, 1758)	FBRC_ZSI: DNA481_INV2295	MN197470
395.	<i>Portunus sanguinolentus</i> (Herbst, 1783)	FBRC_ZSI: DNA482_INV2296	MN197471
396.	<i>Scylla olivacea</i> (Herbst, 1796)	FBRC_ZSI: DNA480_INV2294	MN197469
397.	<i>Spiralothelphusa wuellerstorfi</i> (Heller, 1862)	FBRC_ZSI:	MN225969,

SI. No.	SPECIES NAME	SPECIMEN CODE	BOLD/NCBI
		DNA487_UN8825, FBRC_ZSI: DNA488_UN8813	MN225970
398.	<i>Spiralothelphusa wuellerstorfi</i> (Heller, 1862)	FBRC_ZSI: DNA492_UN8825, INVUN8817_DNA490, INVUN9673_DNA557	MN225972, MN605600, MN605608
399.	<i>Tachaea</i> sp.	FBRC_ZSI: DNA468, FBRC_ZSI: DNA469	MN225966, MN225967
400.	<i>Thalamita crenata</i> Ruppell, 1830	FBRC_ZSI: DNA484_INV2293	MN197472
401.	<i>Thalamita crenata</i> Ruppell, 1830	FBRC_ZSI: DNA479_INV2293	MN197468
REPTILIA			
402.	<i>Hemidactylus frenatus</i> Schlegel, 1836	FBRC_ZSI_DNA550	MN255396
ESTUARINE BIOLOGY REGIONAL CENTRE			
FISH			
403.	<i>Cirrhimuraena indicus</i> sp.nov.	F11811	MT019886
404.	<i>Planiliza macrolepis</i> (Smith, 1846)	F11812	MT019887

ANNUAL REPORT **2019-2020**

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.

This year 20 programmes were conducted for capacity building and outreach activities. Eleven training workshops and one Asian Symposia were organized by ZSI, HQ-Kolkata, while one International workshop, one seminar and six workshops were organized by Regional Centres of ZSI. Total 1,144 participants were benefited by these outreach activities. Environment day and Biodiversity day were celebrated at HQ as well as Regional Centres by organizing various awareness activities.

CAPACITY BUILDING

01 TRAINING WORKSHOP ON "COMPARATIVE OSTEOLOGY"



Organized at ZSI, Kolkata from 21st to 22nd August, 2019. Total 25 students, research scholars, faculty members, staffs participated in the training workshop. Participants were introduced with mammalian skeleton and its interpretation in archaeological studies.

02 "SIXTH ASIAN LEPIDOPTERA CONSERVATION SYMPOSIUM"



Organized at ZSI, Kolkata, from 17th - 21st September 2019. The 6th ALCS included three days Field workshop in Dalma Wildlife Sanctuary (17th - 19th September 2019) and two days conference (20th - 21st September 2019). In the field workshop 50 Lepidopterists participated. In this first phase, a practical workshop was organized in the Dalma Wildlife Sanctuary with world renowned resource persons like Dr. Roger Kendrick from Hong Kong, Dr. Paul, David Grundy, Mark Sterling from England and Dr. K.T. Park from Korea. In this workshop, hands-on training was given in respect to the study of Lepidopteran insects for their conservation and management. 125 students and researchers participated in the conference. Young scientists from various countries like Czech Republic, Bangladesh, Sri Lanka and from all over India participated in this workshop. It was the first of its kind capacity building programme in the field of Lepidoptera conservation held in this part of the Country.

03 "HANDS ON TRAINING ON THE TAXONOMIC IDENTIFICATION OF TERMITE"

Organized at ZSI, Kolkata from 30th - 31st October, 2019. Total 21 participants from different colleges/ Universities of 10 states participated in the training programme. A manual was released on "Taxonomy of Termites in India- A Beginner's Manual".



04 ORIENTATION WORKSHOP ON "METHODOLOGY FOR COLLECTION, PRESERVATION AND CURATION OF ZOOLOGICAL SPECIMENS FOR BIODIVERSITY STUDIES"



It was organized by ZSI, Kolkata from 23rd- 24th January, 2020. Total 53 participants from ZSI regional centres and Headquarters participated in the training programme. There were altogether 22 technical sessions where detailed techniques on collection, preservation and curation methods of invertebrate and vertebrate groups were discussed. Collection/ preservation methods for processing for forensic specimens and documenting species distribution data for proper use in GIS softwares, preparation of maps from collection data were also demonstrated.

05 FIVE TRAINING PROGRAMME ON "MONITORING OF THREATEN VERTEBRATES FOR THE CONSERVATION AND MANAGEMENT"



Total five workshops were conducted under this project:

- i) 13th -14th May 2019: Phadamchen, East-Sikkim
- ii) 26th -27th September 2019: Lahaul and Spiti
- iii) 20th - 21st January 2020: Purola Uttarkashi
- iv) 10th - 11th February 2020: Pasighat East Siang, Arunachal Pradesh
- v) 17th -18th February 2020: Bomdila, West Kameng, Arunachal Pradesh.

The training programme was conducted for the different Stakeholders involved in the biodiversity conservation in the Indian Himalayan region. Total participants comprised 504 including Forest official, NGOs, village representative, school teachers, Van Sarpanch, ITBP, BRO, Police, local administration, Gram Budha.

06 TWO TRAINING PROGRAMME ON "UNDERSTANDING THE IMPACT OF FOREST FIRE ON FAUNAL RESOURCES AND DEVELOPING CONSERVATION AND MANAGEMENT STRATEGY"



under NMHS-MG project Understanding the impacts of forest fire on faunal resources for conservation and management.

- i) 27 - 28 February 2020: Mamit district, Mizoram
- ii) 29 - 30 April 2019: Aizawl district, Mizoram.

A total of about 147 participants have participated in these two day workshops. The programmes were targeted towards enhancing capacity of stakeholders for effective monitoring of wildlife species and combating the forest fires. The stakeholders participated in these workshops were representing organizations including Forest Department field officers, active NGOs, University researchers, students, police department, village panchayats, local judiciary, religious groups and local stakeholders.

07 REGIONAL WORKSHOP ON "CONSERVATION AND MANAGEMENT OF WETLANDS (EASTERN STATES)"

Organized by ZSI, Kolkata on 26th September 2019 under the aegis of the National River Conservation Directorate of the MOEFCC. A field visit to Sundarban Biosphere Reserve was also organized during the programme.

08 INTERNATIONAL WORKSHOP ON SOCIAL NETWORK OF ANIMALS IN EXTREME ENVIRONMENT OF ANTARCTICA WITH SPECIAL REFERENCE TO PENGUINS



Organized by ANRC, ZSI, Port Blair from 22nd - 24th April 2019. Total 60 persons took part including three international participants.

09 WORKSHOP ON "FAUNAL DIVERSITY OF CENTRAL HIGHLANDS, INDIA" IT WAS ORGANIZED BY CZRC, ZSI-JABALPUR ON 25TH OCTOBER 2019. 25 PARTICIPANTS WERE PART OF THE WORKSHOP.



It was organized by CZRC, ZSI-Jabalpur on 25th October 2019. 25 participants were part of the workshop.

10 WORKSHOP ON "FAUNAL DIVERSITY OF CHILIKA LAGOON"

Organized by EBRC, ZSI Gopalpur on 26th July, 2019. 50 students and researchers participated. It was inaugurated by Shri Mishra, Secretary, MoEFCC.



11 ONE-DAY SEMINAR ON THE "FAUNAL DIVERSITY OF INDIAN TRANS HIMALAYAN LANDSCAPE"



HARC, ZSI-Solan organized it on 26th February 2020. Participants included 90 students and researchers Honourable Secretary of MOEF&CC, Shri C. K. Mishra, IAS inaugurated the Seminar as a Chief Guest. The Principal Chief Conservator of Forests (WL) Himachal Pradesh, Dr. Savita, IFS, and Dr. Parvinder Kaushal Vice- Chancellor of Dr. Y.S. Parmar University of Horticulture and Forestry, Nauni, Solan, were Guests of Honour.

12 HANDS-ON TRAINING WORKSHOP ON ANIMAL TAXONOMY

Organized by NERC, Shillong from 12th -14th February 2020. Total 28 undergraduate and postgraduate students of Zoology attended the training programme.



13 A WORKSHOP CUM SYMPOSIUM ON "TRADITIONAL AND MODERN ANIMAL TAXONOMY AND IPR ISSUES FOR BIODIVERSITY PROTECTION AND CONSERVATION"

Jointly organized by NRC, ZSI Dehradun and Dolphin (PG) Institute of Biomedical and Natural Sciences, Dehradun, ICAR-Indian Institute of Soil and Water Conservation, Dehradun from 25th to 29th November, 2019. 50 students and researchers participated.

14 NATIONAL WORKSHOP ON "TAXONOMIC IDENTIFICATION OF INDIAN BEES"



Organized by ENVIS Centre on Biodiversity (Fauna) Zoological Survey of India Kolkata, in collaboration with Centre for Pollination studies, (Calcutta University), University of Agricultural Sciences (Bangalore) and National Centre for Biological Sciences (Bangalore). From 2nd - 3rd March 2020, A total of 21 participants including Young faculties and researchers from 10 states of India attended the workshop.

15 THE NATIONAL WORKSHOP ON 'BIOROCK RESTORATION AND DEPLOYMENT OF BIOROCK STRUCTURE'

Organized by Zoological Survey of India and Gujarat Forest Department at Gulf of Kachchh, Gujarat. from 17-19th January 2020. A total of 20 participants including Young faculties and researchers from 10 states of India attended the workshop.

CELEBRATION OF THE "INTERNATIONAL DAY FOR BIOLOGICAL DIVERSITY" - 22ND MAY, 2019

- Sit and Draw competition on the theme "Biodiversity Conservation"
- Elocution Competition on "Our biodiversity, our food, our health"
- Movie show on Antarctica

CELEBRATION OF THE "WORLD ENVIRONMENT DAY" - 5TH JUNE, 2019

The Swachh Bharat Mission (SBM) was launched by the Government of India on 2 October 2014 with the target of making the country clean by 2 October 2019. It addresses the growing problems of open defecation, sanitation and municipal solid waste management in urban India. This Mission is about to complete its 5th Anniversary this year. In this connection, it has been decided to observe "Swachhta Pakhwada" from 1st-15th June, 2019 to accelerate the "Jan Andolan" for realizing the vision of clean India. World Environment Day Celebration 2019 Theme: Air Pollution. Following programmes were organized by headquarter as well as all 16 Regional centres of ZSI

Cleaning of Office Premises, Schools, Colleges, etc

Cleaning of public parks, market places

Swachhta Rallies on ODF awareness

Cleaning of riverfront, lakes, beaches etc

Cultural programmes, painting, essay writing competitions on Swachh Bharat.



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During the period, MoU was signed between ZSI and five Universities/Institutes

MoU WITH DIFFERENT NATIONAL BODIES

ZSI entered MoU with different National bodies to enhance collaborative research for zoological studies

Sl. No.	Institute	Purpose	Date
1.	Ravenshaw University, Cuttack, for scientific and educational Cooperation	Collaboration for ZSI and any of the 16 Regional Centres shall be a recognised research centre for undertaking Doctoral and Post-Doctoral Programme by the Ravenshaw University, Cuttack	January 2020
2.	Indian Council of Forestry Research and Education (ICFRE) Dehradun	To develop programme and research projects for scientific upliftment and benefit of forestry sector and to strengthen the complementary relationship between respective institutions and to collaborate on the issue of exchange of students and research scholars on mutual basis.	February 2020
3.	Kumaun University, Nainital	Exchange of ZSI scientists and faculty members of the Kumaun University to prepare common research programmes. Ph.D. degree will be done under the Joint supervision of the faculty of the respective department of Kumaun University, Nainital and the scientists of the ZSI.	March 2020
4.	Himachal Pradesh University, Summer Hill, Shimla	Joint research projects, Joint supervision of Ph.D Scholars, Ph.D. registration, Joint conference Seminar etc.	March 2020
5.	Vellore Institute of Technology	Collaboration for Research, Doctoral and Post-Doctoral Programmes.	March 2020

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LIBRARY & PUBLICATION DIVISION

The Library of Zoological Survey of India is one of the largest and eminent special libraries in Asia. Perhaps, in Asia, it is the largest special library of its own kind on the subject Zoology and its different branches of studies.

LIBRARY DIVISION

The presence of a vast and rich collection of old and rare, as well as modern zoological literature has enriched the library of Zoological Survey of India. The library plays a significant role for the students, readers, research scholars and also to the scientists from inside and also outside the institution, of the field of Zoology and its allied subjects.

Though the library of Zoological Survey of India started its journey with a small number of transferred publications from two prestigious organizations, viz. Former Indian Museum of the Asiatic Society of Bengal and the Zoological Section of the Indian Museum on 1st July, 1916, at present, after more than a Century the collection has reached to a remarkable number. As recommended by the MoEF & CC, the digitization of old and rare journals have been resumed and about 10,000 pages have been digitized.

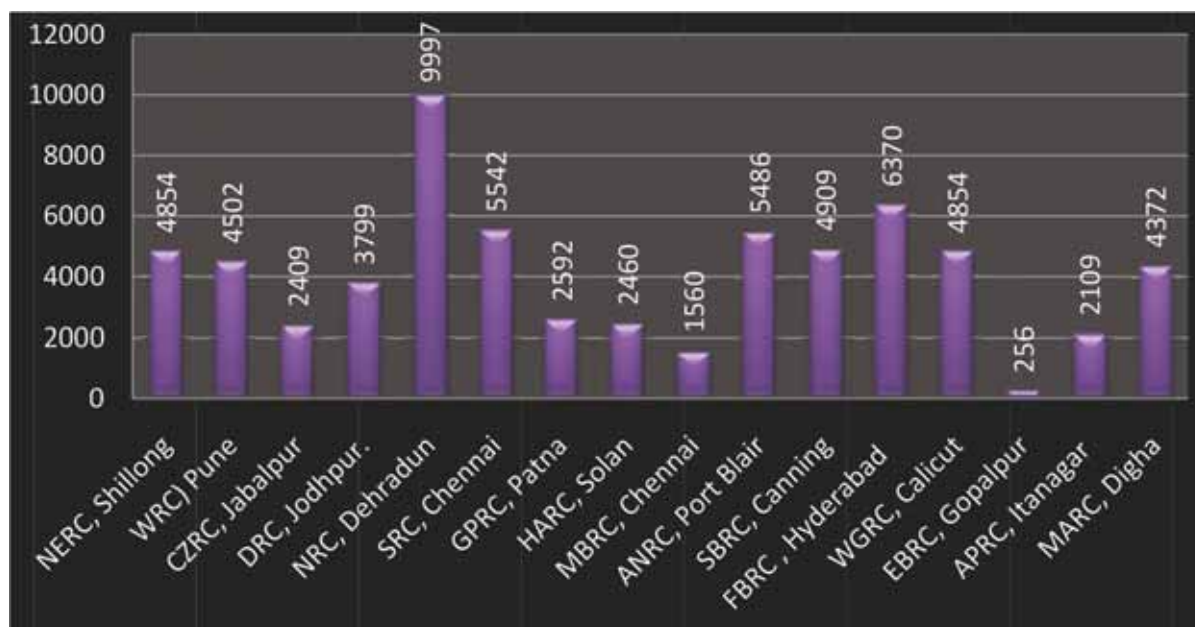
Information of Library Holdings at HQ & Regional Centres

HQ/ RCs	Total number of books	Total number of journals	Number of books accessioned during the reporting period	Number of journals accessioned during the reporting period
HQ	55272	13847	159	482
Arunachal Pradesh Regional Centre (APRC), Itanagar, Arunachal Pradesh (1983)	2235	1414	74	25
Western Ghats Regional Centre (WGRC), Kozhikode, Kerala (1980)	3465	1281	55	10
Sunderban Regional Centre (SRC), Canning, West Bengal (1979)	3499	278	47	02
Northern Regional Centre (NRC), Dehradun, Uttarakhand (1960)	7124	62	24	07
Marine Aquarium cum Regional Centre (MARC), Digha, West Bengal (1989)	1439	875	52	40

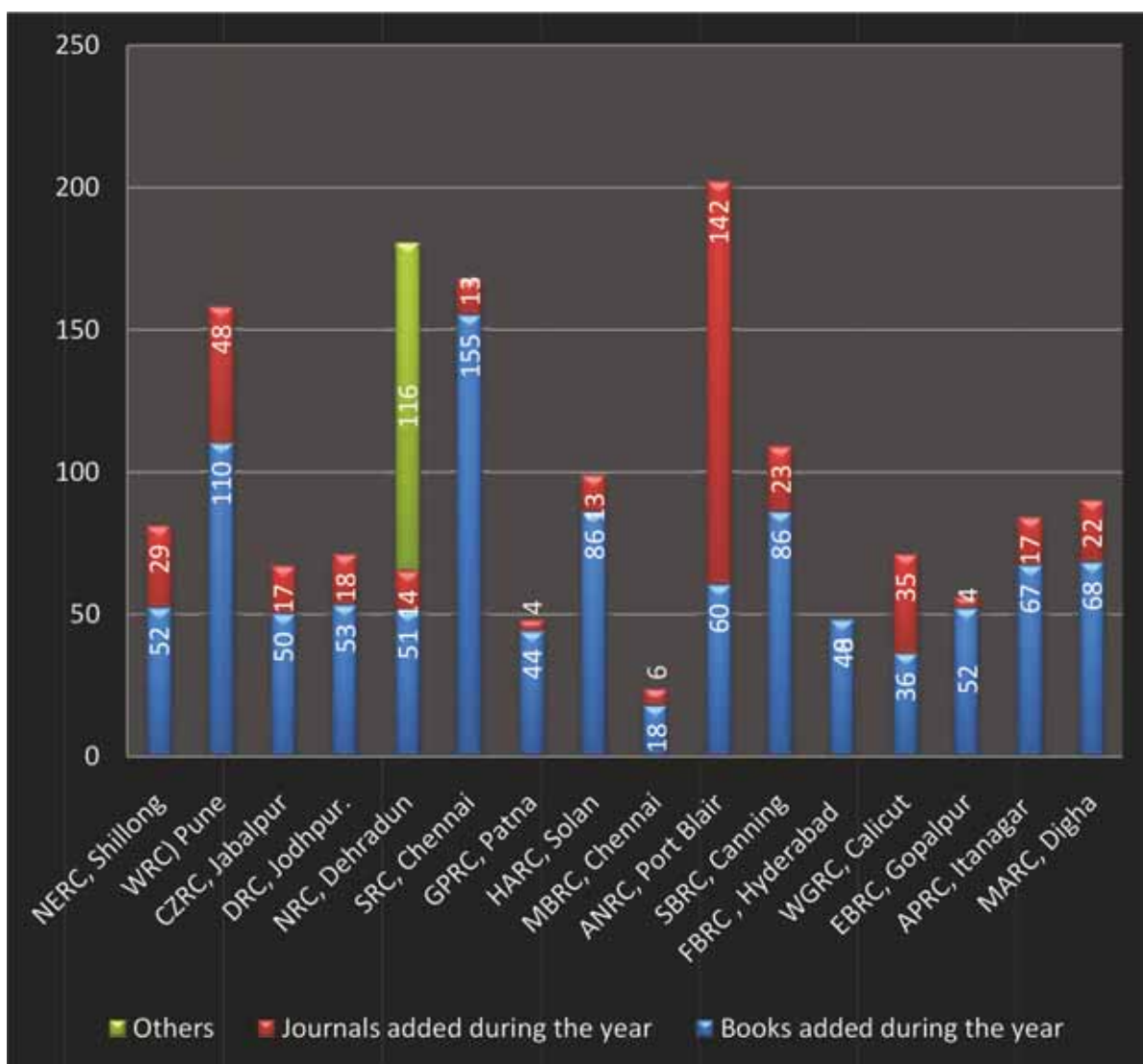
HQ/ RCs	Total number of books	Total number of journals	Number of books accessioned during the reporting period	Number of journals accessioned during the reporting period
Estuarine Biology Regional Centre (EBRC), Gopalpur-on-Sea, Ganjam, Orissa (1980)	3505	318	35	02
Freshwater Biology Regional Centre (FBRC), Hyderabad, Andhra Pradesh (1979)	6431	110	60	00
Central Zone Regional Centre (CZRC), Jabalpur, Madhya Pradesh (1960)	2400	43	36	15
Marine Biology Regional Centre (MBRC), Chennai, Tamil Nadu (1973)	2902	10	53	08
Gangetic Plains Regional Centre (GPRC), Patna, Bihar (1965)	2693	740	79	18
Western Regional Centre (WRC), Pune, Maharashtra (1959)	4519	17605	63	22
North Eastern Regional Centre (NERC), Shillong, Meghalaya (1959)	64	18	19	02
High Altitude Regional Centre (HARC), Solan, Himachal Pradesh (1968)	2366	04	78	04
Southern Regional Centre (SRC), Chennai, Tamil Nadu (1961)	5575	13	92	34
Desert Regional Centre (DRC), Jodhpur, Rajasthan (1960)	3859	11453	109	24
Andaman and Nicobar Regional Centre (ANRC), Port Blair (1977)	2157	3221	20	34
Total	104577	38989	976	711



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

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 (Formerly Records of the Indian Museum)

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.

PUBLICATION DIVISION

Following books were published during the 2019-20

Priced Publications

1. Conservation Area Series 65.
2. State Fauna Series 20: Fauna of Maharashtra part- 3
3. State Fauna Series 23: Fauna of Punjab
4. State Fauna Series 24: Fauna of Haryana
5. Spl. Publ. – Dentition in Indian Terrestrial Mammals
6. Spl. Publ. – Tricho-Taxonomy of Indian Mammals
7. Spl. Publ. – Current Status of Faunal Diversity of Mangroves in India
8. Spl. Publ. – Faunal Diversity of Indian Trans-Himalaya
9. One Hand book
10. Rec. Zool. Surv. India, Occasional Paper No. 396
11. Rec. Zool. Surv. India, Occasional Paper No. 397

12. Rec. Zool. Surv. India, Occasional Paper No. 398
13. Rec. Zool. Surv. India, Occasional Paper No. 399
14. Rec. Zool. Surv. India, Occasional Paper No. 400
15. Rec. Zool. Surv. India, Occasional Paper No. 401
16. Estuarine Ecosystem Series 11: Fauna of Narmada and Tapti Estuarine Ecosystem, Gujarat

Non-priced Publications:

17. Annual Report 2017-2018
18. Animal Discoveries 2018
19. Coffee Table Book: Mesmerising Fauna of Great Nicobar Island
20. Abstract: Sixth Lepidoptera Symposium
21. Abstracts: 12th National Conference on

Vector Borne and Zooanthic Diseases

22. Pictorial Guide on Reptiles, Amphibians and Mammals of East Kolkata Wetlands

23. Centenary Wall Calender

24. ZSI Dairy 2020

The Home Journal – Records of the Zoological Survey of India volume 119 with four issues published

1. Volume 119 (Issue 1) – Comprising 14 articles

2. Volume 119 (Issue 2) – Comprising 09 articles

3. Volume 119 (Issue 3) – Comprising 14 articles

4. Volume 119 (Issue 4) – Comprising 23 articles

Total 4 issues comprising 60 articles were published.

Books released by the dignitaries:

1. Faunal Diversity of Mangrove Ecosystem in India: Editors: Kailash Chandra, Gopi, K.C., Mishra, S.S. & Raghunathan, C.

2. Moths of Bihar and Jharkhand : Editor: Navneet Singh

3. Geometrid Moths of India : Editors: Jagbir Singh Kirti, Kailash Chandra, Abhinav Saxena & Navneet Singh

4. Bees of India (Hymenoptera: Apoidea): Editors: Jagdish Saini, Kailash Chandra & Devanshu Gupta

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MUSEUM AND 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.

No. of specimens displayed

Mammals: 351 Exhibits

Birds, Amphibia and Reptiles: 604 Exhibits

Fish: 128 Exhibits

Invertebrate: 497 Exhibits

SECTIONAL HOLDINGS:

Gallery exhibits: 1733 (Mammal gallery: 351, Bird, Amphibia and Reptile gallery: 604, Fish gallery: 128, Ecology gallery: 153, Invertebrate: 497).

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, Plathelminthis & Nematoda, Annelida, Mollusca, Arthropoda, Echinodermata, Coral reefs, Insect inversion in Water, Interesting insects in Land, Wonders in deep hydrothermal vent, Arthropod & Molluscs, Minor Phyla).



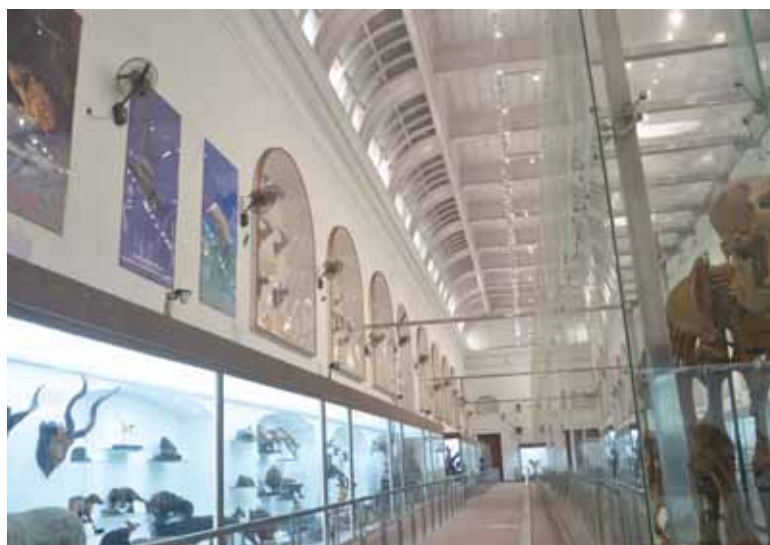
Invertebrate gallery

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) 68 species.

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 441 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. Skeleton, 26 and skull 37.



Mammal gallery

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



Ecosystem gallery

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

Awareness Programmes

For creating awareness on environmental and its faunal resources, Museum & Taxidermy Section participated in four melas/ exhibition.

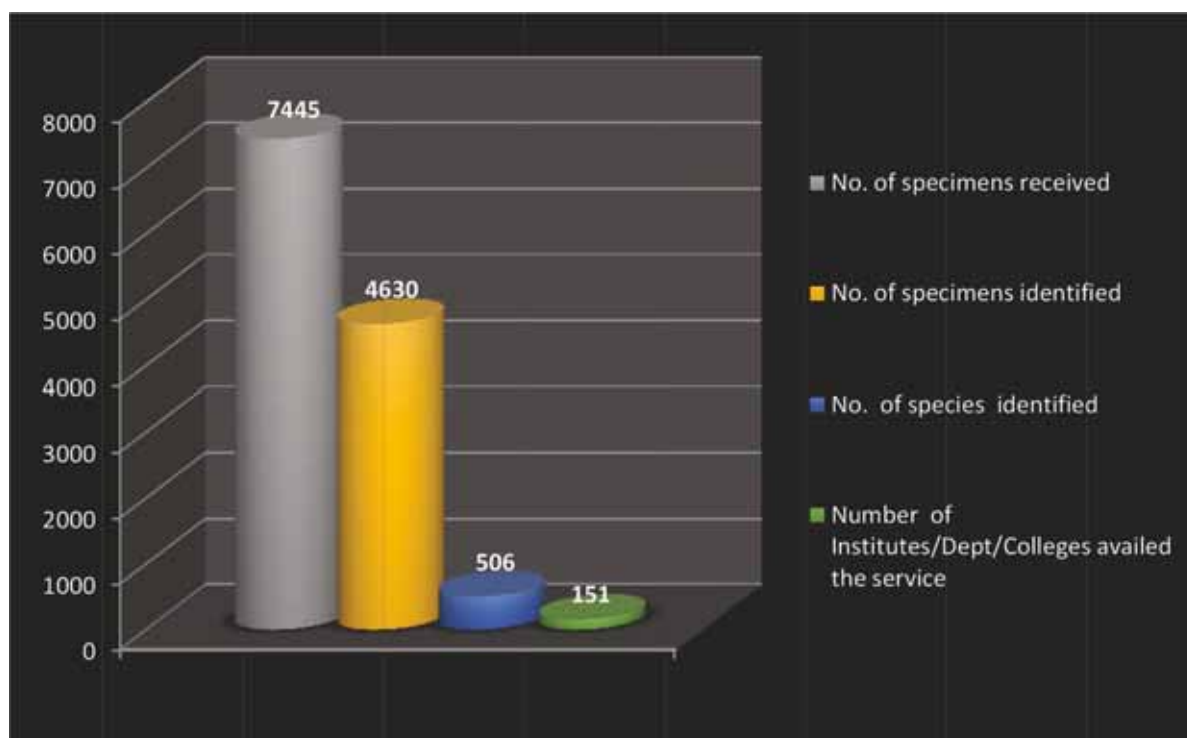
- Damoder Mela/Exhibition at Amta, Hoogly Dist., West Bengal (7-13th Dec, ember 2019)
- Destination Daman and Diu Exhibition at Diu (14- 16th December 2019)
- Sunderban Kristi Mela O Loko Sanskriti Utsab Exhibition, Kuktali, West Bengal (20 -29th December 2019)
- Exhibition Stall at 107th Indian Science congress, Bengaluru (3rd to 7th January, 2020).

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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.

About 7,445 specimens were received from 151 Institute/dept/colleges for identification and advisory services by the scientists of ZSI HQ and Regional Centres, of which 4,630 specimens were identified belonging to 506 species and the report was sent to respective institutes.



Summary: Identification and Advisory Services rendered by the Scientists during 2019-2020

Details of Identification and Advisory Services rendered by the Scientists during 2019-2020

Faunal Groups	No. of specimens received	Number of specimens identified	Name of the identified species	Name of the Institution availed the service
Anguilliformes	02	02	<i>Gymnothorax andamanensis</i> sp nov.	ICAR-Central Island Agricultural Research Institute, Port Blair
Annelida :Earthworm	66	66	-	Moolji Jaitha College, Jalgaon, Maharashtra. Tuljaram Chaturchand College of Arts, Science and Commerce, Baramati, Pune. Department of Zoology, Bethune College, Kolkata
Annelida : Earthworms	09	09	<i>Lampito mauritii</i> Kinber, 1836 <i>Perionyx excavatus</i> (Perrier, 1872) <i>Metaphire posthuma</i> (Vaillant, 1868) <i>Drawida</i> sp.	Department of Zoology, Shri Guru Ram Rai University, Dehradun.
Annelida : Earthworms	10	10	<i>Amyntas diffringens</i> (Baird, 1869) <i>Amyntas morrisi</i> (Beddard, 1892) <i>Metaphire planata</i> <i>Amyntas robustus</i> (Perrier,	Department of Zoology, Shri Guru Ram Rai University, Dehradun.
Annelida : Earthworms	39	39	<i>Lampito mauritii</i> Kinberg, 1866 <i>Perionyx excavatus</i> (Perrier, 1872) <i>Perionyx pulvinatus</i> Stephenson, 1916. <i>Metaphire posthuma</i> (Vaillant, 1868). <i>Amyntas diffringens</i> (Baird, 1869) <i>Eutyphoeus kemp</i> Stephenson, 1914 <i>Drawida nepalensis</i> Michaelsen, 1907 <i>Octolasion tyrtaeum</i> (Savigny, 1826)	Dept. of Life sciences, Dibrugarh University.
Annelida : Earthworms	34	34	<i>Metaphire peguana</i> (Rossa, 1890) <i>Perionyx</i> sp. <i>Octochaetona</i> sp.	Dept. of Zoology, Gulbarga University, Karnataka.
Annelida : Leeches	26	26	<i>Glossiphonia weberi</i> Blanchard, 1897. <i>Hemiclepsis marginata asiatica</i> Moore, 1924 <i>Barbronia weberi</i> (Blanchard, 1897)	Department of Zoology, Shri Guru Ram Rai University, Dehradun.

Faunal Groups	No. of specimens received	Number of specimens identified	Name of the identified species	Name of the Institution availed the service
			<i>Nematobdella indica</i> Kaburaki, 1921 <i>Herpobdelloidea lateroculata</i> (Blanchard, 1897)	
Araneae	5	5	2 species of spiders	NBRRDC, TRA
Araneae	21	21	10 species of spiders	Poyilkavu (HS) School, Poyilkavu, Kerala
Araneae	13	13	10 species of spiders	MES KVM College, Valanchery, Kerala
Araneae	27	27	13 species of spiders	Jamal Muhammed College, Thiruchirappally, Tamil Nadu
Araneae	7	7	4 species of spiders	Asutosh College, W.B.
Araneae	41	41	25 species of spiders	Jamal Mohamed College, Tiruchirappalli, Tamil Nadu
Araneae	60	60	<i>Argiope anasuja</i> Thorell, 1887 <i>Crossopriza lyoni</i> (Blackwall, 1867) <i>Hippasa olivacea</i> (Thorell, 1887) <i>Crossopriza lyoni</i> (Blackwall, 1867) <i>Cyrtophora cicatrosa</i> (Stoliczka, 1869) <i>Cyclosa hexatuberculata</i> Tikader, 1982 <i>Hersilia savignyi</i> Lucas, 1836 <i>Oxyopes pankaji</i> Gajbe & Gajbe, 2001 <i>Peucetia viridana</i> Stoliczka, 1869 <i>Hippasa olivacea</i> (Thorell, 1887) <i>Chorizopes</i> sp. <i>Oxyopes chittrae</i> Tikader, 1966 <i>Argiope anasuja</i> Thorell, 1887 <i>Hippasa pisaurina</i> Pocock, 1900 <i>Araneus</i> sp. <i>Henriksenia hilaris</i> (Thorell, 1877) <i>Cyrtophora cicatrosa</i> (Stoliczka, 1869) <i>Marpissa</i> sp. <i>Cyclosa hexatuberculata</i> Tikader, 1982 <i>Araneus</i> sp. <i>Oxyopes pankaji</i> Gajbe & Gajbe, 2001 <i>Argiope aemula</i> (Walckenaer, 1842)	Ahmednagar College of Arts, Science and Commerce, Ahmednagar, Maharashtra

Faunal Groups	No. of specimens received	Number of specimens identified	Name of the identified species	Name of the Institution availed the service
			<i>Araneus</i> sp. Need more study to confirm species <i>Neoscona mukerjei</i> Tikader, 1980 <i>Cyrtophora cicatrosa</i> (Stoliczka, 1869) <i>Cyrtophora citricola</i> (Forskal, 1775) <i>Oxyopes chittrae</i> Tikader, 1966 <i>Cyrtophora cicatrosa</i> (Stoliczka, 1869) <i>Araneus</i> sp. <i>Plexippus</i> sp. <i>Oxyopes chittrae</i> Tikader, 1966 <i>Peucetia viridana</i> Stoliczka, 1869 <i>Hersilia savignyi</i> Lucas, 1836 <i>Leucauge celebesiana</i> (Walckenaer, 1842) <i>Stegodyphus sarasinorum</i> Karsch, 1891 <i>Telamonia dimidiata</i> (Simon, 1899) <i>Araneus</i> sp. <i>Cyrtophora cicatrosa</i> (Stoliczka, 1869) <i>Telamonia dimidiata</i> (Simon, 1899) <i>Stegodyphus sarasinorum</i> Karsch, 1891 <i>Gibbaranea bituberculata</i> (Walckenaer, 1802) <i>Hippasa madraspatana</i> Gravely, 1924 <i>Plexippuspaykulli</i> (Audouin, 1826) <i>Cyrtophora</i> sp. <i>Plexippuspaykulli</i> (Audouin, 1826) <i>Cyrtophora</i> sp. <i>Araneus</i> sp. <i>Plexippuspaykulli</i> (Audouin, 1826) <i>Araneus</i> sp. <i>Hippasa olivacea</i> (Thorell, 1887) <i>Argiope anasuja</i> Thorell, 1887 <i>Hersilia savignyi</i> Lucas, 1836 <i>Eriovixia excelsa</i> (Simon, 1889) <i>Cyrtophora</i> sp. <i>Cyclosa hexatuberculata</i> Tikader, 1982 <i>Plexippuspaykulli</i> (Audouin, 1826) <i>Cyclosa hexatuberculata</i> Tikader, 1982 <i>Cyclosa hexatuberculata</i> Tikader, 1982 <i>Cyclosa moonduensis</i> Tikader, 1963	

Faunal Groups	No. of specimens received	Number of specimens identified	Name of the identified species	Name of the Institution availed the service
Araneae	01	01	<i>Thalassius albocinctus</i> Doleschall 1859	Kisan Veer Mahavidyalaya, Wai, Satara
Araneae	02	02	<i>Lycosa mackenziei</i> Gravely 1924 <i>Lycosa mackenziei</i> Gravely 1924	RIRD Y.C.I. of Science, Satara
Araneae	36	36	19 species of spiders	Aliah University New Town, Kolkata
Araneae	02	02	01 species of spiders	Sambalpur University
Cladocera	05	05	<i>Ceriodaphniacornuta</i> Sars, 1885 <i>Daphnia lumholtzi</i> Sars, 1885 <i>Chydorus sphaericus</i> (Muller, 1776) <i>Coronatella rectangular</i> (Sars, 1862) <i>Indialona ganapati</i> Petkovski, 1966	P G College, Jhansi (UP).
Crustacea	06	06	<i>Portunus sanguinolentus</i> (Herbst, 1783) <i>Doclea ovis</i> (Fabricius, 1787) <i>Charybdis (Charybdis) natator</i> (Herbst, 1794) <i>Monomia gladiator</i> (Fabricius, 1798) <i>Charybdis</i> sp. <i>Calappa lophos</i> (Herbst, 1782)	SRM – Institute of Science and Technology, SRM University Chennai
Crustacea	01	01	<i>Hyastenus hilgendorfi</i> (De Mann, 1887)	Department of Marine Sciences, Berhampur University
Crustacea	31	31	<i>Oziotelphusa aurantia</i> (Herbst, 1799) <i>Spiralothelphusa wuellerstorfi</i> (Heller, 1862) <i>Spiralothelphusa senex</i> (Fabricius, 1798)	P.G. & Research Department of Zoology, Thiru Kolanjiappar Government Arts College, Vriddhachalam, Tamil Nadu
Crustacea	4	4	<i>Oziotelphusa bouvieri</i> (Rathbun, 1904)	Valliammal College for Women, E-9, Anna Nagar East, Chennai, Tamil Nadu
Crustacea	07	07	<i>Barytelphusa</i> sp. <i>Barytelphusa cunicularis</i> (Westwood in Sykes, 1836)	Department of Zoology, Kisan Veer Mahavidyalaya, Wai-412 803, Satara district, Maharashtra
Crustacea (Crab)	1	1		Shillong College, Shillong

Faunal Groups	No. of specimens received	Number of specimens identified	Name of the identified species	Name of the Institution availed the service
Crustacea Freshwater/ marine crab	32	32	<i>Austruca annulipes</i> (H. Milne Edwards, 1837) <i>Barytelphusa cunicularis</i> (Westwood in Sykes, 1836) <i>Barytelphusa guerini</i> (H. Milne Edwards, 1853) <i>Barytelphusa</i> sp. <i>Oziotelphusa wagrakarowensis</i> (Rathbun, 1904)	Department of Zoology, Arts, Commerce and Science College, Palus-412 803, Sangli district, Maharashtra
Echinoderms	10	Nil	Nil	Jamnagar Forest Department, Gujrat
Fragmentary vertebrate fossil specimens and one recent skull from Susunia, Dist Bankura, West Bengal	30	24	<i>Bubalus</i> sp. Family Bovidae, <i>Suncus murinus</i> (Linn)	Department of Anthropology, Bidhannagar College, Salt Lake, Kolkata.
Insecta: Coleoptera	70	70	<i>Gymnopleurus gemmatus</i> , <i>Euoniticellus pallipes</i> , <i>Euoniticellus pallens</i> , <i>Digitonthophagus catta</i> , <i>Catharsius pithecius</i> , <i>Onitis philemon</i> , <i>Onthophagus tarandus</i> , <i>Onthophagus sagitarius</i> , <i>Tiniocellus spinipes</i> , <i>Sisyphus longipes</i> , <i>Onthophagus cervus</i> , <i>Onthophagus igneus</i> , and <i>Onthophagus ramosellus</i> .	Vidyasagar University, West Bengal.
Insecta: Coleoptera	19	19	<i>Hydrovatus</i> sp., <i>Berosus indicus</i> Mostch., <i>Tachys</i> sp., <i>Astenus</i> sp., <i>Allcotocerus striatopunctatus</i> (Castelanau), and <i>Paederus fuscipes</i> (Curt.).	Serampore College, Department of Zoology for UG & PG Studies, Serampore, Dist. Hooghly, W. Bengal.
Insecta: Coleoptera	03	03	<i>Laccophilus anticatus anticatus</i> Sharp and <i>Allocotocerus striatopunctatus</i> Castelnau.	Serampore College, Department of Zoology for UG & PG Studies, Serampore, Dist. Hooghly, W. Bengal.
Insecta: Coleoptera	22	22	<i>Laccophilus</i> sp., <i>Hydroglyphus</i> sp., <i>Berosus pulchellus</i> Macleay, <i>Berosus</i> sp., <i>Sternolophus</i> sp., <i>Enochrus</i> sp.	Department of Zoology, Punjab Agricultural University, Ludhiana-141004.

Faunal Groups	No. of specimens received	Number of specimens identified	Name of the identified species	Name of the Institution availed the service
Insecta: Coleoptera	06	06	<i>Holotrichia</i> sp. and <i>Anomala</i> sp.	Department of Zoology, NEHU, Shillong- 22, Meghalaya
Insecta: Coleoptera	02	02	<i>Caccobius</i> sp.	Department of Zoology, Bethune College, Kolkata- 700 006.
Insecta: Coleoptera	04	04	<i>Protaetia</i> sp.	Agricultural Research Station, Agriculture University, Mandor, Jodhpur- 342 304
Insecta: Coleoptera	03	03	<i>Hydrophilus olivaceus</i> Fab., <i>Xylotrupes gideon</i> Linn., and <i>Batocera rubus</i> Linn.	Department of Agricultural Entomology, Uttar Banga Krishi Vidwavidyalaya, Pundibari, Cooch Behar- 736 165, West Bengal.
Insecta: Coleoptera	64	64	<i>Hyborosus orieutalis</i> , <i>Protaetia aurichalcea</i> , <i>Chiloloba acuta</i> , <i>Eophileurus platypterus</i> , <i>Heteronychus lioderes</i> , <i>Pentadon</i> sp., <i>Digitonthophagus bonasus</i> , <i>Oniticellus cinctus</i> , <i>Tiniocellus spinipes</i> , <i>Catharsius sagax</i> , <i>Onitis falcatus</i> , <i>Onitis subopacus</i> , <i>Onitis lama</i> , <i>Onitis philemon</i> , <i>Eoniticellus pallipes</i> , <i>Heliopris midas</i> , <i>Anomala dorsalis</i> , <i>Maladera</i> sp., <i>Aphodius</i> sp., <i>Onthophagus</i> sp., <i>Gymnopleurus miliaris</i> , and <i>Apogonia</i> sp.	Khalsa College, Amritsar
Insecta: Coleoptera	25	25	<i>Digitonthophagus bonasus</i> , <i>Onitis falcatus</i> , <i>Onitis philemon</i> , <i>Onitis subopacus</i> , <i>Euonticellus pallipes</i> , <i>Oniticellus cinctus</i> , <i>Eophileurus platypterus</i> , and <i>Pentodon</i> sp.	Khalsa College, Amritsar
Insecta: Coleoptera	17	17	<i>Heliocopris gigas</i> (Linnaeus, 1764) <i>Heliocopris dominus</i> Bates, 1868 <i>Oryctes rhinoceros</i> (Linnaeus, 1758) <i>Hybosorus orientalis</i> Westwood, 1846 <i>Holotrichia fissa</i> Brenske, 1894 <i>Bolbogonium</i> sp. <i>Bolboceras</i> sp. <i>Adoretus versutus</i> Harold, 1869 <i>Heterorrhina elegans</i> (Fabricius, 1781) <i>Catharsius</i> (<i>Catharsius</i>)	Ahmednagar College, Ahmednagar, Maharashtra

Faunal Groups	No. of specimens received	Number of specimens identified	Name of the identified species	Name of the Institution availed the service
			<i>molossus</i> (Linnaeus, 1758) <i>Onitis philemon</i> Fabricius, 1801 <i>Onthophagus</i> sp.	
Insecta: Coleoptera	97	97	<i>Gametis versicolor</i> (Fabricius, 1775) <i>Protaetia alboguttata</i> (Vigors, 1826) <i>Eophileurus perforatus</i> Arrow, 1908 <i>Catharsius pithecius</i> (Fabricius, 1775) <i>Phyllognathus dionysius</i> Fabricius, 1792 <i>Catharsius molossus</i> (Linnaeus, 1758) <i>Catharsius sagax</i> (Quensel, 1806) <i>Gymnopleurus cyaneus</i> (Fabricius, 1798) <i>Garreta dejeani</i> (Castelnau, 1840) <i>Scarabaeus (Kheper) sanctus</i> (Fabricius, 1798) <i>Eophileurus platypterus</i> (Wiedemann, 1823) <i>Onitis philemon</i> Fabricius, 1801 <i>Onitis virens</i> Lansberge, 1875 <i>Bolbogonium</i> sp. <i>Digitonthophagus</i> sp. <i>Digitonthophagus gazella</i> (Fabricius, 1787) <i>Onthophagus (Proagoderus) pactolus</i> (Fabricius, 1787) <i>Hybosorus orientalis</i> Westwood, 1846 <i>Tiniocellus spinipes</i> (Roth, 1851)	S.G.B. University, Amravati, Maharashtra.
Insecta: Coleoptera	18	18	<i>Cybister convexus</i> <i>Cybister limbatus</i> (Fabricius, 1775) <i>Cybister tripunctatus asiaticus</i> Sharp <i>Cybister tripunctatus asiaticus</i> Sharp <i>Eretes griseus</i> (Fabricius, 1781) <i>Hydaticus luczonicus</i> Aube, 1838 <i>Hydaticus vittatus</i> (Fabricius, 1775) <i>Hydrophilus olivaceus</i> (Fabricius, 1781) <i>Sandracottus dejeani</i> (Aube, 1838) <i>Sternolophus rufipes</i> (Fabricius, 1792)	Sant Gadge Baba Amravati University, Amravati, Maharashtra

Faunal Groups	No. of specimens received	Number of specimens identified	Name of the identified species	Name of the Institution availed the service
Insecta: Coleoptera	15	15		S. D. M. College, Honavar, Karnataka
Insecta: Coleoptera	03	03	<i>Coccinella septempunctata</i> (Linnaeus)	Institute of Biomedical & Natural Sciences
Insecta: Coleoptera (Aquatic)	13	13	<i>Sandracottus festivus</i> (Illiger, 1801) <i>Sandracottus dejeani</i> (Aube, 1838) <i>Eretes griseus</i> (Fabricius, 1781) <i>Hydaticus fabricii</i> (MacLeay, 1825) <i>Sternolophus rufipes</i> (Fabricius, 1792)	Sant Gadge Baba Amravati University
Insecta: Coleoptera, darkling beetles	44	44	<i>Heterotarsus crenatus</i> Fairmaire, 1894 <i>Calosoma imbricatum</i> Klug, 1832 <i>Rhytinota indica</i> Schauf, 1872 <i>Luprops rugosissimus</i> Kaszab, 1980 <i>Himatismus fasciculatus</i> (Fabricius, 1798) <i>Hyperops coromandelensis</i> Solier, 1835	University, Amravati, Maharashtra
Insecta: Coleoptera: Aquatic beetle	83	83	<i>Berosus indicus</i> Motchulsky, 1861 <i>Berosus pulchellus</i> MLeay, 1825 <i>Canthydrus angularis</i> Sharp <i>Canthydrus laetabilis</i> Walker, 1858 <i>Dineutus unidentatus</i> (Aube, 1838) <i>Hydroglyphus signatellus</i> Klug, 1834 <i>Hydrovatus confertus</i> Sharp, 1882 <i>Laccophilus inefficiens</i> Walker, 1859	Pandit Jawaharlal Nehru College of Agriculture and Research Institute, Karaikal, Puducherry U.T.

Faunal Groups	No. of specimens received	Number of specimens identified	Name of the identified species	Name of the Institution availed the service
			<i>Laccophilus sharpi</i> Regimbart <i>Neohydrocoptus subvittulus</i> Mots, 1859 <i>Regimbartia attenuate</i> Fabricius	
Insecta: Coleoptera: Coccinellidae	17	17	10	Lucknow University
Insecta: Coleoptera: Scarabaeidae	79	79	<i>Anomala dorsalis</i> (Fabricius, 1775) <i>Anomala ruficapilla</i> Burmeister, 1855 <i>Anomala varicolor</i> (Gyllenhal, 1817) <i>Apogonia</i> sp. <i>Catharsius molossus</i> (Linnaeus, 1758) <i>Catharsius pithecius</i> (Fabricius, 1775) <i>Catharsius</i> spp. <i>Chiloloba acuta</i> (Wiedemann, 1823) <i>Digitonthophagus gazella</i> (Fabricius, 1787) <i>Eophileurus platypterus</i> (Wiedemann, 1823) <i>Garreta</i> sp. <i>Gymnopleurus gemmatus</i> (Harold, 1871) <i>Heliocopris bucephalus</i> (Fabricius, 1775) <i>Heterorrhina elegans</i> (Fabricius, 1781) <i>Holotrichia serrata</i> (Fabricius, 1787) <i>Hybosorus orientalis</i> Westwood, 1846 <i>Omorgus</i> sp. <i>Oniticellus (Oniticellus) cinctus</i> (Fabricius, 1775) <i>Onitis philemon</i> Fabricius, 1801 <i>Onitis</i> sp. <i>Onthophagus</i> sp. <i>Orphnus (Orphnus) impressus</i> Westwood, 1846 <i>Phaeochrous emarginatus</i> Castelnau, 1840 <i>Phyllognathus dionysius</i> Fabricius, 1792 <i>Sisyphus longipes</i> (Olivier, 1789)	Department of Zoology, Sant Gadge Baba Amravati University, Amravati, Maharashtra

Faunal Groups	No. of specimens received	Number of specimens identified	Name of the identified species	Name of the Institution availed the service
Insecta: Collembola	210	210	<i>Salina bengalensis</i> Mitra, 1973 <i>Dicranocentrus indicus</i> Bonet, 1930 <i>Isotomurus</i> sp <i>Ectonura</i> sp	Deptt. of Zoology, Modern College, Shivajinagar, Pune
Insecta: Diptera	01	01	Details attached as Annexure I	Deptt. of Entomology, College of Horticulture & Forestry, Neri, Hamirpur, H.P.
Insecta: Diptera	12	12	Details attached as Annexure I	P.G. Deptt. of Zoology, Science College, Kokrajhar, Assam
Insecta: Diptera	24	24	Details attached as Annexure I	Deptt. of Zoology, Moulana Azad College, Kolkata, West Bengal
Insecta: Diptera	01	01	Details attached as Annexure I	Deptt. of Zoology, Vidyasagar University, West Bengal
Insecta: Diptera	04	04	Details attached as Annexure I	Deptt. of Zoology, Punjab Agricultural University, Ludhiana- 141004
Insecta: Diptera	19	19	Details attached as Annexure I	University of Horticulture & Forestry, Neri, Hamirpur, H.P.
Insecta: Diptera	02	02	Details attached as Annexure I	Deptt. of Zoology, Vidyasagar University, West Bengal
Insecta: Diptera	20	20	Details attached as Annexure I	Deptt. of Bioscience, Himachal Pradesh University, Summer Hill, Simla- 171005
Insecta: Diptera	04	04	Details attached as Annexure I	Dept. of Entomology, College of Horticulture & Forestry, Himachal Pradesh.
Insecta: Diptera (Culicidae)	16	16	<i>Anopheles subpictus</i> , <i>An. annularis</i> , <i>An. vagus</i> , <i>Aedes albopictus</i> , <i>Aedes aegypti</i>	WB Malaria Dept., and, Parasitology and Microbiology Research Laboratory The University of Burdwan
Insecta: Hymenoptera	06	06	Hymenoptera	Uttar Banga Krishi Viswavidyalaya, Coochbehar
Insecta: Hymenoptera	29	29	Hymenoptera	PG Dept. of Zoology, Science College, Kokrajhar, Assam
Insecta: Hymenoptera	13	13	Hymenoptera	KVK, Kalyan, Purulia, WB
Insecta: Hymenoptera	11	11	Hymenoptera	Assam Agricultural University

Faunal Groups	No. of specimens received	Number of specimens identified	Name of the identified species	Name of the Institution availed the service
Insecta: Hymenoptera	01	01	Hymenoptera	Vidyasagar University, Midnapore
Insecta: Hymenoptera	95	95	Hymenoptera	Himachal Pradesh University
Insecta: Hymenoptera	04	04	Hymenoptera	ICAR-CRIJAF, Kolkata, WB
Insecta: Hymenoptera	05	05	Hymenoptera	Sarojini Naidu College for Women, Kolkata, W.B.
Insecta: Hymenoptera	39	39	14 species of Hymenoptera	University of Calicut, Kerala
Insecta: Hymenoptera	27	27	9 species of Hymenoptera	TKMCAS College, Kollam
Insecta: Hymenoptera	14	14	6 species of Hymenoptera	Central University, Kasaragod, Kerala
Insecta: Hymenoptera	37	37	24 species of Hymenoptera	PSMO College, Thirurangadi, Kerala
Insecta: Hymenoptera	1	1	1 species of Hymenoptera	R M V C College, Rahara, Kolkata
Insecta: Hymenoptera	14	14	3 species of Hymenoptera	WII, Dehradun
Insecta: Hymenoptera	38	38	21 species of Hymenoptera	ATREE, Bangalore
Insecta: Hymenoptera	2	2	2 species of Hymenoptera	Loyola College, Chennai
Insecta: Hymenoptera	07	07	5 species of Hymenoptera	Poyilkavu (HS) School, Poyilkavu
Insecta: Hymenoptera	02	02	2 species of Hymenoptera	Loyola College, Chennai
Insecta: Hymenoptera	01	01	1 species of Hymenoptera	Centre for Ecological Sciences, IISC
Insecta: Hymenoptera	01	01	1 species of Hymenoptera	Malabar Christian College, Kozhikode
Insecta: Hymenoptera	09	09	7 species of Hymenoptera	Jamal Muhammed College, Thiruchirapally, Tamil Nadu

Faunal Groups	No. of specimens received	Number of specimens identified	Name of the identified species	Name of the Institution availed the service
Insecta: Hymenoptera	13	13	7 species of Hymenoptera	ATREE, Bengaluru
Insecta: Hymenoptera	2	2	2 species of Hymenoptera	St. Xavier's College (Autonomous), Palayamkottai, Tamil Nadu
Insecta: Hymenoptera	6	6	4 species of Hymenoptera	M.E.S. College, Valanchery
Insecta: Hymenoptera	2	2	1 species of Hymenoptera	ICAR-NBAIR, Bengaluru
Insecta: Hymenoptera	03	03	<i>Apis mellifera</i> Linnaeus	Institute of Biomedical & Natural Sciences
Insecta: Hymenoptera (Formicidae)	10	10	10 species of Ants	Mahishadal Raj College, Purba Medinipur
Insecta: Hymenoptera (Formicidae)	14	14	09 species of Ants	Sambalpur University, Odisha
Insecta: Isoptera	10	10	<i>Amitermes messinae</i> (Fuller, 1922) <i>Microtermes mycophagus</i> (Desneux, 1906) <i>Microcerotermes palestinensis</i> Spaeth, 1964.	Department of Biology, Faculty of Science, Jazan University, Saudi Arabia
Insecta: Isoptera	01	01	<i>Coptotermes ceylonicus</i> Holmgren	P.G. & Department of Zoology, J.B.A.S. College for Women (Autonomous), Chennai- 600 018
Insecta: Isoptera	01	01	<i>Odontotermes bellahunisensis</i> Holmgren and Holmgren <i>Odontotermes obesus</i> (Rambur)	Department of Zoology, Voorhees College, Vellore)
Insecta: Isoptera	01	01	Termites	Department of Zoology, Brthune College, 181, Bidhan Sarani, Kolkata- 700006
Insecta: Isoptera	05	05	<i>Coptotermes heimi</i> (Wasmann) <i>Heterotermes indicola</i> (Wasmann)	Indian Plywood Industries Research & Training Institute, Sarsuna, Kolkata- 700 061.
Insecta: Isoptera	13	13	<i>Amitermes messinae</i> (Fuller, 1922) <i>Microtermes mycophagus</i> (Desneux, 1906) <i>Amitermes gallagheri</i> Chhotani, 1988)	Department of Biology, Faculty of science, Jazan University, Jazan, Saudi Arabia Continuation

Faunal Groups	No. of specimens received	Number of specimens identified	Name of the identified species	Name of the Institution availed the service
Insecta: Lepidoptera	03	03	<i>Mythimna separata</i> Walker, 1865	B.P.S. Agricultural College, Purnea.
Insecta: Lepidoptera (Images)	18	18	<i>Ariadne merione</i> <i>Catopsilia Pomona</i> <i>Gandaca harina</i> <i>Hypolimnas misippus</i> <i>Junonia almana</i> <i>Junonia atlites</i> <i>Junonia iphita</i> <i>Leptosia nina</i> <i>Mycalesis nr. Gotama</i> <i>Papilio demoleus</i> <i>Papilio polytes male</i> <i>Papilio polytes female</i> <i>Pareronia valeria hippia</i> <i>Phalanta phalantha</i> <i>Spindasis vulcanus</i> <i>Zizeeria karsandra</i>	BSI, Kolkata
Insecta: Lepidoptera	06	06	<i>Paraponyx</i> sp. <i>Euproctis</i> sp. <i>Deroca</i> sp. <i>Argina astrea</i> Drury, 1773 <i>Hulodes drylla</i> Guenee, 1852 <i>Olepa clavatus</i> (Swinhoe, 1885)	Central Research for Jute and Allied fibres (ICAR), Kolkata-700120 (W.B.).
Insecta: Lepidoptera	15	15	<i>Daphnis nerii</i> (Linnaeus, 1758) <i>Adoxophyes epipepla</i> (Lower, 1908) <i>Dasychira mendosa</i> (Hubner, 1823) <i>Euproctis xanthorrhoea</i> (Kollar, 1848) <i>Adoxophyes</i> sp. <i>Archips</i> sp. <i>Anomis flava</i> Fabricius, 1775 <i>Cnaphalocrocis</i> sp. <i>Euproctis virguncula</i> Walker, 1855 <i>Paraponyx fluctuosalis</i> (Meyrick, 1899) <i>Chrysodeixis</i> sp. <i>Cnaphalocrocis latimarginalis</i> (Hampson, 1891) <i>Jamides alecto</i> (Felder, 1860) <i>Rapala pheretima</i> (Hewitson, 1863)	College of Agriculture, Tripura
Insecta: Lepidoptera	10	08	<i>Cnaphalocrocis medinalis</i> (Guenee, 1854) <i>Cnaphalocrocis poeyalis</i> (Boisduval, 1833)	Department of Agril. Entomology UBKV, Pundibari, Cooch Behar, West Bengal

Faunal Groups	No. of specimens received	Number of specimens identified	Name of the identified species	Name of the Institution availed the service
			<i>Omiodes indicata</i> (Fabricius, 1775)	
Insecta: Lepidoptera	02	02	<i>Acherontia styx</i> (Westwood, 1847) Damaged specimen	Ahmednagar College, Ahmednagar, Maharashtra
Insecta: Lepidoptera	40	40	<i>Acraea terpsicore</i> (Linnaeus, 1758) <i>Ariadne ariadne</i> (Linnaeus, 1763) <i>Belenois aurota</i> (Fabricius, 1793) <i>Castalius rosimon</i> (Fabricius, 1775) <i>Catopsilia pomona</i> (Fabricius, 1775) <i>Catopsilia pyranthe</i> (Linnaeus, 1758) <i>Cepora nerissa</i> (Fabricius, 1775) <i>Colotis amata</i> (Fabricius, 1775) <i>Danaus chrysippus</i> (Linnaeus, 1758) <i>Danaus genutia</i> (Cramer, 1779) <i>Euploea core</i> (Cramer, 1780) <i>Eurema blanda</i> (Wallace, 1836) <i>Eurema brigitta</i> (Cramer, 1780) <i>Eurema hecabe</i> (Linnaeus, 1758) <i>Graphium agamemnon</i> (Linnaeus, 1758) <i>Graphium tereon</i> (C & R Felder, 1865) <i>Hypolimnas misippus</i> (Linnaeus, 1764) <i>Junonia lemonias</i> (Linnaeus, 1758) <i>Melanitis leda</i> (Linnaeus, 1758) <i>Pachliopta aristolochiae</i> (Fabricius, 1775) <i>Pachliopta hector</i> (Linnaeus, 1758) <i>Papilio demoleus</i> (Linnaeus, 1758) <i>Papilio polytes</i> (Linnaeus, 1758) <i>Spindasis vulcanus</i> (Fabricius, 1775) <i>Symphaedra nais</i> (Forster, 1771) <i>Tirumala limniace</i> (Cramer, 1790) <i>Ypthima huebneri</i> (Kirby, 1871) <i>Zizina otis</i> (Fabricius, 1787)	Tujaram Chaturchand College, Baramati, Pune
Insecta: Lepidoptera	32	32	<i>Acraea terpsicore</i> (Linnaeus, 1758) <i>Ariadne ariadne</i> (Linnaeus, 1763) <i>Catochrysops strabo</i> (Fabricius, 1793)	Arts, Science & Commerce College, Akurdi, Pune

Faunal Groups	No. of specimens received	Number of specimens identified	Name of the identified species	Name of the Institution availed the service
			<i>Catopsilia pomona</i> (Fabricius, 1775) <i>Catopsilia pyranthe</i> (Linnaeus, 1758) <i>Chilades pandava</i> (Horsfield, 1829) <i>Danaus chrysippus</i> (Linnaeus, 1758) <i>Euploeacore</i> (Cramer, 1780) <i>Euthaliaa conthea</i> (Cramer 1779) <i>Graphium agamemnon</i> (Linnaeus, 1758) <i>Hypolimnas bolina</i> (Linnaeus, 1758) <i>Hypolimnas misippus</i> (Linnaeus, 1764) <i>Junonia hierta</i> (Fabricius, 1798) <i>Junonia lemonias</i> (Linnaeus, 1758) Material examined: 1ex. Female <i>Melanitis leda</i> (Linnaeus, 1758) <i>Neptis hylas</i> (Linnaeus, 1758) <i>Pachliopta aristolochiae</i> (Fabricius, 1775) <i>Papilio polymnestor</i> (Cramer, 1775) <i>Papilio polytes</i> (Linnaeus, 1758) <i>Phalanta phalantha</i> (Drury, 1773) <i>Talica nyseus</i> (Giurin, 1843) <i>Tirumala limniace</i> (Cramer, 1790) <i>Udaspes folus</i> (Cramer, 1775)	
Insecta: Lepidoptera	08	08	<i>Papilio polytes</i> Linnaeus <i>Cephonodes hylas</i> (Linnaeus) <i>Danaus chrysippus</i> (Linnaeus) <i>Colias fieldii</i> Menetries <i>Pieris brassicae</i> (Linnaeus) <i>Delias eucharis</i> (Drury)	Institute of Biomedical & Natural Sciences, Dehradun.
Insecta: Lice	03	03	Lice	Centurion University of Technology and Management, Bhubaneswar
Insecta: Odonata	05	05	Odonates have been identified	Sreerampore College, West Bengal.
Insecta: Odonata	23	23	<i>Pseudagrion decorum</i> (Rambur, 1842) <i>Copera marginipes</i> (Rambur, 1842) <i>Brachythemis contaminata</i> (Fabricius, 1793) <i>Bradinopyga geminata</i> (Rambur, 1842)	Ahmednagar College, Ahmednagar

Faunal Groups	No. of specimens received	Number of specimens identified	Name of the identified species	Name of the Institution availed the service
			<i>Diplacodes trivialis</i> (Rambur, 1842) <i>Neurothemis tullia</i> (Drury, 1773) <i>Pantala flavescens</i> (Fabricius, 1798) <i>Trithemis aurora</i> (Burmeister, 1839) <i>Zyxomma petiolatum</i> Rambur, 1842.	
Insecta: Odonata	58	58	<i>Agriocnemis</i> sp. <i>Anax guttatus</i> (Burmeister, 1839) <i>Bradinopyga geminata</i> (Rambur, 1842) <i>Crocothemis servilia</i> (Drury, 1770) <i>Pantala flavescens</i> (Fabricius, 1798) <i>Pseudagrion</i> sp <i>Trithemis aurora</i> (Burmeister, 1839) <i>Trithemis festiva</i> (Rambur, 1842)	Ahmednagar College, Ahmednagar, Maharashtra
Insecta: Orthoptera	05	05	<i>Pteronemobius (Pteronemobius) p anteli</i> Hebard, 1913 -	Dept. of Zoology, West Bengal State University.
Insecta: Orthoptera	03	03	<i>Oxya hyla</i> Serville, 1831 <i>Oxya</i> sp.	Dep. of Zoology, Mohishadal Raj College, Purba Medinipur, West Bengal.
Insecta: Orthoptera	02	02	<i>Atractomorpha crenulata</i> (Fabricius, 1793) <i>Atractomorpha</i> sp	Dep. of Zoology, Serampore College, Hooghly.
Insecta: Orthoptera	01	01	<i>Schizodactylus monstrosus</i> (Drury, 1773)	Dep. of Zoology, Science College, Kokraghar, Assam.
Insecta: Orthoptera	03	03	<i>Acrotylus humbertianus</i> Saussure, 1884. <i>Chrotogonus</i> (Ch.) tr. <i>trachypterus</i> (Blanchard, 1836) <i>Blattella germanica</i> (Linnaeus, 1767)	Dep. of Zoology, Vidyasagar University, Midnapur.
Insecta: Orthoptera	01	01	<i>Oxya</i> sp.	Dep. of Zoology, Serampore College, Hooghly.
Insecta: Orthoptera	09	09	<i>Oxya hyla</i> Servile, 1839. <i>Oxya nitidula</i> (Walker, 1870) <i>Oxya</i> sp. [Nymph].	Uttar Banga Krishi Viswavidyalaya, (Coochbehar), West Bengal
Insecta: Orthoptera	27	27	<i>Trilophidia annulata</i> (Thunberg, 1815) <i>Acrotylus</i>	Scott Christian College (autonomous) Nagercoil, Kanyakumari, Tamil Nadu.

Faunal Groups	No. of specimens received	Number of specimens identified	Name of the identified species	Name of the Institution availed the service
			<i>humbertianus</i> Saussure, 1884 <i>Diabolocatantops innotabilis</i> (Walker, 1870) <i>Phaneroptera (Ph.) gracilis</i> Burmeister, 1838 Gryllidae Acrididae	
Insecta: Orthoptera	01	01	<i>Atractomorpha crenulata</i> (Fabricius, 1793) -1ex	Dep. of Zoology, Bethune College
Insecta: Orthoptera: Acrididae	17	17	<i>Bradybaena similis</i> (Ferussac, 1822) <i>Chamalycaeus</i> sp. <i>Sinoenneaplangucula</i> (Benson, 1863) <i>Sinoennea</i> sp. <i>Stagnicola</i> sp. <i>Theobaldius tristis</i> (Blanford, 1869) <i>Trachia nilagirica</i> (Pfeiffer, 1846) <i>Trachia</i> sp. <i>Veronicella sloanii</i> (Cuvier, 1817)	Dept. of Zoology, A.S. Mandal's, Arts, Science & Commerce College, Taloda, Nandurbar, Maharashtra
Insecta: Orthoptera: Acrididae	14	14	<i>Gastrimargus africanus</i> (Saussure, 1888) <i>Tristria pulvinata</i> (Uvarov, 1921) <i>Leptacris filiformis</i> Walker, 1870 <i>Hieroglyphus banian</i> Fabricius, 1798 <i>Cyrtacanthacris tartarica</i> (Linnaeus, 1758) <i>Hieroglyphus banian</i> Fabricius, 1798 <i>Pyrgomorpha bispinosa</i> Walker, 1970 <i>Gastrimargus africanus</i> (Saussure, 1888)	BPHE Society's Ahmednagar College, Ahmednagar, Maharashtra
Insecta: Hymenoptera (Formicidae)	03	03	03 species of Ants	Vidyasagar University, West Bengal.
Land Mollusca	02	02	<i>Pupisoma orcula</i>	Department of Zoology University of Calcutta
Mammal (Bat) (Photographs)	01	01		Bikali College, Dudhnoi, Assam
Mammal, Rodent (Photographs)	02	02		Petigrew College, Ukhrul, Manipur.

Faunal Groups	No. of specimens received	Number of specimens identified	Name of the identified species	Name of the Institution availed the service
Mammalia	47	11	<i>Bos gaurus</i> Smith <i>Equus</i> sp. <i>Sus scrofa domesticus</i> Erxleben <i>Bubalus bubalis</i> (Linn) <i>Capra/Ovis</i>	Archaeological Survey of India, Excavation Branch III, Patna, Bihar
Mantodea (Insecta)	11	11	5 species of Hymenoptera	RTM Nagpur University, Nagpur
Marine confiscated material	24	24	<i>Turbinella pyrum</i> <i>Volegalae canaria</i> <i>Pleuroploca trapezium</i> <i>Lambis crocata</i> <i>Checoreus virgineus</i> <i>Pleuroploca filamentosa</i> <i>Semicassis canaliculata</i> <i>Harpulina lapponica</i> <i>Rapana rapiformis</i> <i>Bufo naria crumena</i> <i>Turbo brunneus</i> <i>Fusus forceps</i> <i>Monoplex vaspaeum</i>	Forest Department Maharashtra
Mollusca	24	24	7 species of freshwater Mollusca.	Tyagaraja College, Chennai
Mollusca	407	407	102 species of marine Mollusca	St. Xavier College, Palayamkottai, Tamil Nadu
Mollusca	48	48	14 species of freshwater mollusca	AVC, College, Mayavaram, Tamil Nadu
Mollusca	4	4	2 species of slug	Holy Cross College, Nagarcoil, Tamil Nadu
Mollusca	43	43	17 species of marine mollusca	Holy Cross College, Nagarcoil, Tamil Nadu
Mollusca	43	43	29 species freshwater mollusca.	Nehru Memorial College, Puthanampatti, Trichy, Tamil Nadu.
Mollusca	67	67	28 species of marine gastropods	Quaid-e-Milleth Govt. College, Chennai
Mollusca	1437	112	Mollusca : <i>Gabbia</i> sp. <i>Gyraulus</i> sp <i>Idiopoma dissimilis</i> (Muller) <i>Pila globosa</i> (Swainson) <i>Lamellidens marginalis</i> (Lamarck) <i>Filopaludina bengalensis</i> (Lamarck)	Archaeological Survey of India, Excavation Branch III, Patna, Bihar

Faunal Groups	No. of specimens received	Number of specimens identified	Name of the identified species	Name of the Institution availed the service
Mollusca (Gastropoda) images	05	05	<i>Conus pealii</i> <i>C.pusillus</i> <i>C.virgo</i> <i>C.textile</i> <i>C.tulipa</i>	Dr. N.V.Subba Roa, Ex-Scientist, ZSI
Mollusca	120	120	Mollusca	Centurion University of Technology and Management, Bhubaneswar
Mollusca	250	228	<i>Corbicula striatella</i> (Deshayes,1834) <i>Parreysia corrugata</i> Mueller,1774 <i>Parreysia favidens</i> (Benson,1862) <i>Parreysia triembolus</i> (Benson,1855) <i>Parreysi acorbis</i> (Benson,1856) <i>Lamellidens marginalis</i> (Lamarck,1822) <i>Lamellidenscorrianus</i> (Lea,1859) <i>Lamellidensconsobrinus</i> (Lea,1859) <i>Radiatula lima</i> (Simpson,1900) <i>Radiatula occata</i> (Lea,1860) <i>Radiatula andersoniana</i> (Nevil,1877) <i>Radiatula bonneaudi</i> (Eydoux,1838) <i>Filopaludina bengalensis</i> (Lamarck, 1822) <i>Radiatula cylindrica</i> (Annandale &Prashad, 1919) <i>Radiatula caerulea</i> (Lea, 1831) <i>Lamellidens jenkinsianus</i> (Benson, 1862) <i>Radiatula khadakvaslaensis</i> (Ray, 1966) <i>Lamellidens corrianus</i> (Lea, 1859) <i>Idiopoma dissimilis</i> (Mueller, 1774) <i>Tarebia lineata</i> (Gray, 1828) <i>Melanoides tuberculata</i> (Mueller, 1774) <i>Meiniplotia scabra</i> (Mueller, 1774) <i>Physella acuta</i> (Draparnaud, 1805) <i>Tarebia granifera</i> (Lamarck, 1816)	Gulbarga University, Karnataka
Mollusca	05	03	<i>Vanni malabarica</i> (Henderson, 1912) <i>Pila globosa</i> Swainson. 1822 <i>Pila virens</i> Lamarck, 1822	Hajee Karutha Rowther Howdia College, Uthamapalayam Theni, TN

Faunal Groups	No. of specimens received	Number of specimens identified	Name of the identified species	Name of the Institution availed the service
Mollusca	01	01	<i>Achatina fulica</i> (Ferussac, 1821)	Department of Zoology, D.G. Ruparel College, Senapati Bapat Marg, Matunga West, Mumbai
Mollusca	4	4		Shillong College
Mollusca (Bivalve)	01	01	<i>Perna viridis</i> (Linnaeus, 1758)	SRM Institute of Science and Technology
Mollusca (Cephalopoda)	04	04	<i>Sepiella inermis</i> <i>Uroteuthis duvauceli</i>	Ministry of Ayush, Govt. of India.
Mollusca (Fresh water)	27	27	<i>Filipaludina Bengalensis</i> <i>Gabbia orcula</i> <i>Bellamya crassa</i> <i>Thiara granifera</i> <i>Pila globosa</i> <i>Melanoides tuberculata</i> <i>Thaïra lineata</i> <i>Bithynia ceramiopoma</i> <i>B. pulchella</i> <i>Indoplanorbis exustus</i> <i>Gyraulus convexiculus</i>	Rani Lokmata Rashmoni Mission Nimpith Ashram, 24 Parganas
Mollusca (Fresh water) (Gastropoda)	17	17	<i>Gabbia orcula</i> <i>Filipaludina Bengalensis</i> <i>Pila virens</i> <i>Melanoides tuberculata</i> <i>Thaïra lineata</i> <i>Bithynia ceramiopoma</i> <i>Mecongia crassa</i> <i>Stenothyra ornata</i>	Murshidabad Raj College
Mollusca (Fresh water) (Gastropoda+Bivalvia)	15	15	<i>Radix rufescens</i> <i>Filipaludina bengalensis</i> <i>Pila virens</i> <i>Melanoides tuberculata</i> <i>Thaïra lineata</i> <i>Lamellidens marginalis</i>	dept. of Zoology, Kumaun University, Uttarakhand
Mollusca (Fresh water) (Gastropoda)	04	04	<i>Filipaludina Bengalensis</i> <i>Pila virens</i> <i>Melanoides tuberculata</i> <i>Thaïra lineata</i>	Shivaraju S/o Nagabhushanappa, Yaragunte village, Yelkur post, Madhugiri (T), Tumkur (D), Karnataka-572124

Faunal Groups	No. of specimens received	Number of specimens identified	Name of the identified species	Name of the Institution availed the service
Mollusca (Fresh water) (Gastropoda)	24	24	<i>Gabbia orcula</i> <i>Filipaludina Bengalensis</i> <i>Pila virens</i> <i>Melanooides tuberculata</i> <i>Thaira lineata</i> <i>Bithynia ceramiopoma</i> <i>Mecongia crassa</i> <i>Stenothyra ornata</i>	Sreerampore College.
Mollusca (Fresh water) (Gastropoda)	10	10	<i>Pila globosa</i> <i>Melanooides tuberculata</i> <i>Thaira lineata</i>	Dept of Zoology, Tripura University
Mollusca (Fresh water) (Gastropoda)	17	17	<i>Filipaludina Bengalensis</i> <i>Thiara granifera</i> <i>Pila virens</i> <i>Melanooides tuberculata</i> <i>Thaira lineata</i> <i>Bithynia ceramiopoma</i> <i>B.pulchella</i>	Dept. of Environmental Science, Calcutta University.
Mollusca (Fresh water)	258	258	<i>Bellamya bengalensis</i> (Lamarck, 1822) <i>Corbiculas triatella</i> (Deshayes, 1854) <i>Indoplanorbis exustus</i> (Deshayes, 1834) <i>Melanooides tuberculata</i> (Mueller, 1774) <i>Tarebia lineate</i> (Gray, 1828)	Dept. of Zoology, A.S. Mandal's, Arts, Science & Commerce College, Taloda, Nandubar, Maharashtra
Mollusca (Freshwater)	130	130	<i>Parreysia (Radiatula) caerulea</i> (Lea) <i>Parreysia (Parreysia) corrugata</i> (Mueller) <i>Tarebia lineata</i> (Gray) <i>Parreysia (Radiatula) caerulea</i> (Lea) <i>Lymnaea (Pseudosuccinea) acuminata</i> Lamarck <i>Melanooides tuberculata</i> (Mueller) <i>Bellamya bengalensis</i> (Lamarck) <i>Parreysia (Parreysia) corrugata</i> (Mueller) <i>Bellamya bengalensis</i> (Lamarck) <i>Tarebia lineata</i> (Gray) <i>Parreysia (Radiatula) caerulea</i> (Lea) <i>Tarebia lineata</i> (Gray) <i>Parreysia (Radiatula) caerulea</i> (Lea) <i>Melanooides tuberculata</i> (Mueller) <i>Melanooides tuberculata</i> (Mueller) <i>Parreysia (Radiatula) caerulea</i>	RIRD Y.C.I. of Science, Satara

Faunal Groups	No. of specimens received	Number of specimens identified	Name of the identified species	Name of the Institution availed the service
			(Lea) <i>Parreysia (Radiatula) caerulea</i> (Lea) <i>Parreysia (Radiatula) caerulea</i> (Lea) --- <i>Melanoides tuberculata</i> (Mueller) <i>Parreysia (Parreysia) corrugata</i> (Mueller) <i>Parreysia (Parreysia) corrugata</i> (Mueller) <i>Parreysia (Parreysia) corrugata</i> (Mueller) <i>Tarebia lineata</i> (Gray) <i>Parreysia (Parreysia) corrugata</i> (Mueller) <i>Corbicula striatella</i> Deshayes <i>Parreysia (Parreysia) corrugata</i> (Mueller) <i>Parreysia (Parreysia) corrugata</i> (Mueller) <i>Parreysia (Parreysia) corrugata</i> (Mueller) <i>Parreysia (Radiatula) caerulea</i> (Lea) <i>Melanoides tuberculata</i> (Mueller) <i>Tarebia lineata</i> (Gray) <i>Tarebia lineata</i> (Gray) <i>Bellamyia bengalensis</i> (Lamarck) <i>Melanoides tuberculata</i> (Mueller)	
Mollusca (Marine)	10	10	<i>Nassarius obesus</i> <i>N. olivaceous</i> <i>N. pullus</i> <i>N. stolatus</i> <i>Agaronia gibbosa</i>	GEER Foundation, Gujarat
Mollusca (Marine)	12	Nil	Nil	Bharathidasan University, Trichy
Mollusca images	05	05	<i>Macrochlamys indica</i>	Miss. Mallika, New Delhi, NGO
Mollusca images (Freshwater)	02	02	<i>Paracrostoma hugelii</i> <i>Corbicula striatella</i>	Burke Korol, Canada, Barrie, ON
Mollusca: Gastropoda	70	70	19	J.P. University Chhapra

Faunal Groups	No. of specimens received	Number of specimens identified	Name of the identified species	Name of the Institution availed the service
Mollusca: Pelecypoda	28	28	08	J.P.University Chhapra
Molluscs	152	152	Molluscs	Department of Marine science, Gopalpur College
Ophiuroidea	3	3	Ophiopleura sp. – 2 specimens. Ophioplinthus sp. – 1 specimen.	Wildlife Institute of India Chandrabani Dehradun, Uttarakhand
Opisthobranchia (Images)	02	02	<i>Pleurobranchia</i> sp. <i>Armina</i> sp.	NCSCM, Chennai
Pisces	09	09	<i>Tenualosa ilisha</i> (Hamilton, 1822) <i>Psettodes erumei</i> (Bloch & Schneider, 1801) <i>Netuma thalassina</i> (Rüppell, 1837) <i>Eridacnis radcliffei</i> Smith, 1913 <i>Lagocephalus guentheri</i> Miranda Ribeiro, 1915 <i>Leiognathus equulus</i> (Forsskal, 1775)	SRM Institute of Science and Technology, Chennai
Pisces	1	1	<i>Pygocentrus natterei</i> Kner, 1858 (Red bellied Piranha).	P.G and Research Department of Advanced Zoology & Biotechnology, School of Environment Toxicology & Biotechnology, Loyola College (Autonomus), Chennai-6000 034
Pisces	01	01	<i>Pangasianodon hypophthalmus</i> (Sauvage, 1878)	Eucare Pharmaceuticals Private Limited, SIDCO Industrial Estate,Thirumudivakkam, Chennai-600132
Pisces	01	01	<i>Heteropneustes longiptoralis</i>	Department of Fisheries Resource Management, Kerala University of Fisheries and Ocean Studies (KUFOS), Kochi 682506, India.
Pisces	9	9		Dept of Zoology, Shillong College
Pisces	226	226		Department of Life Sciences, Assam University, Silchar
Pisces	19	19		Deptt. Of Fishery Science, St. Anthony's College, Shillong

Faunal Groups	No. of specimens received	Number of specimens identified	Name of the identified species	Name of the Institution availed the service
Pisces	48	48	<i>Tenualosa ilisha</i> (Hamilon,1822) <i>Psettodes erumei</i> (Bloch & Schneider,1801) <i>Netuma thalassina</i> (Ruppell,1837) <i>Eridacnis radcliffei</i> Smith,1913 <i>Lagocephalus guentheri</i> Miranda Ribeiro,1915 <i>Leiognathus equulus</i> (Forsskal,1775) <i>Carangoides oblongus</i> (Cuvier, 1833) <i>Ostorhinchus aureus</i> (Lacepède, 1802) <i>Lutjanus vitta</i> (Quoy & Gaimard, 1824) <i>Plectorhinchus vittatus</i> Linnaeus,1758 <i>Alepes kleinii</i> (Bloch, 1793) <i>Nemipterus japonicas</i> (Bloch,1791) <i>Lutjanus fulvus</i> (Forster, 1801) <i>Leiognathus equulus</i> (Forsskal, 1775) <i>Johnius elongatus</i> Lalmohan,1976 <i>Narke dipterygia</i> (Bloch & Schneider, 1801) <i>Decapterus russelli</i> (Rüppell, 1830) <i>Tenualosa toli</i> (Valenciennes, 1847) <i>Trachinocephalus myops</i> (Forster, 1801) <i>Pomadasys maculatus</i> (Bloch, 1793) <i>Scolopsis vosmeri</i> (Bloch, 1792) <i>Apistus carinatus</i> (Bloch & Schneider, 1801) <i>Synodus indicus</i> (Day, 1873) <i>Upeneus targula</i> Richardson, 1846 <i>Lutjanus vitta</i> (Quoy & Gaimard, 1824) <i>Plotosus lineatus</i> (Thunberg, 1787) <i>Rogadius asper</i> (Cuvier, 1829) <i>Callionymus erythraeus</i> Ninni, 1934 <i>Thryssa malabarica</i> (Bloch, 1795) <i>Lutjanus quinquilineatus</i> (Bloch, 1790) <i>Minos mondactylus</i> (Bloch & Schneider, 1801)	SRM – Institute of Science and Technology, SRM University Chennai

Faunal Groups	No. of specimens received	Number of specimens identified	Name of the identified species	Name of the Institution availed the service
			<i>Pempheris mangula</i> Cuvier, 1829 <i>Uranoscopus marmoratus</i> Cuvier, 1829 <i>Psettodes erumei</i> (Bloch & Schneider, 1801) <i>Brevitrygon imbricata</i> (Bloch & Schneider, 1801) <i>Zebrias quagga</i> (Kaup, 1858) <i>Cynoglossus lingua</i> Hamilton, 1822 <i>Cynoglossus arel</i> (Bloch & Schneider, 1801) <i>Synaptura commersonnii</i> (Lacepède, 1802) <i>Pseudorhombus triocellatus</i> (Bloch & Schneider, 1801) <i>Bothus pantherinus</i> (Rüppell, 1830) <i>Bothus myriaster</i> (Temminck & Schlegel, 1846) <i>Jaydia lineata</i> (Temminck & Schlegel, 1842) <i>Secutor insidiator</i> (Bloch, 1787) <i>Siganus canaliculatus</i> (Park, 1797) <i>Siganus javus</i> (Linnaeus, 1766) <i>Uranoscopus affinis</i> Cuvier, 1829 <i>Aluterus monoceros</i> (Linnaeus, 1758)	
Pisces	02	02	<i>Labeo rohita</i> (Hamilton, 1822) <i>Channa striata</i> (Bloch, 1793)	Sarojini Naidu Vanita Mahavidyalaya, Hyderabad
Pisces	12	12	<i>Aplocheilichthys</i> sp. <i>Dawkinsia filamentosa</i> (Valenciennes, 1844) <i>Anguilla bengalensis</i> (Gray, 1831) <i>Mastacembelus armatus</i> (Lacepède, 1800) <i>Systomus sarana</i> (Hamilton, 1822) <i>Garra mullia</i> (Sykes, 1839) <i>Hypselobarbus kolus</i> (Sykes, 1839) <i>Devariomala baricus</i> (Jerdon, 1849) <i>Mystus vittatus</i> (Bloch, 1794) <i>Ompok malabaricus</i> (Valenciennes, 1840) <i>Etroplus suratensis</i> (Bloch, 1790) <i>Glossogobius giurus</i> (Hamilton, 1822)	Dr. Yogesh Koli, Lecturer, Kudal, Sindhudurg district, Maharashtra

Faunal Groups	No. of specimens received	Number of specimens identified	Name of the identified species	Name of the Institution availed the service
Pisces	01	01	<i>Catla catla</i> (Hamilton, 1822)	Mrs. Avni Parmar, Surat, Gujarat
Pisces	10	10	<i>Cyprinus carpio</i> Linnaeus, 1758 <i>Carassius auratus</i> (Linnaeus, 1758) <i>Poecilia reticulata</i> Peters, 1859	Annasaheb Magar Mahavidyalaya, Hadapsar, Pune
Pisces	04	04	<i>Dawkinsia filamentosa</i> (Valenciennes, 1844) <i>Salmostoma boopis</i> (Day, 1874) <i>Systemus sarana</i> (Hamilton, 1822) <i>Glossogobius giuris</i> (Hamilton, 1822)	Dr Yogesh Koli, Lecturer, Kudal, Sindhudurg district, Maharashtra
Pisces	40	40		Assam University, Silchar, Assam
Pisces (Freshwater)	12	12	<i>Aplocheilus panchax</i> (Hamilton, 1822)	Department of Zoology for UG and PG Studies, Serampore College, Serampore, Hoogly. West Bengal
Pisces (Freshwater)	02	02	<i>Clarias magur</i> (Hamilton, 1822)	PG Department of Zoology Ranchi University, Ranchi.
Pisces (Freshwater)	21	21	<i>Macrognathus pancalus</i> (Hamilton, 1822) <i>Barilius barila</i> (Hamilton, 1822) <i>B. bendelisis</i> (Hamilton, 1822) <i>B. vagra</i> (Hamilton, 1822) <i>Salmostoma bacaila</i> (Hamilton, 1822) <i>Pethia ticto</i> (Hamilton, 1822) <i>P. conchoni</i> (Hamilton, 1822) <i>Puntius sophore</i> (Hamilton, 1822) <i>Lepidocephalichthys guntea</i> (Hamilton, 1822) <i>Cirrhinus reba</i> (Hamilton, 1822)	Department of Biodiversity and Conservation of Natural Resource, University of Orissa.
Pisces : Freshwater	05	05	<i>Poecilia reticulata</i> Peters, 1859	JDM Scientific Research Organisation Pvt. Ltd.
Pisces: Scorpion fish	02	Nil	Nil	Presidency College, Chennai
Platyhelminthes/ Trematoda	02	02	<i>Paradiscogaster mannari</i> n.sp.	Andhra University, Vishakhapatnam, 530 003

Faunal Groups	No. of specimens received	Number of specimens identified	Name of the identified species	Name of the Institution availed the service
Platyhelminths/ Trematoda	01	01	<i>Isoparirchis hypselobagri</i> (Billet, 1838)	ICAR/ Central Inland Fisheries Research Institute, Barrackpore, W.B.
Protozoa (35 samples of soil samples)	17	17	7 species; 3 genera belonging to 2 family of 2 orders	News, Kolkata
Reptile (Photographs)	01	01		Divisional Forest Officer, Jaintia Hills Division, Meghalaya
Reptilia	1427	30	<i>Gavialis</i> sp. <i>Trionyx</i> sp. <i>Lissemys</i> sp	Archaeological Survey of India, Excavation Branch III, Patna, Bihar.
Reptilia photograph	01	01	<i>Hemidactylus leschenaulti</i> (Dumeril & Bibron, 1836)	Shri. Pranav Pradeep, Student from Mumbai
Reptilia (Image)	01	01	<i>Psammophilus blanfordanus</i>	P. Sriraman, Chennai Resident
Reptilia (Image)	02	02	<i>Lissemys punctata</i>	Kuvempu University, Karnataka .
Reptilia: Squamata: Sauria One photo of skin of monitor lizard	01	01	<i>Varanus flavescens</i> (Yellow Monitor lizard)	Central Bureau of Investigations, New Delhi
Rotifera	13	13	<i>Brachionus caudatus</i> Barrios & Daday, 1894 <i>Brachionus diversicornis</i> Daday, 1883 <i>Brachionus forficula</i> Wierzejski, 1891 <i>Brachionus falcatus</i> Zacharias, 1898 <i>Keratella tropica</i> (Apstein, 1907) <i>Euchlanis dilatata</i> Ehrenberg, 1832 <i>Mytilina ventralis</i> Ehrenberg, 1830 <i>Lecane luna</i>	P G Collecge, Jhansi (UP).
Sponges (Marine)	08	07	<i>Phakettia ridleyi</i> (Dendy, 1887) <i>Axinella donnani</i> (Bowerbank, 11873) <i>Mycale (Aegogropila) crassissima</i> (Deny, 1905) <i>Gelliodes carnosus</i> Dendy, 1889	KLE College of Pharmacy, Bangaluru

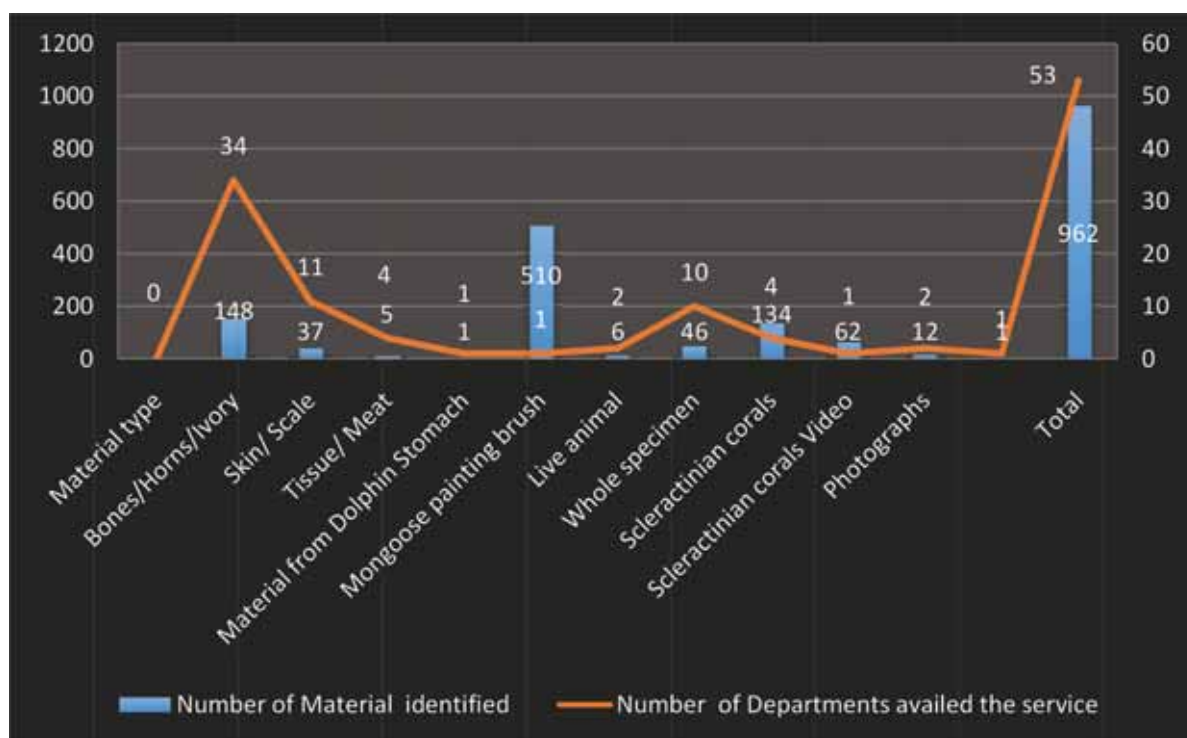
Faunal Groups	No. of specimens received	Number of specimens identified	Name of the identified species	Name of the Institution availed the service
			Hyattella cribriformis (Hyatt, 1877)	
Sponges : Freshwater	2	2	Eunapius carteri (Bowerbank, 1863) Corvospongilla caunteri Annandale, 1911	Dr. Himanshu Saha Scientist ICAR-CIFRI (Barrackpur), WB
Stromatopod	01	01	<i>Lysiosquilla</i> sp.	SRM Institute of Science and Technology
Zooplankton (Rhizopod, Rotifera, Cladocera, Copepoda)	16	16	Rhizopoda <i>Arcella</i> sp <i>Centropyxis spinosa</i> <i>Centropyxis aculeate</i> Rotifera <i>Asplanchna brightwelli</i> <i>Brachionus diversicornis</i> <i>Brachionus forficula</i> <i>Lecane (M) bulla</i> <i>Lecane luna</i> <i>Mytilina ventralis</i> Cladocera <i>Ceriodaphnia cornuta</i> <i>Alona rectangular</i> <i>Macrothrix spinosa</i> <i>Alona guttata</i> <i>Alona quadrangularis</i> <i>Biapertura karua</i> Copepoda <i>Heliodiaptomus</i> sp <i>Mesocyclops</i> sp <i>Diaptomus</i> sp	Department of Life Sciences, Tikaram Yadav Smriti P.G. College, Moth, Jhansi, Uttar Pradesh-284402
35 groups (including 35 images)	7445	4630	506	151

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IDENTIFICATION OF CONFISCATED WILDLIFE MATERIALS

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

ZSI Hq & Regional Centres had received about 962 confiscated wildlife materials of animal remains and photographs from 53 Departments for providing identification.



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

Details of Identification of Confiscated Wildlife Materials by the Scientist during 2019-2020

Material type	No. of material received	No. of material identified	Species involved along with their Schedule in IWPA, 1972	Departments availed the service
Ivories	1	1	Asiatic Elephant <i>Elephas maximus</i> Schedule- I	Forest department, Kurseong forest division, West Bengal
Mongoose painting brush	22	22	Grey Mongoose <i>Herpestes edwardsii</i> Schedule- II	Judicial Magistrate, Coimbatore, Tamil Nadu
Skin of squirrel	1	1	Northern Palm Squirrel <i>Funambulus pennantii</i>	Forest department, Berhampur south range, West Bengal
Ivories	30	30	Elephant	Wildlife Crime Control Bureau (ER), West Bengal
Pangolin scales	One lot	One lot	Indian Pangolin <i>Manis crassicaudata</i> Schedule- I	Police department, Kasba Police station, West Bengal
Pangolin scales	One lot	One lot	Pangolin <i>Manis crassicaudata</i> Schedule- I	Police department, Baruipur Range, West Bengal
Leopard skin & skull	2	2	Leopard <i>Panthera pardus</i> Schedule- I	Forest department, Darjeeling wildlife division, West Bengal
Pangolin skin (1) Horn (1) Leopard skin (1) & skull (1)	4	4	Chinese Pangolin <i>Manis pentadactyla</i> Schedule- I Greater One-horned Rhinoceros <i>Rhinoceros unicornis</i> Schedule- I Leopard <i>Panthera pardus</i> Schedule- I	Forest department, Jaldapara National Park, West Bengal
Hooves	4	4	Greater One-horned Rhinoceros <i>Rhinoceros unicornis</i> Schedule- I	Forest department, Jaldapara North Range, West Bengal
Mongoose painting brush	488	488	Grey Mongoose <i>Herpestes edwardsii</i> Schedule- II	District Municipality Judicial Magistrate, Coimbatore, Tamil Nadu
Horn	1	1	Could not be determined	Police department, Kharibari police station, West Bengal

Material type	No. of material received	No. of material identified	Species involved along with their Schedule in IWPA, 1972	Departments availed the service
Pangolin scales (1 lot) Flat skin (8) Ivories (3) Skull & bone (3) Cheek teeth (1) Raw hairs (8 bags)	25	21	Indian Pangolin, <i>Manis crassicaudata</i> (Schedule- I) Tiger, <i>Pantheratigris</i> , (Schedule- I) Leopard, <i>Pantherapardus</i> (Schedule- I) Clouded Leopard, <i>Neofelis nebulosi</i> (Schedule- I) Asiatic Elephant, <i>Elephas maximus</i> (Schedule- I) Sloth Bear, <i>Melursusursinus</i> (Schedule- I) Asiatic Black Bear, <i>Ursusthibetanus</i> (Schedule- II) Wild Pig, <i>Susscrofa</i> (Schedule- III)	Forest department, Baikunthapur division, West Bengal
Shawl	6	6	Tibetan Antelope, <i>Pantholopshodgsonii</i> (Schedule- I)	Customs department, Air cargo export, New Delhi
Horn	1	1	Fake material	Forest department, Jalpaiguri division, West Bengal
Antlers with upper jaw	2	2	Spotted Deer <i>Axis axis</i> (Schedule- III)	Police department, Jadavpur Police station, West Bengal
Tiger skin	1	1	Tiger, <i>Pantheratigris</i> Schedule- I	Forest department, Wildlife Crime Control Cell & Data management Unit, West Bengal
Fake skin of Crocodile	1	1	Nil	Maharashtra (Thane) Police Department
Tokay Gecko	1	1	Tokay Gecko (<i>Gekko gekko</i>) Schedule IV CITES Appendix II	DFO, Nadia-Murshidabad, Forest Dept, Govt of West Bengal
Tokay Gecko	1	1	Tokay Gecko (<i>Gekko gekko</i>) Schedule IV CITES Appendix II	Range Officer, Raidighi, Forest Dept, Govt of WB
Tokay Gecko	1	1	Tokay Gecko (<i>Gekko gekko</i>) Schedule IV CITES Appendix II	Wildlife Crime Control Unit, HQ, Forest Dept, Govt of West Bengal.

Material type	No. of material received	No. of material identified	Species involved along with their Schedule in IWPA, 1972	Departments availed the service
]One lot of confiscated material have been received (Gastropoda)	24	24	1 species <i>Pleuroploca trapezium</i> (Linn.)	Deputy conservator of Forest(T), Solapur Forest Division, Solapur Maharashtra
Photographs	09	09	Red Sandboa <i>Eryx johnii</i> (Russell, 1801) Alexandrine Parakeet <i>Psittacula eupartia</i> (Linnaeus, 1766) Indian tent turtle <i>Pangshura tentoria</i> (Gray, 1834) Red Sandboa <i>Eryx johnii</i> (Russell, 1801) Spectacled cobra <i>Naja naja</i> (Linnaeus, 1758) Rat Snake <i>Ptyas mucosa</i> (Linnaeus, 1758) Common sand boa <i>Eryx conicus</i> (Schneider, 1801) Rat snake <i>Ptyas mucosa</i> (Linnaeus, 1758)	DCF (WL) Mumbai
Scleractinian corals	6	6	Schedule I Part (IV) A	Tamil Nadu Forest Department
Scleractinian corals	40	40	Schedule I Part (IV) A	Wildlife Crime Control Bureau
Scleractinian corals & Holothurions	37 + 10	37 + 10 Videos	Schedule I Part (IV) A	Wildlife Crime Control Bureau
Scleractinian corals videos	28 + 6	28 + 6	Schedule I Part (IV) A	Wildlife Crime Control Bureau
Scleractinian corals	11	11	Schedule I Part (IV) A	Tamil Nadu Forest Department and Wildlife Crime Control Bureau
Scleractinian corals videos	22 + 4	22 + 4	Schedule I Part (IV) A	Wildlife Crime Control Bureau
Scleractinian corals videos	01	01	Schedule I Part (IV) A	Wildlife Crime Control Bureau
Scleractinian corals videos	01	01	Schedule I Part (IV) A	Wildlife Crime Control Bureau
Scleractinian (Hard) corals, Alcyonarians (Soft Corals) and Zooanthids	13 + 4 + 2	13 + 4 + 2	Schedule I Part (IV) A	Wildlife Crime Control Bureau

Material type	No. of material received	No. of material identified	Species involved along with their Schedule in IWPA, 1972	Departments availed the service
Poriferans	03	03	Non-Scheduled sponges	Wildlife Crime Control Bureau
Scleractinian and Gorgonian Corals	6 +1	6 +1	Schedule I Part (IV) A	Wildlife Crime Control Bureau
Processed specimen	02	02	Schedule in W(P)A, 1972- Part IV-C	Gulf of Mannar Marine National Park, Forest
Processed Seacucumber- <i>Holothuriscabra</i>	04	04	Schedule-I protection act 1972.	RangeRaghuvaran, RFO, Gulf of Mannar National Park, Thoothukudi, Tamil Nadu
Material from Dolphin Stomach	01	01	Schedule-I protection act 1972.	GoMBR office of Forest Department
Peeled Dried frog specimens	02	02	It was difficult to identify due to lack of identifiable morphological characters. The specimens were dried, skin peeled; snout, fingers and toes chopped.	Range Forest Officer of the Shillong Protection Range, Dept. of Forest, Govt of Meghalaya.
Photographs of live seized birds	02	02		Directorate of Revenue Intelligence, Kolkata Zonal Unit.
Seized packet of one whole body and few feathers of bird	01	01		Range Officer, Berhampore South Range, Directorate of Forests, Govt. of West Bengal.
Witness in court related to confiscated material.	01	01		Dr. G. Maheswaran, Scientist E & O/C Bird Section has appeared in Alipore court on 5 th September, 2019.
Scleractinian Coral cases	2	2	Inanimate materials imitating Scleractinian corals	Shri. S. Suresh Forest Range Officer (I/C) Coimbatore Range Coimbatore 641043
Scleractinian corals	2	2	Favia sp.	Shri. K.R. Kannan, B.A., B.L. Judicial Magistrate No. VI, Coimbatore 641018, TN
Concrete mixture consisting Scleractinian Corals	01	01	Scleractinian corals (Rubble form)	Shri. P. Naveenkumar, IFS DCF, Wildlife Division, Haddo, Port Blair, AN
Tokay Gecko, <i>Gekko gekko</i> (Linnaeus, 1758]	01	01	Tokay Gecko, <i>Gekko gekko</i> (Linnaeus, 1758] Schedule IV	Forest Range Officer, Berhampore South Range, Murshidabad, West Bengal

Material type	No. of material received	No. of material identified	Species involved along with their Schedule in IWPA, 1972	Departments availed the service
One fake Crocodile	01	01		Sub-Inspector of Police, Anti Extorsion Cell, Crime Branch, Court Naka, Police Parade Ground, Thane City (West): 400601, Maharashtra.
Dry skeletal parts (bones) found from digging of abandoned village hut of Bodai village, Amdanga, North 24 Parganas, W.B. Incomplete skeleton (Skull – without teeth except first premolars Mandibles both sides with canines and cheek teeth (incisors and last molars missing) Vertebrae –total 19 vertebrae including Atlas and Axis vertebra Ribs - 12 Pectoral girdles - two Humerus -2 Radius -1 ulna -1 Pelvic girdle -2 Femur -2 Tibia -2 fibula -1 sacrum -1)	01	01	Asian Palm Civet, <i>Paradoxurus hermaphroditus</i> (Pallas), W(P)A Schedule II	Animal Resources Development and Parishad Officer, North 24 Parganas, Govt. of West Bengal.
Scales	01	01	Order Pholidota: Family Manidae	Pune Police, Maharashtra
Horn samples	05	05	Family Cervidae which is in Schedule III of Wildlife Protection Act, 1972	Tasgaon Police Station
Horn samples	02	02	Family Cervidae which is in Schedule III of Wildlife Protection Act, 1972	Hinjewadi Police Station, Pune, Maharashtra
Scales	01	01	Class Mammalia; Order Pholidota	Navghar Police Station, Thane, Maharashtra
Skins	03	03	Skins of Blackbuck (<i>Antilope cervicapra</i>)	Police Dept. Washim district, Maharashtra

Material type	No. of material received	No. of material identified	Species involved along with their Schedule in IWPA, 1972	Departments availed the service
Ivory and skin	03	03	Schedule I Elephant tusks (ivory) , one leopard skin and one fake tiger skin	Crime Branch Police, Thane
Ivory	01	01	Fake elephant tusk	Dattawadi Police Station, Pune city
Skin, head and meat pieces	01	01	One skin, head and meat pieces of Monitor Lizard (<i>Varanus bengalensis</i>)	Range Forest Officer, Malkapur, Shahuwadi, Kolhapur district, Maharashtra.
Skin	01	01	Skin of Leopard (<i>Panthera pardus</i>), which is in Schedule I of Wildlife (Protection) Act, 1972	Forest dept., Alibaug, Maharashtra
Skin	01	01	Skin of leopard (<i>Panthera pardus</i>)	Police Department, Chiplun Tal, Ratnagiri district, Maharashtra
Skin	01	01	Fake skin of tiger (<i>Panthera tigris</i>)	Police Department, Pune, Maharashtra
Ivory	01	01	Elephant ivory (<i>Elephas maximus</i>)	Police Department, Mumbai, Maharashtra
Ivory	01	01	Elephant ivory (<i>Elephas maximus</i>)	Police Department, Thane, Maharashtra
Skin	01	01	Skin of leopard (<i>Panthera pardus</i>)	Police Department, Ulhasnagar, Maharashtra
Confiscated bird specimens	01	01	Bird	Wildlife Inspector, Wildlife Crime Control Bureau, Kochi, Kerala
Skin	01	01	Skin of leopard (<i>Panthera pardus</i>) which is in schedule I of Wildlife Protection Act, 1972	Mumbai Police dept. Maharashtra
Skin	01	01	Skin of Blackbuck (<i>Antilope cervicapra</i>) schedule I	Thane Police dept. Maharashtra
Skin	01	01	Fake skin of tiger (<i>Panthera tigris</i>)	Thane Police dept. Maharashtra
Skin	01	01	Skins of Blackbuck (<i>Antilope cervicapra</i>) Schedule I and two skins of Chital (<i>Axis</i>)	Pune Police dept. Maharashtra

Material type	No. of material received	No. of material identified	Species involved along with their Schedule in IWPA, 1972	Departments availed the service
			axis) which is in Schedule III of Wildlife Protection Act,1972	
Ivory	02	02	Fake ivory	Police Department, Pune, Maharashtra
Ivory	01	01	Fake ivory	Forest Department, Thane, Maharashtra
Skins	04	04	Skins and two pairs of horns, which were that of Mammalia: Family Bovidae: Subfamily: Antilopinae (Antelope), Schedule I	Police Department, Mumbai, Maharashtra
Horns	02	02	Horns of Blackbuck (<i>Antilope cervicapra</i>), Schedule I	Police Department, Pune, Maharashtra
Confiscated Turtle images			Turtle	Wildlife Crime Control Bureau, Regional Office, Ernakulam, Kerala
Live birds	5 pairs	5 pairs	Psittacuserithacus(African Grey Parrot) - Exotic birds. Not listed in IWPA,1972	Additional Director General, Directorate of Revenue Intelligence, Kolkata Zonal Unit
Body remains	01	01	Sloth bear (<i>Melursus ursinus</i>)-listed as Schedule -I in IWPA, 1972.	Shri Gaurav Ojha, IFS, DFO cum- Deputy Director, Valmiki Tiger Reserve, Division 2, Bettiah, West Champaran, Bihar 845438
Suspected Pangolin scales	01	01	Indian pangolin (<i>Manis crassicaudata</i>)- listed as Schedule -I in IWPA, 1972.	Shri Bipul Kumar Sarkar, Sub Inspector, New Jalpaiguri Police Station, GRPS, Siliguri (GRP), West Bengal 734004
Unidentified skull	01	01	Skull identified as cattle. (not listed in IWPA,1972)	Divisional Forest Officer, Kurseong Forest Division, Dowhill, Kurseong, West Bengal
Unidentified claws	02	02	01- Identified as <i>Panthera tigris</i> 01- <i>Melursus ursinus</i> ; Both species listed as Schedule -I in IWPA, 1972.	Dr. K.A. Subramanian, Scientist D & Officer-in-Charge, Southern Regional Centre, Zoological Survey of India, Chennai
Suspected elephant ivories	01	01	Asiatic Elephant (<i>Elephas maximus</i>). listed as Schedule -I in IWPA, 1972.	Shri Thomas Basumatary, Joint Commissioner, Directorate of Revenue

Material type	No. of material received	No. of material identified	Species involved along with their Schedule in IWPA, 1972	Departments availed the service
				Intelligence, Siliguri Regional Unit, DeyBhawan, Ashutosh Mukherjee Road, Collegepara, Siliguri 734001, Distt. Darjeeling, West Bengal
Suspected elephant ivories	01	01	Asiatic Elephant (<i>Elephas maximus</i>). listed as Schedule -I in IWPA, 1972.	Shri Thomas Basumatary, Joint Commissioner, Directorate of Revenue Intelligence, Siliguri Regional Unit, DeyBhawan, Ashutosh Mukherjee Road, Collegepara, Siliguri 734001, Distt. Darjeeling, West Bengal.
Water samples and viscera	01	01	Indian Rhinoceros (<i>Rhinoceros unicornis</i>) listed as Schedule -I in IWPA, 1972.	DFO, Gorumara Forest Division
Viscera	01	01	Wild Pig; listed as Schedule -III in IWPA, 1972	DFO, Gorumara Forest Division
Putrified tissue	01	01	Paddy Field Pipit (<i>Anthus rufulus</i>). listed as Schedule -IV in IWPA, 1972.	DFO, Berhampore South range, Murshidabad, West Bengal
Putrified tissue	01	01	Jungle cat (<i>Felis chaus</i>); listed as Schedule -I in IWPA, 1972.	DFO, Berhampore South range, Murshidabad, West Bengal
Suspected Elephant Tusk, sculptures and statues, remnant cut pieces of assorted sizes of idols	34	34	Asiatic Elephant (<i>Elephas maximus</i>). listed as Schedule -I in IWPA, 1972.	Additional Director General, Directorate of Revenue Intelligence, Kolkata Zonal Unit
Rescued lion cub	01	01	Asiatic lion (<i>Panthera leo persica</i>); listed as Schedule -I in IWPA, 1972.	West Bengal Zoo Authority and the Wildlife Crime Control Unit of WB Forest Deptt.
Body parts of almost decomposed carcass of a suspected tiger	01	01	Bengal Tiger (<i>Panthera tigris tigris</i>). listed as Schedule -I in IWPA, 1972.	Range Officer, Law cell, South 24 Parganas, 12, Biplabi Kanailal Bhattacharjee Sarani, New Administrative Building, 4th Floor, Alipore, Kolkata- 700 027, West Bengal
Elephant Tusk, ivory articles and tiger	20	20	Asiatic Elephant (<i>Elephas maximus</i>) and Bengal tiger.	Additional Director General, Directorate of Revenue

Material type	No. of material received	No. of material identified	Species involved along with their Schedule in IWPA, 1972	Departments availed the service
canines			Both listed as Schedule -I in IWPA, 1972.	Intelligence, Kolkata Zonal Unit
Tissue	01	01	Cheloniamydas(Green Sea-turtle); listed as Schedule -I in IWPA, 1972.	Deputy Conservator of Forests, Wildlife Division, Haddo, Port Blair Andaman & Nicobar
Tissue	01	01	Varanusflavescens(Yellow monitor); listed as Schedule -I in IWPA, 1972.	Divisional Forest Officer, Gorumara Wildlife Division, AranyaBhawan, Jalpaiguri, West Bengal
Skin piece	01	01	Pantherapardus (Leopard). listed as Schedule -I in IWPA, 1972.	Divisional Forest Officer, Gorumara Wildlife Division, AranyaBhawan, Jalpaiguri, West Bengal
Suspected scales	01	01	Manis crassicudata(Indian Pangolin);listed as Schedule -I in IWPA, 1972.	Principal Chief Conservator of Forests, HQ, BikashBhawan, North Block, Third Floor, Salt Lake City, Kolkata 700 091
Suspected scales	01	01	Manispentadactyla(Chinese Pangolin). listed as Schedule -I in IWPA, 1972.	Divisional Forest Officer, Gorumara Wildlife Division, AranyaBhawan, Jalpaiguri, West Bengal
Suspected scales	01	01	Manis crassicudata(Indian Pangolin);listed as Schedule -I in IWPA, 1972.	Shri G. Bhattacharya Sub-inspector, 27B Bosepukur Station, Kasba police station Kolkata-42
Meat sample	01	01	Axis axis (Chital deer) listed as Schedule -III in IWPA, 1972.	Shri UmaprasadMondol, Forest Ranger, Forest Range Office, Bhagwatpur Range, District South -24 Parganas, West Bengal on
Suspected tiger tooth	01	01	Bengal Tiger (Pantheratigristigris); listed as Schedule -I in IWPA, 1972.	Deputy Director, Directorate of Revenue Intelligence, Kolkata Zonal Unit 8, Ho Chi-Minh Sarani, Kolkata 700071
Total	966	962		53

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Scientists of ZSI have been participating in important International meetings, Symposiums and Expeditions

INTERNATIONAL PARTICIPATION

Sl. No.	Name of Scientists	Centre Name	Programme / Meeting Attended
1	Dr. Kailash Chandra, Director,	ZSI, Kolkata	Participated in the "8 th International Barcode of Life Conference" held at Trondheim Norway from 15 th to 23 rd June 2019. Three papers and posters were presented on the occasion from ZSI.
2	Dr. Basudev Tripathy, Scientist-E	ZSI, Kolkata	Participated in the 4 th International Workshop on the Science and Conservation of Horseshoe Crabs, Qinzhou & Beihai, Guangxi, China from 15 th to 20 th June 2019 and presented lead talk on "Potential habitat requirement of horseshoe crabs <i>Carcinoscorpius rotundicauda</i> and <i>Tachypleus gigas</i> in North-east coast of India.
3	Dr. Kailash Chandra, Director	ZSI, Kolkata	Participated as Scientific Authority on Animal Committee of Indian Delegation in the CITES COP-18 at Geneva, Switzerland from 21 st to 26 th August 2019 and attended the proceeding of the 'Proposals for the Amendment of Appendices I & II, as well as intervened India's position at various agenda items.
4	Dr. Mukesh Thakur, Scientist-C	ZSI, Kolkata	Participated in the International Symposium on Galliformes organized by the World Pheasant Association, held at Dong Hoi, Quang Binh province, Vietnam from 23 rd to 24 th September 2019.
5	Dr. Bineesh, K.K., Scientist-D	ANRC,ZSI Port Blair	Participated in the IUCN Shark Specialist Group Deep-Sea Red List Workshop at vVancouver, Canada from 18 th – 22 nd November 2019.
6	Dr. C. Raghunathan, Scientist-E	ZSI, Kolkata	Participated in the ICRI/GCRMN Regional Workshop for South Asia Sea Region (SASR) on 'Regional Data Analysis of Coral Reef Monitoring' to be held at Male, Republic of Maldives from 28 th to 29 th January 2020 and presented 'Status of Coral Reefs of India – ZSI's initiatives on monitoring' as country presentation.
7	Dr. Mukesh Thakur, Scientist-C	ZSI, Kolkata	Participated 4th Annual Meeting in Conservation Genetics - from Genomes to Application" held at the Senckenberg Research Institute and Natural History Museum, Frankfurt am Main from 26 th to 28 th February 2020.

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SEMINARS, CONFERENCES & WORKSHOPS ATTENDED BY SCIENTISTS

During the year, scientists of ZSI have been actively involved in many important scientific activities like Workshops, Conferences, and Symposiums.

Workshops (26)

1. Dr. Kailash Chandra, Director and Dr. B. Sinha attended a capacity Building Workshop under National Mission of Himalaya Studies at Itanagar, Arunachal Pradesh from 30th March, 2019 to 1st April, 2019.
2. Dr. Kailash Chandra, Director, Dr. C. Raghunathan and Dr. C. Sivaperuman attended an "International Workshop on Social Network of Animals in Extreme Environment of Antarctica with special reference to Penguins" organised jointly by Zoological Survey of India, and Ministry of Earth Sciences at Port Blair, Andaman & Nicobar Island from 22nd to 24th April 2019.
3. Dr. B. Sinha participated in the Brain Storming cum Workshop "Conservation & Management of High Altitude Wetlands in the Indian Himalaya" held at GBPNIHESD, Kosi-Katarmal, Almora on 8th May 2019 as an invitee.
4. Dr. H. S. Banyal attended a Workshop on Preparation of DPR for Rejuvenation of Luni River through forestry Interventions organized by AFRI (ICFRE) at Jodhpur on 27th May, 2019.
5. Dr. Avtar Kaur Sidhu and Dr. Archana Bahuguna attended "One-day workshop on Cold Desert Biosphere Reserve for the preparation of UNESCO MAB net document" at Himalayan Forest Research Institute (HFRI), Shimla on 26th July, 2019 and actively participated in the discussion session on Entomological fauna of Cold desert.
6. Dr. Kailash Chandra, Director and Dr. C. Raghunathan attended the one day workshop on Faunal Diversity of Chilka Lagoon and Foundation Stone Laying ceremony for Chilka Museum at Gopalpur from 25th to 27th July, 2019.
7. Dr. Sanjeev Kumar and Dr. H. S. Banyal attended National Workshop on Air Quality Monitoring jointly organized by Deptt. of Zoology & Environmental Sciences of Lachoo Memorial College of Science & Technology (LMCS & T) and Society for Indoor Environment (SIE), New Delhi with Global Strategic Communication Council at Lachoo Memorial College of Science & Technology, Jodhpur on 30th August, 2019.
8. Dr. B.H. C. Murthy attended workshop from 5th September to 10th September 2019 to assess the status of reptiles of South Asia organized by Zoo Outreach, Coimbatore at Karl Kubel Institute, Anaikatti, Coimbatore in collaboration with the IUCN.
9. Dr. B. Sinha participated in the Regional workshop for R&D collaboration between ZSI, BSI & GBNIHESD at Gangtok, Sikkim on 9th September 2019.
10. Dr Archana Bahuguna participated in workshop SECURE Himalaya on 19th September 2019, organized by Forest Department H.P., sponsored by GEF, UNDP and State Forest Department Himachal Pradesh.
11. Dr. Kailash Chandra, Director, Dr. C. Raghunathan, Dr. Basudev Triptahy and Dr. Santosh Kumar attended the Regional Workshop on "Conservation and Management of Wetland (Eastern States)" organised by ZSI under the aegis of the National River Conservation Directorate of the MOEFCC from 26th to 27th September 2019. A field visit to Sundarban Biosphere Reserve was also organised during the programme.
12. Dr. Kailash Chandra, Director attended the workshop to celebrate Ganga River Dolphin Day, jointly organized by National Mission for Clean Ganga (NMCG), Wildlife Institute of India (WII) and World Wide Fund at New Delhi on 5th October 2019.
13. Dr. Pratyush P. Mohapatra was invited as a resource person for the workshop on 'Working Plan Units of Madhya Pradesh for mainstreaming forestry biodiversity issues in the working plan' on 7th November, 2019 organized by Madhya Pradesh State Biodiversity Board in association with forest department.
14. Dr. Sanjeev Kumar and Dr. H. S. Banyal attended two days' Workshop for Preparing of Rajasthan State Biodiversity Strategy and

Action Plan organized by Rajasthan State Biodiversity Board, Jaipur at Rajasthan Forestry & Wildlife Training Institute, Jaipur on 30th & 31st December 2019.

15. Dr. Kailash Chandra, Director attended the 'Consultative Workshop on Animal Inclusive Disaster Risk Reduction (AiDRR)' held at National Institute of Disaster Management, Ministry of Home Affairs, New Delhi on 9th January, 2020 and chaired a session on "Challenges and Gaps with respect to DRR for Livestock and Stray Animals.
16. Dr. K. A. Subramanian and Dr. R. Venkitesan participated in E-PBR brainstorming workshop at National Biodiversity Authority, Chennai on 9th to 10th January 2020 and provided inputs for creating taxonomic architecture for proposed E-PBR software.
17. Dr. Kailash Chandra, Director and Dr C. Satyanaraya attended the National Workshop on 'Biorock Restoration and Deployment of Biorock Structure' organised by Zoological Survey of India and Gujarat Forest Department at Gulf of Kachchh, Gujarat from 17th January, 2020 to 19th January, 2020.
18. Dr. Sreeraj, C.R. participated in National Workshop "Fundamentals of Animal Taxonomy" at Nehru Arts and Science College, Kannur University, Kerala on 18th January, 2020. Also, training on Fish Taxonomy was given to the College students.
19. Dr. R. Venkitesan participated in "Training cum Workshop on the development of IT Monitoring Tool" under the Indo-German partnership ABS project from 20th to 23rd January, 2020 at Chennai.
20. Dr. U. Saikia attended as resource person a workshop on "Field techniques and taxonomy of bats" organized by the Dept of Zoology, Gauhati University between 21st to 23rd January 2020.
21. All the Officer-in- Charge of the sections of ZSI Headquarters participated as resource persons in the 'Orientation Workshop on Methodology for Collection, Preservation and

Curation of Zoological Specimens for Biodiversity Studies' at Zoological Survey of India, Kolkata on 23rd to 24th January, 2020.

22. Dr. Jasmine.P attended the international capacity Building workshop on Ocean Acidification (ICBWOA) conducted at IISER, Kolkata with the representation of 8 countries participants and resource persons from 26th to 29th January, 2020.
23. Dr U. Saikia attended workshop on "Hands on basic bioinformatics and sequence analysis training using bioinformatics tools as a faculty development programme" organized by Bioinformatics infrastructure facility of Gauhati University between 3rd to 6th Feb., 2020
24. Dr. Kailash Chandra, Director attended the Workshop on 'Impact on Minimum Ecological Flows in Downstream of Reservoir on Riparian Ecosystem (Aquatic Life) Along River Ganga' organised by Central Pollution Control Board, at New Delhi on 6th February, 2020.
25. Dr. Marimuthu N. 2020. Keynote Lecture presented on "Statistical applications in Intertidal and Subtidal ecosystems" during the program, National level Workshop on Intertidal Ecology and Climate Change (IECC 2020) at Satyabama University, Chennai on 13th February, 2020.
26. Dr. Gaurav Sharma participated in the "Workshop on Himalayan Knowledge Network fostering sustainable development in the Indian Himalayan Region (IHR)" organized by GB Pant National Institute of Himalayan Environment (GBNIHE) in partnership of ICIMOD held at Uttarakhand State Council for Science and Technology (UCOST), Dehradun from 27th to 28th February, 2020.

Conferences (14)

1. Dr. C. Raghunathan attended the International Conference and Exhibition on Integrated Coastal Zone Management: Lessons Learned and Relevance for India, 9th to 11th July, 2019 at NCSCM, Chennai.

2. Dr. Sambath attended Regional Research Conference of Central India, 2019 (RRC) organized by the Tropical Forests Research Institute, (TFRI), Jabalpur on 23rd August, 2019.
3. Dr. Kailash Chandra, Director attended the 7th HSCA International Conference on "Chemical, Physical and Biological Sciences" as Chief Guest at Chitkara University, Himachal Pradesh on 20th October 2019.
4. Dr. G. Maheswaran attended an International Conference on "Wetlands and Migratory water birds of the Asian Flyways" organized by Bombay Natural History Society (BNHS) from 18th to 22nd November, 2019 at Lonavala, Maharashtra and delivered a talk on ecology of Black-necked Stork.
5. Dr. Raghunathan, Dr. Dhriti Banerjee, Dr. Rajmohana, Dr. Anjum N. Rizvi, Dr. Santosh Kumar, Dr. Vikas Kumar, Dr. D. S. Suman and Dr. Kumud Tyagi co-chaired the scientific session during the National Conference on Vector born and zoonotic diseases' held from 25th to 26th November, 2019 at ZSI.
6. Dr. Muhamed Jafer Palot attended the 6th World Owl Conference on 30th November 2019 at Savitribai Phule Pune University organized by Ela Foundation, Savitribai Phule Pune University and the Maharashtra State Forest Department from 29th November to 2nd December 2019.
7. Dr. Jasmine.P participated in the Sixth biennial conference of Ocean Society of India: OSICON-2019, Indian Ocean Processes and Resources: A key to Blue Economy from 12th to 14th December, 2019.
8. Dr. Honey U K Pillai participated in the International Conference on Frontiers in Marine Science - Challenges and Prospects" held at Cochin University of Science and Technology, Kochi from 16th to 20th December, 2019 and presented the research paper.
9. Mrs. Jayita Sengupta participated in "International Conference on Sustainable Environment and Healthcare" organised by Dr. Tarak Nath Podder Memorial Foundation, in collaboration with Centre for Disaster Preparedness & Management, Jadavpur University, Chittaranjan National Cancer Institute, Kolkata, India and Lincoln University College, Malaysia held at 21st to 22nd December, 2019.
10. Dr. Basudev Tripathy gave three talks on "Marine Biodiversity and Challenged Coast of Odisha" in the National Conference on Advances in Zoology-2019, Utkal University, Bhubaneswar; on Marine turtle conservation and management in India" on National conference during "Trends and progress of animal sciences-2019", P.G. Dept. of BS & BT, Fakir Mohan University, Balasore, Odisha and on "Conservation of sympatric species of Horseshoe Crabs of Odisha" on National Conference on Coastal Ocean-Atmosphere Science & Technology (COAST 2020), Berhampur University, Odisha.
11. Dr. Kailash Chandra, Director chaired a session in the "107th Indian Science Congress: Pride of India Expo" held at the University of Agriculture Sciences (UAS), Bangalore from 3rd to 5th January, 2020.
12. Dr. Satyanarayana attended an International Conference on Biodiversity and Ecological Restoration organized by Department of Advanced Zoology and Biotechnology at Quaid-E-Millath Government College for Women, Chennai-2 from 30th to 31st January, 2020.
13. Dr. Kailash Chandra, Director and Dr. Gaurav Sharma attended the "14th Uttarakhand State Council for Science and Technology Congress 2019-20" organized and held at Uttarakhand State Council for Science and Technology (UCOST), Dehradun from 27th to 29th February, 2020.
14. Dr. Anil Mohapatra and Dr. Aftab Ahmad participated in National Conference on Coastal Ocean-Atmosphere Science and Technology, 28th February to 1st March, 2020 held at Marine Science Department, Berhampur University, Bhanja Vihar, Ganjam, Odisha.

Seminars and Symposia (16)

1. Dr. U. Saikia attended "National seminar on biotechnology impacting lives" at the Institute of Bioresource and Sustainable Development, DBT at Shillong on 24th April, 2019.
2. Dr. M. E. Hassan attended "One-day seminar on Right to Information Act, 2005" on 3rd May, 2019 conducted by Institute of Secretariat Training and Management (ISTM), New Delhi.
3. Dr. Avtar Kaur Sidhu attended as Chief Guest the seminar organized at MSME, Chambaghat, Solan on 26th June, 2019 during Swacchta Pakhwara and delivered a guest lecture on "Management of Solid, Liquid and E-Waste from Industries".
4. Dr. D. S. Suman has attended "WIPO-IPO PCT ROVING Seminar" on Intellectual Property Rights (IPR), Patent Cooperation Treaty (PCT) at Hotel Hindustan International, Kolkata on 26th June, 2019.
5. Dr. R. H. Raina attended National Seminar on Entomology Issues and Opportunities at BGSB University Rajouri Jammu and Kashmir from 29th to 30th July, 2019 and delivered an Invited Lecture on Pollinating bees and their role in pollination ecology in Indian Himalaya at School of Bioscience, Deptt. of Zoology, BGSB University Rajouri (J & K).
6. Dr. Uttam Saikia delivered an invited talk on "Diversity & conservation of the bat fauna of Meghalaya: Do caves hold the key?" in the International Seminar on the role of research in Biodiversity Conservation at Lady Keane College, Shillong on 24th October, 2019.
7. Dr. Kailash Chandra, Director attended the seminar on the faunal diversity of central highlands was organised at CZRC, ZSI, Jabalpur on 25th October 2019. Mrs. Manju Pandey, Joint Secretary, MOEF&CC, New Delhi inaugurated the habitat showcases of faunal diversity of Central Highlands.
8. Dr. Gaurav Sharma, Dr. Anil Kumar, and Dr. V.M. Sathish Kumar, had participated in "A workshop cum Symposium on Traditional and Modern Animal Taxonomy and IPR issues for Biodiversity Protection and Conservation" organized and held at Dolphin (PG) Institute of Biomedical and Natural Sciences, Dehradun in collaboration with ZSI and ICAR-IISWC, Dehradun from 25th to 29th November, 2019.
9. Dr. Pratyush P. Mohapatra and Shri G. Ramesh participated in "International Seminar on Biodiversity and Climate Change" organized at St. Joseph's College, Devagiri, Kozhikode on 4th January, 2020.
10. Ms. Supriya. Nandy attended the Symposium on Deep Time Biodiversity of West Bengal organized by the Geological Studies Unit, Indian Statistical Institute, Kolkata on 27-28th January, 2020 and delivered lecture on Pleistocene vertebrates of Susunia, West Bengal on 28th January, 2020.
11. Dr. Sheela. S. Section chaired the technical session in a national seminar organized by Social Environmental and Biological Association on "Water conservation and harvesting: Focusing Biodiversity issues and management" at Indian Institute of Chemical Engineers, Jadavpur on 8th February, 2020.
12. Dr. Marimuthu N. attended National Seminar on Avenues of Research in Biology at Fatima College (Madurai Kamaraj University), Madurai on 12th February, 2020.
13. Dr. Aftab Ahmad participated in the National seminar on Advances and Challenges in Biological Sciences held on 12th to 13th February, 2020 at P.G. Department of Zoology, Berhampur University BhanjaVihar, Ganjam, Odisha.
14. Dr. M. E. Hassan participated in the "National Seminar on Advancement of Biology in 21st Century". Organized by Department of Zoology Visva-Bharati University, Santiniketan, West Bengal held from 27th to 28th February 2020.
15. Dr. Suranjana Banerjee made oral presentation of the paper in the National Seminar on Advancement of Biology in 21st Century held in the Department of Zoology, VisvaBharati University, Santiniketan, West Bengal from 28th to 29th February, 2020.

16. Dr. Sanjeev Kumar attended and delivered a talk as an invited speaker on Ethology of urban avian species and conservation strategies in the Thar Desert landscape in the National Symposium on Animal Behavior Focal Theme: Avian Ethology at Deptt. of Environmental Sciences, M. D. S. University, Ajmer, Rajasthan on 6th March, 2020. Dr. Kumar also presided over as Co-Chair Person in the Technical Session VI-(A).

Trainings (5)

1. Ms. Debashree Dam attended training programme on Right to Information Act organised by Indian Secretariat Training & Management (ISTM), New Delhi on 3rd May 2019.
2. Dr. Kamalakannan M., attended training programme on the ISRO Sponsored NNRMS Certificate Course on 'Remote Sensing & GIS applications in Forest Resources and Ecosystem Analysis' from 13th May, 2019 to 5th July, 2019 (2 months) at the Indian Institute of Remote Sensing, ISRO, Dehradun.
3. Dr. Saipari Sailo attended 5 days training on "Forestry sector in Disaster Risk Reduction & Climate Resilience" at TFRI, Jabalpur from 5th to 9th August 2019.
4. Dr. K. Valarmathi attended a DST sponsored training programme on 'Socio-Economic impact assessment of S&T Outcomes' for Women Scientists / Technologists from 18th to 22nd November, 2019 at CSIR-HRDC, Ghaziabad.
5. Imran Alam attended a training course on Use and Application of SPSS going to be held at Indian Statistical Institute, Kolkata from 27th January 2020 to 31st January 2020.

Meeting/Events (85)

1. Dr. Kailash Chandra, Director and Dr. K. Rajmohana attended the "National Review Meet (NRM) of ENVIS under the chairmanship of Hon'ble Secretary in MoEF&CC, New Delhi

on 2nd April, 2019 regarding Green Skill Development Programme and National Environment Survey-a grid-based decision support System (NES-GRIDSS).

2. Dr. Jasmine attended the Arctic review meeting held at Goa on 5th to 6th April, 2019 at NCPOR, Goa.
3. Dr. C. Raghunathan attended the 24th meeting of the Committee on Introduction of Exotic Aquatic Species to Indian Waters, Ministry of Agriculture and Farmer's Welfare, Department of Fisheries, New Delhi on 9th April, 2019.
4. Dr. Kailash Chandra, Director, Dr. C. Raghunathan and Dr. Santosh Kumar attended the All India Coordinated Project on Taxonomy (AICOPTAX) Screening Committee Meeting for scrutinizing fresh projects in IPB, MoEFCC, Jor Bagh, New Delhi on 12th April, 2019.
5. Dr. K. Rajmohanaparticipated in a meeting on 12th April, with ISRO officials for signing MoU on Survey Mobile Apps..
6. Dr. Kailash Chandra, Director and all the Officers attended the Annual Programme of Research: 2019-2020, Meeting of Senior Officials of Headquarters and Regional Centres for the Review of Completed, Ongoing, and New Research Programmes of Zoological Survey of India atZSI, HQs. from 15th to 16th April, 2019.
7. Dr. B. Sinha attended the Arunachal Pradesh Forest Research committee meeting in the office of PCCF, Itanagar on 23rd April, 2019.
8. Dr. Navneet Singh attended a meeting with Sh. R.K. Verma, PCCF Wildlife and Chief Wildlife Warden, Jharkhand at Van Bhawan, Ranchi on dated 24th April, 2019.
9. Dr. U. Saikia, Dr. D. Khynriam and Sh. A. B. Meetei attended an orientation programme on Government e-procurement through GeM at North Eastern Indira Gandhi Regional Institute of Health and Medical Sciences, Shillong on 29th April, 2019.

10. Dr. Kailash Chandra, Director, Dr Rajmohana and Dr Devanshu Gupta attended the meeting, organised by Prof. Parthib Basu, Director, Centre for Pollination Studies, Calcutta University and Scientists of ZSI, Kolkata to discuss regarding studies on Insect Pollinators and MSc/P.G. Diploma in Integrated Animal Taxonomy by ZSI at Baini Prashad Hall on 1st May, 2019.
11. Dr. C. Sivaperuman, attended meeting with Deputy Commissioner, South Andaman in connection with the allotment of land for NCRRI on 3rd, 6th and 7th May 2019.
12. Dr. Kailash Chandra, Director attended the 56th Central Insecticides Board Meeting at New Delhi on 7th May, 2019.
13. Dr. Kailash Chandra, Director, Dr. C. Raghunathan and Dr Avtar Kaur attended the "All India Coordinated Project on Taxonomy (AICOPTAX) Screening Committee Meeting" at High Altitude Regional Centre, Zoological Survey of India, Solan, Himachal Pradesh from 14th to 17th May, 2019.
14. Dr. C. Sivaperuman, attended Institutional Animal Ethics Committee meeting to review ongoing research work using animals at Central Island Agricultural Research Institute, Port Blair on 15th May 2019.
15. Dr. Kailash Chandra, Director attended the meeting chaired by Shri Ravi Aggarwal, IAS, Additional Secretary, MoEFCC, New Delhi and presentation were made on the progress and activities of ZSI on 24th May, 2019.
16. Dr. C. Raghunathan attended the first meeting of the Task Force constituted with reference to the Marine Mammal by- catch and the related international obligations at Ministry of Agriculture and Farmer's Welfare, Department of Fisheries, New Delhi on 28th May 2019.
17. Dr. Kailash Chandra, Director attended the Eco-Sensitive Zone (ESZ) Expert Committee Meeting at Indira Paryavaran Bhawan, JorBagh Road, MOEFCC, New Delhi on 3rd June, 2019 under the chairmanship of Shri Ravi S Prasad, Additional Secretary, MOEFCC, New Delhi for the finalization of draft notification ESZ.
18. Dr. Kailash Chandra, Director, Dr. C. Raghunathan, Dr G.Maheswaran and Dr Basudev Tripathy attended the 'World Environment Day' celebration programme at Indira Paryavaran Bhawan, JorBagh Road, MOEFCC, New Delhi on 6th June, 2019. Two books published by ZSI, '*Animal Discoveries-2018*' and '*Faunal Diversity of Mangrove Ecosystems in India*' were released by Hon'ble Minister, Shri Prakash Javadekar, Hon'ble Minister of State, MOEFCC, Shri Babul Supriyo, and Shri CK Mishra IAS, Secretary, MOEFCC on the occasion.
19. Dr. N. Sharma attended State Level Steering Committee Meeting on 07 June, 2019 for State Level Plan to secure Red Panda habitats in the state of Arunachal Pradesh in collaboration with WWF.
20. Dr. C. Raghunathan attended the meeting for Development of a scale of compensation for imposing environmental compensation to deal with cases of illegal sand mining' held at Central Pollution Control Board (CPCB), New Delhi on 20th June 2019.
21. Dr. Kailash Chandra, Director and Dr C. Raghunathan attended the 3rd steering committee of AICOPTAX at Annandale Hall, HQs., ZSI, Kolkata on 27th June, 2019.
22. Dr. B. Sinha attended the 11th State Level Steering Committee Meeting of Dehang Dibang Biosphere Reserve in the conference room of the CS, Govt. of Arunachal Pradesh on 27th June, 2019.
23. Dr. Kailash Chandra, Director attended the 'Economic Planning and Statistics Celebrating Statistics Day' at Plenary Hall, Vigyan Bhawan, Maulana Azad Road, New Delhi from 28th to 30th June, 2019 with the theme Sustainable Development Goals.
24. Dr. C. Raghunathan attended the consultation cum brainstorming meeting on *Biodiversity Beyond National Jurisdiction* organized by CMLRE, Ministry of Earth Sciences, Kochi from 1st to 2nd July 2019.

25. Dr. C. Raghunathan attended the meeting with the Commissioner, Andhra Pradesh Capital Region Development Authority at Amaravati, Andhra Pradesh on 3rd July 2019 for the allocation of land of ZSI to establish the Eastern Ghats Regional Centre at Amaravati.
26. Dr. C. Sivaperuman attended the meeting with Conservator of Forests (Head Quarters), Department of Environment and Forests on 3rd, 4th and 10th July 2019 in connection with the preparation of research proposal for submission under the world bank forestry projects.
27. Dr. Kailash Chandra, Director attended a meeting with Dr. S.S. Bajaj, Add. Principal Chief Conservator of Forest, State Forest Research and Training Institute, Raipur, Chhattisgarh to discuss "Protect Proposal on Studies on the District wise Faunal Diversity and Faunal Diversity of Protected Area in Chhattisgarh (Phase-II)" at ZSI, HQs., Kolkata on 5th July, 2019.
28. Dr. C. Raghunathan attended the National meeting of the Task Force with reference to marine mammals by-catch and the related international obligations held at Ministry of Agriculture and Farmer's Welfare, New Delhi on 5th July 2019.
29. Dr. Kailash Chandra, Director attended as an expert member the Research Advisory Committee Meeting at CMLRE, Cochin on 7th to 8th July, 2019.
30. Dr. Kailash Chandra, Director participated in the discussion in a meeting with Hon'ble Minister, MoEF&CC, New Delhi on 9th July, 2019.
31. Dr. Anjum N. Rizvi was deputed to attend the Eco-Sensitive Zone meeting at MoEF&CC on 18th July, 2019.
32. Dr. Santosh Kumar attended the meeting held on the 18th July at the PCCF Office, Aranya Bhawan, Salt Lake, Kolkata regarding the discussion on the sites and technologies used for drainage management in Kolkata.
33. Dr. C. Raghunathan attended the Third Regional Consultation meeting with State Biodiversity Boards held at Kolkata on 19th July 2019 organized by National Biodiversity Authority, MoEF&CC.
34. Dr. C. Raghunathan attended the meeting of Sunderban B R chaired by Minister on 22nd July, 2019.
35. Dr. K. Rajmohanaas deputed by Director, ZSI, attended a meeting organised by ENVIS secretariat, on Key Biodiversity Areas, on 29th July, 2019.
36. Dr. C. Sivaperuman attended meeting with the Secretary (Tourism) and Director (Tourism) in connection with the opening of the new dive sites at North Bay, South Andaman on 31st July 2019.
37. Dr. Kailash Chandra, Director attended the "Expert Committee on ESZ under MoEF&CC, New Delhi" for identifying the changes of land use pattern at ground level based on-site inspection in Mount Abu, Rajasthan from 31st July to 3rd August, 2019.
38. Dr. C. Raghunathan attended the Steering Committee meeting to fix the qualified landscape consultancy work for Botanical Garden of Indian Republic (BGIR) at MoEF&CC, New Delhi on 1st August 2019.
39. Dr. Kailash Chandra, Director attended the review meeting related to the exhibition during COP-14 at MoEF&CC, New Delhi on 9th August, 2019.
40. Dr. Kailash Chandra, Director Attended the 14th Conference of Parties to the United Nations Convention to Combat Desertification (UNCCD-COP-14) from 1st to 3rd September, 2019 and from 6th to 10th September, 2019, organised at India Expo Mart, Greater Noida, (UP), Delhi NCR. Hon'ble Prime Minister of India, Shri Narendra Modi inaugurated the high-level segment of the Conference. A gallery of zoological specimens showcasing major fauna of the desert ecosystem was also installed in the exhibition.
41. Dr. Kailash Chandra, Director attended the 6th Meeting of Steering Committee of R&D

- Scheme on Conservation Development at MoEF&CC, New Delhi on 16th August, 2019.
42. Dr. C. Raghunathan attended the 27th Annual General Meeting of SACON Society on 24th August 2019 at SACON Society, Coimbatore, Tamil Nadu under the presidentship of Shri. Prakash Javadekar, Hon'ble Minister for Environment, Forest and Climate Change.
 43. Dr. Anjum N. Rizvi was deputed to attend sixth meeting of the "Inter-Ministerial Group on Environmental-Economic Accounting-India" held under the chairmanship of Director General (Social Statistics), NSO on 28th August 2019, New Delhi.
 44. Dr. K. Rajmohana attended Ph.D. Research Advisory committee meeting, to be held on 29th August, at Dept. of Zoology, Calcutta University.
 45. Dr. Kailash Chandra, Director attended the 73rd Annual General Body meeting of 'The Zoological Society, Kolkata' on 30th August 2019 at Ballygunge Circular Road, Kolkata.
 46. Dr. C. Raghunathan attended the board meeting of the West Bengal State Biodiversity Board on 2nd September 2019 at Kolkata.
 47. Dr Kailash Chandra, Dr C. Raghuanthan, Dr G. Maheswaran, Dr Avtar Kaur, Dr. Sanjeev Kumar, Dr Basudev Tripathy and Dr Mukesh Thakur participated as the side event participant at the United Nations Convention to Combat Desertification (UNCCD)-CoP-14 meeting and exhibition from 14 August to 13th September, 2019 at India Expo Centre and Mart, Knowledge Park II, Greater Noida, Delhi-NCR, India.
 48. Dr. Kailash Chandra, Director attended the meeting at Botanical Survey of India, Salt Lake, Kolkata on 4th September, 2019.
 49. Dr. Indu Sharma and Dr. H. S. Balyal participated in "Farmers Fair cum Farm Innovation Meet 2019" at Central Arid Zone Research Institute (CAZRI), Jodhpur on 16th September, 2019.
 50. Dr. Kailash Chandra, Director attended as an external examiner for the final PhD thesis evaluation and public defence of Shri Malay Shukla at Faculty of Doctoral Studies and research, Gujarat Forensic Sciences University, Gandhinagar, Gujarat, India from 16th to 17th September, 2019.
 51. Dr. C. Sivaperuman attended the meeting in connection with the Crocodile Conflict and mitigation on 20th September 2019 under the Chairmanship of PCCF & Principal Secretary, ANI.
 52. Dr. S.D. Gurumayum attended a consultative meeting for upcoming multi disciplinary expedition at Dibang Wild Life sanctuary, Upper Dibang valley, Arunachal Pradesh, chaired by PCCF (Wild Life) Dr. M Surya Prakash at Itanagar on 24th September 2019.
 53. Dr. K. Rajmohana attended ABS meeting by NBA, on 26th September, 2019
 54. Dr. P.J. Sethy attended the project review meeting of West Bengal Biodiversity Board on 26th September, 2019 at Prani Sampad Bhawan, Salt Lake City, Kolkata.
 55. Dr. C. Raghunathan attended the Eco-Sensitive Zone Expert Committee meeting to discuss the progress of Eco-Sensitive Zone for finalization of draft notification at MoEFCC, New Delhi on 30th September, 2019.
 56. Dr. C. Sivaperuman attended meeting under the Chairmanship of Principal Chief Conservator of Forests & Principal Secretary (Environment and Forests), Department of Environment and Forests, Port Blair on 3rd October 2019 in connection with the Smart City Green Cover.
 57. Dr.Narender Sharma attended Arunachal Pradesh State Forest Research Committee meeting on 13th October, 2019 at PCCF Office, Itanagar.
 58. Dr. Kailash Chandra, Director, Dr. C. Raghunathan Dr. K. Rajmohana and Dr Anjum N. Rizvi attended the 2nd National Consultation of the National Mission on Biodiversity and Human Well-Being was organised at Bani Prasad Hall, ZSI HQs. on 14th October, 2019.

59. Dr. Kailash Chandra, Director, Dr C. Raghunathan, Dr. Anjum N. Rizvi, Dr Avtar Kaur, Dr P.C.Pathania and Dr. Devanshu Gupta attended the event of the Book release of 'Fauna of Punjab' at Raj Bhawan, Chandigarh on 19th October, 2019.
60. Dr. Kailash Chandra, Director attended the 7th Meeting of Steering Committee on R&D scheme of MOEFCC at Indira Paryavaran Bhawan, New Delhi on 24th October, 2019.
61. Dr. Santosh Kumar, Scientist D attended the Annual General Meeting of the Society of IBSD, Imphal, Manipur, under the chairmanship of Dr. Harsh Vardhan, Hon'ble Union Minister for Science and Technology and Earth Sciences, held on 1st November, 2019 at 10.40 AM at the CSIR Science Centre, Lodhi Road, New Delhi.
62. Dr. Kailash Chandra, Director Dr. C. Raghunathan and all Officer-in-Charge of Regional centres attended the half yearly monitoring meeting and RAMC meeting at WGRC, Kochi from 7th to 9th November 2019.
63. Dr. D S Suman has attended a meeting organized by Central Insecticide board of India, Nirman Bhawan, New Delhi on 15th November, 2019.
64. Dr. C. Raghunathan attended the 9th Meeting of Technical and Financial Appraisal Committee on R & D Scheme at MoEFCC, New Delhi on 18th November 2019 to present the final technical report for the grant-in-aid project entitled, 'Reproductive Biology of Scleractinian corals in Andaman and Nicobar Islands'.
65. Dr. R. Bano attended Town Official Language Implementation Committee (TOLIC) meeting at CAZRI, Jodhpur on 22nd November, 2019.
66. Dr. P.S. Bhatnagar and party participated in 14th KRISHITHON International Agriculture Trade Fair and Conference held at Nashik, Maharashtra from 21st to 25th November 2019.
67. Dr. K. Rajmohana attended a meeting with Prof. Parthiba Basu, Dept. of Zoology, Calcutta University, on 22nd November, 2019, organising Pollinator Taxonomy workshops soon after the Asian Pollinator meet on 2nd to 3rd March 2019.
68. Dr. C. Raghunathan attended the 30th meeting of the State Level Steering Committee for Sunderban Biosphere Reserve Management held at Department of Forest, Government of West Bengal on 3rd December, 2019.
69. Dr. C. Raghunathan attended the meeting on preparation of DPR on Tranche – I of ENCORE at ICZM office in Institute of Environmental Studies and Wetlands Management, Department of Environment, Govt. of West Bengal on 6th December, 2019.
70. Dr. Kailash Chandra, Director attended the meeting, under the chairmanship of the Additional Secretary, MoEFCC at New Delhi on 13th December, 2019 regarding the progress of ZSI.
71. Dr. Kailash Chandra, Director attended the meeting of National River Conservation Directorate at Ministry of Jalshakti at New Delhi on 16th December, 2019.
72. Dr. C. Raghunathan attended the 38th Eco-sensitive Zone Expert Committee meeting to discuss the proposals of Eco-Sensitive Zone for finalization of draft notification at MoEFCC, New Delhi on 17th December, 2019.
73. Dr. Satyanarayana, Shri. C. Surendar, and Rajendar Kumar attended the event showcasing the activities of MBRC, ZSI, through marine exhibits, in an Awareness event organized by Cognizant Outreach, a voluntary organization of the "Cognizant IT Firm", under an initiative "Earthling" on 21st December 2019 at Cognizant Thoraipakkam, OMR, Chennai.
74. Dr. C. Raghunathan attended the Research Advisory Committee Meeting at West Bengal Biodiversity Board, Kolkata on 2nd January, 2020.
75. Dr. S.D Gurumayum attended 3rd meeting of XXII State Board of Wildlife Arunachal Pradesh Conference Hall of Chief Minister's Office, Chaired by Honorable CM Mr Pema Kandu on 10th January, 2020.

76. Dr. Kailash Chandra, Director attended the meeting for a stakeholder consultation on 'Post-2020 Global Biodiversity Framework' at MoEFCC, New Delhi on 16th January, 2020 to centre stage as a new 10-year strategic Plan for Biodiversity under the Convention on Biological Diversity.
77. Dr. Kailash Chandra, Director attended the Steering/Technical Evaluation Meeting at New Delhi from 16th to 17th January, 2020.
78. Dr. C. Raghunathan attended the seventh meeting of the 'Inter-Ministerial Group on Environmental Economic Accounting-India' at Ministry of Statistics and Programme Implementation on 3rd February, 2020.
79. Dr. C. Raghunathan attended the 39th Eco-sensitive Zone Expert Committee meeting at Ministry of Environment, Forest and Climate Change on 4th February, 2020.
80. Dr. K. Rajmohana attended a meeting on 11th February, 2020 at Dept of Zoology, Calcutta University to finalise collaboration by ZSI for the Asian Meeting on Pollinators.
81. Dr. Kailash Chandra, Director, Dr C. Raghunathan, Dr G. Maheswaran and Dr Basudev Tripathy attended the 'Conference of the Parties to the Convention on the Conservation of Migratory Species of Wild Animals-COP 13' at Gandhinagar, Gujarat from 15th to 20th February, 2020.
82. Dr. Sanjeev Kumar and Dr. Indu Sharma attended and established stall for showcasing the economically important insects and other wildlife animals to the farmers of the region in a Farmer's Fair (*KisanMela*) organized by Directorate of Extension Education, Agriculture University, Jodhpur at *KrishiVigyan Kendra* (KVK), on 24th February, 2020.
83. Dr. Kailash Chandra, Director and Dr Devanshu Gupta attended the inaugural Programme of Meeting of Pollinator Researchers in Asia, organised by Centre of Pollination Studies, at Calcutta University, Kolkata on 27th February, 2020.
84. Dr. R. H. Raina attended the Asian Pollinators Research Meet at University of Kolkata from 27th to 29th February, 2020 as a Resource person.
85. Dr. C. Raghunathan attended the Eco-Sensitive Zone (EEZ) Expert Committee Meeting on 16th March, 2020 at MoEFCC, New Delhi on 16th March, 2020.

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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

Thematic Map (according to the schedule work on the basis on ISBEID GRIDSS for Purulia dist., West Bengal, India)

- Land Use and Land Cover map for 2019
- Aspect out for 2019
- 3 land classification maps for the year of 1985, 1995 & 2005.

Data Repository in Spreadsheet and in Doc format

More than 20,000 data entered in the spreadsheet for repository purpose

- Listing of faunal species from the Status of Biodiversity of West Bengal (published in 2012)
- Listing of threatened species of India categorised under IUCN Redlist.
- Listing of Freshwater Faunal Diversity in India
- Listing of Endemic Species In India
- Endemic Fauna of Andaman and Nicobar Islands
- Listing of Fauna of Sundarban Biosphere Reserve (Published in July 2017)
- Listing of freshwater faunal diversity in India (from Current Status of Freshwater Faunal Diversity in India)
- Faunal Diversity of Indian Himalaya (listing of >3000 species data were entered, work ongoing)

Publication

Newsletter 2019–20

- i) Vol. 26 Issue I: Theme: Wildlife forensics
- ii) Vol. 26 Issue II: Theme: Belowground faunal diversity
- iii) Vol. 26 Issue III: Theme: Fauna of Indian Mangroves
- iv) Vol. 26 Issue IV: Theme: Faunal Diversity of Indian Himalaya

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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



Secretary of MOEF&CC Shri C. K. Mishra, IAS inaugurating the Himalayan Faunal Repository at ZSI-Solan



Renovated Lepidoptera Gallery was inaugurated by Shri Ravi Agarwal, IAS Addl. Secretary, MOEF&CC, New Delhi on 20th September 2019



Fauna of Punjab: Book released at Raj Bhavan, Chandigarh by Hon'ble Governor of Punjab, Shri Vijayender Pal Singh Badnore



Admiral D.K. Joshi, PVSM, AVSM, YSM, NM, VSM (Retd.), Lieutenant Governor, Andaman & Nicobar Islands & Vice-Chairman, Islands Development Agency released the book titled "Mesmerizing fauna of Great Nicobar Island" at Raj Niwas, Port Blair, A & N Islands



Hon'ble Minister of Environment Forests and Climate Change, Shri Prakash Jawadekar visited ZSI stall



Events and Stalls organized by ZSI during UNCCD-COP 14 at Greater Noida during August 2019





Events and Stalls organized by ZSI during CMS-CoP at Gandhinagar during February 2020



RAMC meeting at ZSI- Calicut



AICOPTAX Review meeting at ZSI-Kolkata



Hindi Pakhwada at ANRC, ZSI-Port Blair



Essay writing competition during Hindi Pakhwada at ZSI-Shillong



Yoga Day at ZSI-Kolkata



Plantation of Sapling on World Environment Day at ZSI- Dehradun



Beach Cleaning at ANRC, Anadaman



Cleaning of Campus at ZSI-Calicut



Officers Annual Meeting at ZSI-Kolkata



2 Meeting of National Mission on Biodiversity at ZSI-kolkata



Wetland day Celebration at ZSI –Kolkata



Meeting at ZSI, Kolkata with Shri Babul Supriyo.
Minister of State for Environment, Forest and Climate Change



Hindi Pakhwada 2019 at ZSI-Kolkata



Hindi Diwas Celebration at FBRC, ZSI-Hyderabad



Rally on ODF Awareness by CZRC-Jabalpur



Painting Competition during Swachhta Pakhwada at ZSI-Shillong



Winners of Biodiversity Day quiz & painting competition at ZSI-Kolkata



Ozone day celebrated at ZSI-Kolkata



Coast Guard Training at ZSI, Port Blair



Training programme to trainees of Uttarakhand Forestry Training Academy, Haldwani, Uttarakhand at NRC, Dehradun

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INFRASTRUCTURE DEVELOPMENTS

ZSI is continuously upgrading the laboratories sections and Centres, repositories for strengthening its functioning ability, during 2019-2020, several such developments have been and initiated and completed.

1. Himalayan faunal repository three story building with interactive room on top floor and mobile storage units for dry and wet collections on first and second floor has been constructed at the centre. at HARC
2. DNA laboratory at EBRC, Gopalpur on Sea and HARC, Solan
3. GIS laboratory at Headquarters
4. Forensic laboratory at Headquarters
5. Upgradation of Lepidoptera section at Headquarters
6. Estuarine Museum-cum-Auditorium at EBRC
7. Faunal repository for Island Ecosystem at ANRC

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:

Sl No	Description
1	Motor Vehicles
2	Research grade Bench Meter
3	Camera Lens
4	Vortex Mixer Thermomixer
5	PCR Machine
6	Desktop Computers
7	Digital Standee Computer Kiosk
8	Nikon Camera D7200 Under Water Housing
9	Streozoom Microscopes
10	Online UPS
11	Work Station
12	Deep Freezer
13	Gel Documentation System
14	Plotter (Printer)
15	Water Cooler RO
16	Lab. Furnitures

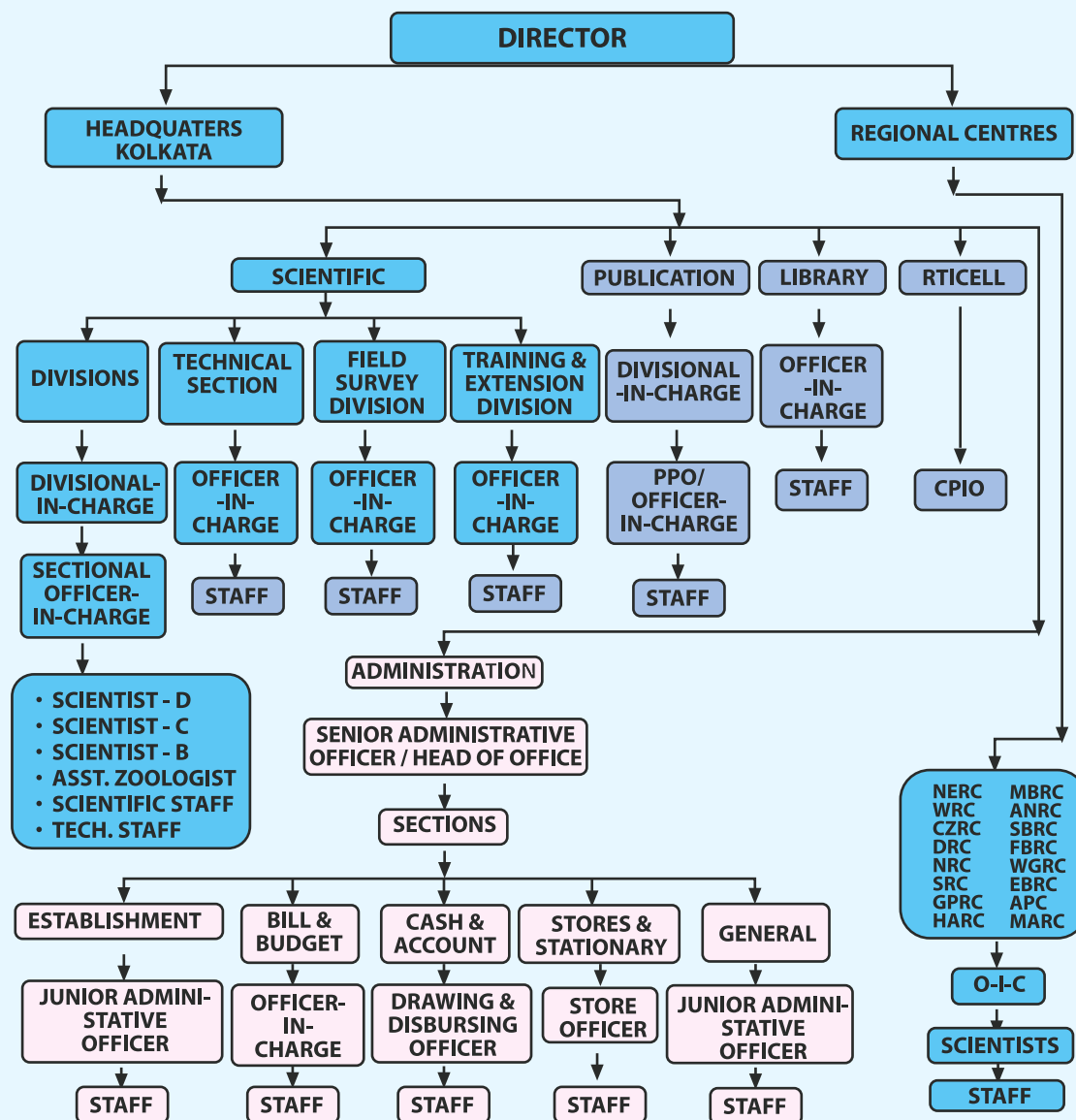
Inventory Management System (IMS): The procured materials are distributed to scientists through IMS

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ORGANIZATIONAL STRUCTURE OF ZSI

ZOOLOGICAL SURVEY OF INDIA

ORGANIZATIONAL STRUCTURE



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ACCOUNTS

Statement of Actual Expenditure up to 31.03.2020 (From 01.04.2019 to 31.03.2020)

Sub-heads as Demand for Grants	RE 2019-20	Expenditure up to 31.03.20	Balance	Percentage
Salary	448300000	447835678	464322	99.90
Wages	750000	742292	7708	98.97
O.T.A.	35000	17570	17430	50.20
Medical	5400000	5373361	26639	99.51
D.T.E.	25500000	25382249	117751	99.54
F.T.E.	1500000	572509	927491	38.17
O.E.	80000000	79744575	255425	99.68
RRT	3000000	2996696	3304	99.89
Publication	6900000	6868033	31967	99.54
S.&M.	55500000	55313077	186923	99.66
Min.Works	29990000	29986754	3246	99.99
OCS	37000000	36945799	54201	99.85
Grants-in-Aid	40000	40000	0	100.00
Sch.&Stp.	10800000	10793841	6159	99.94
Other charges	11685000	11684451	3564986	100.00
Total :	716400000	714296885	5667552	99.71

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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



Ministry of Environment
Forest & Climate Change



सत्यमेव जयते



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Zoological Survey of India

Ministry of Environment, Forest and Climate Change

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