

ZSI e-NEWS

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ZSI e-NEWS

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Foreword



Friends,

It is gratifying that the, *ZSI e-News*, The Monthly Electronic Newsletter of Zoological Survey of India has completed two years since its launching in 2009 January and is now on the third year. The *e-News*, has kept its readers informed regularly, the activities of the organization. By sharing and updating the events and news of significance, the *e-News* has served as an effective medium of communication within and among the scientific fraternity. The information on new species discoveries, new records, survey trips, participation of the staff in various national and international events and highlights of their accomplishments have also been motivational towards better work output and an inspiration to work towards common goals. No doubt all these have made the *e-News* a worthwhile one.

The innumerable colour photographs of the fauna as well as of the events, the periodic addition of newer segments, web-linked information, along with the simple design and layout, have also contributed to the success of the *e-News*.

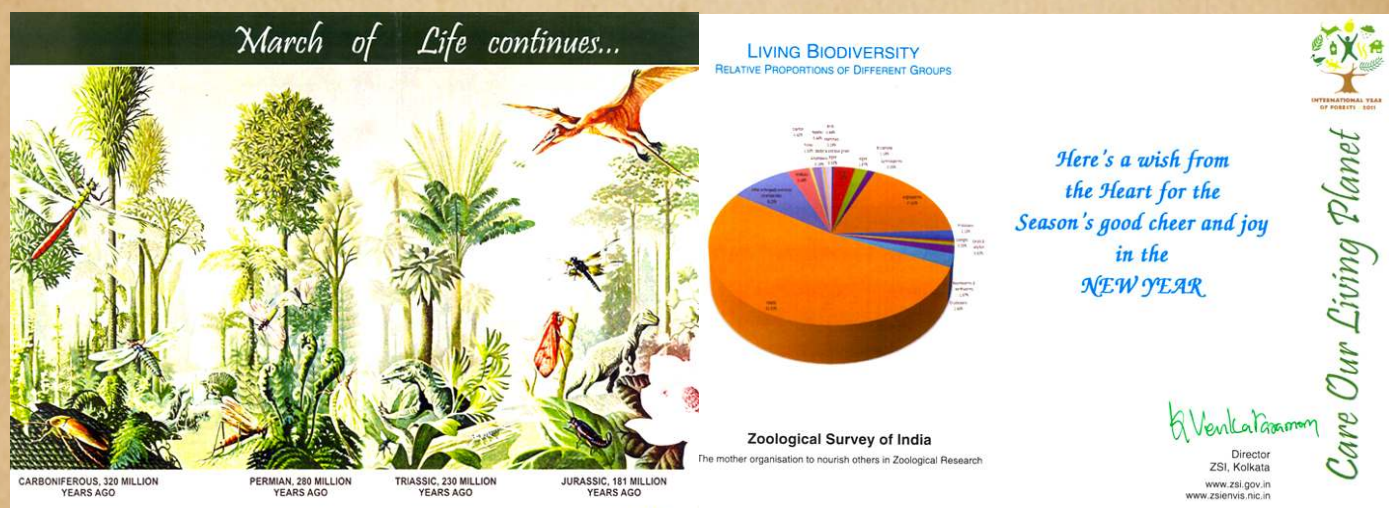
It has rather been a pleasure for me to compile the news from Headquarters and the 16 Regional Centres of ZSI, all through. I thank one and all from within the country and abroad for their appreciation, whole hearted support and encouragement towards this endeavor.

C. Radhakrishnan
*Scientist- F & Officer-in-Charge,
ZSI, Calicut
& Editor, ZSI e-News*

From the Director's Desk



Dr. K. Venkataraman
Director



Paying tribute to Sir William Jones, the great adopted son of Mother India

On behalf of the staff of Zoological Survey of India, Dr. K. Venkataraman, Director, placed a wreath at the tomb of Sir William Jones, Founder of the Asiatic Society, at South Park Street Burial Ground on 15th January, the 228th Foundation Day of Asiatic Society of Bengal.

Sir William Jones, a great scholar and visionary of British origin came to India as a Judge of the Supreme Court and with the help of Charles Wilkins, in 1784 started the *Asiatic Society of Bengal* and the journal *Asiatic Researches*. These were instrumental in establishing the field of

Indology. It is a well known fact that various apex organisations in the country including the Geological Survey of India, Zoological Survey of India, Botanical Survey of India and Archaeological Survey of India owe their origin to the Asiatic Society or are intimately connected with the Asiatic Society. Further, the Indian Science Congress Association, School of Tropical Medicine, University of Calcutta, Indian National Science Academy and the Indian Museum were the offshoots of the Asiatic Society.

Sir William Jones was responsible for the progress in scientific studies in India. There are many firsts to his credit. He invented the system of transliteration and translated the Laws of Manu (*Manusmriti*) into English. He was the first westerner to study and write a paper on Indian Classical Music, the first person to put forward a plan for classification of Indian plants and animals. He was instrumental in compilation of books in Botany, Zoology, Astronomy and Philosophy. He had observed that the Sanskrit language was wonderfully structured, more perfect than Greek, more copious than the Latin and thus laid foundation for the birth of Science of Linguistics. Thereafter, many western universities began founding chairs in Sanskrit. He translated Kalidasa's "*Abhijnana-Sakuntalam*" and "*Ritu Samharam*," and Jayadeva's "*Gita Govindam*" into English. This paved way for extensive studies on Indian dramatic literature and mythology. Further he also encouraged study of Indian Chronology.

He reached the abode of God on 27th April 1794 at just forty eight years of age and India lost its precious adopted son of the soil.



Tomb of Sir William Jones



Dr. K. Venkataraman, Director, ZSI, placing a wreath at the tomb of Sir William Jones

Headquarters, Kolkata

Extensive faunal surveys were undertaken in the States of Arunachal Pradesh, Chhattisgarh and West Bengal. A status survey of four-horned Antelope, *Tetracerus quadricornis* Blainville, was also conducted in Simlipal Tiger Reserve, Orissa. Besides, local surveys were carried out in and around the wetland areas (Bortibeel) of North 24 Parganas, West Bengal.

During the month, two species of parasitic wasps, *Zaischnopsis mampadicus* Narendran & Girish Kumar sp. nov. and *Zaischnopsis stom* Narendran & Girish Kumar sp. nov. (Hymenoptera: Eupelmidae) were described as new to science.

Out of the material studied, the nocturnal wasp, *Provespa barthelemyi* (du Buysson) (Hymenoptera: Vespidae) turned out to be a new report for Arunachal Pradesh, Manipur, Mizoram, Nagaland, Tripura and West Bengal and the conservation areas of Namdapha National Park in Arunachal Pradesh and Balphakram National Park in Meghalaya. The anomuran crab, *Albunea thurstoni* Henderson and 19 species of Odonata identified also turned out to be new records to West Bengal and Himachal Pradesh, respectively.

The Potter wasp, *Xenorhynchium nitidulum* (Fabricius) (Hymenoptera: Vespidae), in the collection turned out to be the first record from the States of Himachal Pradesh, Jharkhand, Maharashtra and Pondicherry. The Orb web building spider, *Araneus* sp. and two genera of Trematoda namely, *Clinostomum* Leidy and *Maculifer* Nicoll also were recorded for the first time from West Bengal and Assam, respectively.

Apart from these studies, during the month, the scientists of Headquarters identified, 3 species

of moss inhabiting Protozoa, 2 species of parasitic nematodes of cockroach, 1 species of Trematoda, 6 species of Collembola, 10 species of Coleoptera, 28 species of Hemiptera, 1 species of Hymenoptera, 5 species of Isoptera, 7 species of Odonata, 4 species of Orthoptera, 15 species of spiders, 7 species of mites, 2 species of Crustacea, 15 species of Mollusca and 9 species of fishes, from the States of Andhra Pradesh, Assam, Bihar, Himachal Pradesh, Jharkhand, Karnataka, Kerala, Maharashtra, Pondicherry, Uttarakhand, Uttar Pradesh and West Bengal.

Identification and advisory services were rendered on seven lots of specimens, received from different organizations. Information on freshwater crabs of India, especially those occurring in Kodaikanal region, Tamil Nadu, was provided to Ms. Katelyn Marie Kubart, St. Olaf College, Nortfield, USA. Three lots comprising 115 examples of polished marine shells, received from Delhi Police, as seized materials, were identified and the identification report communicated. The Reduviidae (Hemiptera) specimens of Kanniyakumari Wildlife Sanctuary, Tamil Nadu, received from Southern Regional Centre, Chennai, were also identified.

During the month, 13 research papers were published, 9 accepted and 6 submitted for publication.

Dr. Tan Koh Siang and Dr. Lim Swee Cheng, SRF's from Marine Biology and Ecology Laboratory, Tropical Marine Science Institute, Singapore visited the Mollusca Section to study the Types.

Twenty five students of final year B.Sc. Zoology, Cotton College, Guwahati; 5 M.Sc students of Maulana Azad College, Kolkata, two research students from S.D.J.P.G. College, Azamgarh, U.P., 4 students from

Vivekananda College, Joka, Kolkata, Sri Kamal Sharma from Guwahati University, Guwahati, Assam and 3 Research Scholars from Department of Zoology, University of Calcutta, visited different sections of ZSI Headquarters to study the specimens of their interest in the faunal holdings of the Headquarters.

Dr. G.P. Mandal, Scientist- C, participated in the scientific exhibition of the *Parivesh Mela* at Madhyamgram, West Bengal as an official delegate from 5th to 10th January.

Dr. Achintya Chattopadhyay, Assistant Zoologist, acted as coordinator in the State level seminar on “Climate Change and Biodiversity of Sundarban” held on 6th & 7th January at Nimpith Ashram, South 24 Parganas, West Bengal.

Dr. K. Venkataraman, Director and Dr. A.K. Sanyal, Scientist- F, delivered invited lectures on “Status, threats and conservation of Coral Reef in India” and “Marine Bio-resources and Human Welfare”, respectively, in the National Seminar on “Bio-resource and Human Welfare” held on 20th & 21st, January, 2011 at Lady Brabourne College, Kolkata. Drs. V.D. Hegde, G. Srinivasan, G.P. Mandal, R. Babu, Scientist- C's and Dr. Nivedita Saha, Scientist- B of ZSI Headquarters also attended the above mentioned National Seminar.

Dr. K. Venkataraman, Director, attended various meetings at the Ministry of Environment and Forests, New Delhi, on 3rd, 17th and 19th January; he also attended the “98th Indian Science Congress” from 4th to 8th January at Chennai and the seminar on “Global Warming: Climate Change and Sustainable Development” held on 20th & 21st January at Sundarban Mahavidyalaya, Kakdwip, South 24 Parganas, West Bengal.

Dr. R. Venkitesan, Scientist-C, attended the Workshop on “Disposal of Appeal under RTI” held at the Institute of Secretariat Training and Management, Dept. of Personnel and Training, New Delhi, on 24th January, 2011.

Dr. P. B. Neelratna, Joint Secretary, and Dr. J. R. Bhatt, Director, Ministry of Environment and Forests, New Delhi, visited different sections of ZSI Headquarters on 12th January, 2011.

ZSI Headquarters celebrated the 62nd Republic Day on 26th January. On this occasion, cultural programmes were organized and retired eminent Scientists/Staff members of ZSI were felicitated.

Publications:

1. Babu, R. and Nandy, S. 2010. New Odonata records from Himachal Pradesh, India. *Notul. Odonatol.*, 7 (6): 55-57.



Zaischnopsis mampadicus
Narendran & Girish Kumar sp. nov.



Zaischnopsis stom
Narendran & Girish Kumar sp. nov.

2. Dev Roy, M.K. 2010. Diversity and distribution of Crustacean fauna in wetlands of West Bengal. *J. Environ. Sociobiol.*, 7 (2): 147-187.
3. Dev Roy, M.K. and Santanu Mitra, 2010. *Albunea thurstoni*- a new record of anomuran crab from West Bengal. *J. Environ. Sociobiol.*, 7 (2): 188.
4. Girish Kumar, P. and Nguyen, L. T. P. 2010. New records of the nocturnal wasp *Provespa barthelemyi* (du Buysson) (Hymenoptera: Vespidae: Vespinae) from various states of India. *J. Exp. Zool. India*, 13(2): 379-382.
5. Mishra, S.S. 2010. Fishes. In: *Fauna of Vamsadhara and Nagavali estuary. Estuarine Ecosystem Series*, Zool. Surv. India, Kolkata, pp. 73-113.
6. Mishra, S.S., Chakrabarty, M., Kar, S. and Gopi, K.C., 2010. Catfish Diversity of West Bengal, India. *J. Environ. Sociobiol.*, 7 (2): 189-194.
7. Narendran, T.C., Girish Kumar, P. and Kazmi, S.I. 2010. Two new species of *Zaischnopsis* Ashmead (Hymenoptera: Eupelmidae) from India and a revised key to Oriental species. *Rec. zool. Surv. India*, 110 (3): 13-18.
8. Pattanayak, J.G. and Santanu Mitra, 2010. Sponges of wetlands of West Bengal. *J. Environ. Sociobiol.*, 7 (2): 197-198.
9. Santanu Mitra, 2010. Cnidarian fauna in wetlands of West Bengal. *J. Environ. Sociobiol.*, 7 (2): 133-139.
10. Santanu Mitra, 2010. Habitat and population density of *Lingula anatina* (Brachiopoda) a living fossil from Subarnarekha estuary, Orissa. *J. Environ. Sociobiol.*, 7 (2): 140.
11. Santanu Mitra, and Misra, A. 2010. Polychaetes of Wetlands of West Bengal. *J. Environ. Sociobiol.*, 7 (2): 141-146.
12. Santanu Mitra and Pattanayak, J.G. 2010. A note of freshwater Bryozoa of West Bengal Wetlands. *J. Environ. Sociobiol.*, 7 (2): 199-200.
13. Wafar, M., Venkataraman, K., Ingole, B., Khan, S.A. and Bharathi, P.L. 2011. State of knowledge of Coastal and Marine Biodiversity of Indian Ocean Countries. *PLOS ONE*, 6(1): 1-12. (www.ploscollections.org).



During the 62nd Republic Day Celebrations at ZSI, Kolkata

Northern Regional Centre, Dehra Dun

Two intensive faunal surveys were undertaken in the Jhilmil Conservation Reserve. A group of Crocodiles was observed, photographed and videographed.

Three surveys were undertaken in Dehra Dun and adjacent areas. Four nematodes and seven species of butterflies were identified from the area. One survey was undertaken in connection with the programme on 'Ecological and Molecular Studies of Freshwater Turtles' in Haridwar and its environs.

Manuscripts on mammals and Aves of Kalesar Wildlife Sanctuary and the Haryana State were finalised. 22 species of Acridoidea have been identified. The collection of 15 different animal groups, for which the expertise is not available at NRC, was sorted out and list prepared for sending to experts in the other Regional Centres

of ZSI. 20 species of nematodes were identified and registered. Besides, 18 species of Helminth Parasites of Vertebrates in and around Doon Valley were identified and photomicrography of 10 species completed. A research proposal refereed by DST was reviewed and comments offered. Dr. A. N. Rizvi, Scientist- C delivered a lecture on Molecular Taxonomy to the students of B.Sc Biotechnology at Dolphin (PG) institute of Biomedical & Natural Sciences, Dehra Dun. Dr. Vinita Sharma, Scientist- C attended the National Conference on Animal Sciences: Innovation and Prospective, held at JNV University Jodhpur on 29th January.

Publication:

Bahuguna, A. 2010. Trichotaxonomy of Indian Species of the genus *Ratufa* Gray (Mammalia: Rodentia: Sciuridae). *Rec. Zool.surv.Inida*, 110(3) 37-57.

Andaman and Nicobar Regional Centre, Port Blair

Surveys were conducted in Long Island and Rangat coastal waters on 20th to 25th January and Landfall Island, Twin Islands and Saddle Peak National Park during 27th to 31st January to study the faunal communities in marine and terrestrial ecosystems. A total of 89 species of corals, 6 species of sponges, 62 species of gastropods, 38 species of nudibranchs, 11 species of crabs, 5 species of fishes, 37 species of phytoplankton and 32 species of zooplankton were identified from marine habitat while 54 species of butterflies, 8 species of spiders 1 species of amphibian, 65 species of birds and 2 species of mammals were recorded from the terrestrial ecosystem of Saddle Peak. Among them, the coral *Turbinaria radicalis* Bernard 1896, nudibrachs *Hypselodoris maridadilus* Rudman 1977, *Noumea varians* (Pease, 1871),

Thorunna australis (Risbec, 1928), *Thorunna florens* (Baba, 1949), *Thorunna horologia* Rudman 1984, *Bornella anguilla* Johnson 1984, *Chromodoris alius* Rudman 1987, *Chromodoris conchyliata* Yonow 1984, *Chromodoris hintuanensis* Gosliner & Behrens 1998, *Chromodoris sinensis* Rudman 1985, *Durvilledoris pusilla* (Bergh, 1874), *Durvilledoris similis*



Sponge, *Stylissa massa*

Sponge, *Paratetilla bacca*Sponge, *Monanchora arbuscula*Coral, *Platygyra pini*Coral, *Favia matthaii*

Rudman 1986 and *Elysia bangtawaensis* Swennen 1997 are new records to Indian waters. Coral reef monitoring study conducted in Landfall Island indicates the replenishment of coral colonies at a density of 23-28 colonies / 10m² in most of the areas where it was devastated by about 30% due to Tsunami cum earthquake in December 2004.

During the month, four research manuscripts were accepted for publication and one research paper was submitted for publication. In response to the request received from the Border Roads Task Force, a proposal for conducting EIA studies for the road alignment in Great Nicobar Island has been submitted. Besides, another proposal for the preparation of Management Action Plan for Loha Barrack Wildlife Sanctuary has been submitted as requested by Dept. of Environment and Forests, A&N Administration. The hair samples of wild

pig *Sus scrofa andamanensis* (Blyth, 1858) has been identified in consultation with the expert from ZSI headquarters for the Conservator of Forests, Diglipur Division, Andaman. Laboratory facilities to examine the nudibranch specimens have been extended to the Assistant Professor from California Academy of Sciences. An article on the 'Role of ZSI on monitoring the coral reefs of Andaman and Nicobar Islands' has been published in the Republic Day 2011 special

Coral, *Porites lobata*

supplementary issue of the newspaper, 'The Daily Telegrams'. Dr. C. Sivaperuman attended the Management Effectiveness Evaluation meeting for Curtbert Bay Wildlife Sanctuary, Middle Andaman during 19th - 21st January 2011. Dr. C. Raghunathan, Scientist-C and Officer-in-Charge served as member in the meeting for organizing 'International Conference on Tropical Island Ecosystem' held in the Secretariat, chaired by the Chief Secretary, A&N Administration on 10th January. Dr. C.

Raghunathan and Mr. P.T. Rajan, Asst. Zoologist, participated in the 'Consultation Workshop on Bay of Bengal Large Marine Ecosystem' organized by the Fishery Survey of India, on 24th January at Port Blair.

Publication:

Tamal Mondal, Raghunathan, C. and Ramakrishna, 2011. New findings of four Scleractinian Corals from Great Nicobar Island. *Proc. 98th Indian Science Congress, Part II, Section XII: New Biology*, 88 p.

Desert Regional Centre, Jodhpur

Scientists of the Centre identified 7 species of Nematoda, 12 species of Lepidoptera, 8 species of Coleoptera and 2 species of Pisces from various environs of Rajasthan. A team proceeded on a faunal field survey of Aravalli Range, Rajasthan on 30th January. Dr. Gaurav Sharma, Scientist-C delivered lecture on "*Faunal diversity of Rajasthan and Gujarat and on conservation of Biodiversity*" to teachers and school students of Govt. Middle School, Shikarpura, Jodhpur. Dr. Gaurav Sharma, Dr. Sanjeev Kumar, Scientist-C, Dr. H.S. Banyal, Scientist-C, Dr. Ram Sewak, Scientist-B and Ms. Shalini Vashistha, JRF participated and presented papers in "*National Conference on*

Animal Science: Innovation & Prospectives" held at the Dept. of Zoology, Jai Narain Vyas University, Jodhpur on 29th of the month. Dr. Gaurav Sharma and Dr. Sanjeev Kumar acted as Chairpersons in the oral and Poster presentations in the conference. Identification and advisory services were rendered to Rajasthan Forest Department, Zoo Jodhpur on identification of Reptilia listed in Indian Wildlife (Protection) Act, 1972. 4 research papers were published. 57 entries of identified fauna were made in the faunal Database of the Centre. 72 entries pertaining to the books in the Centre's library was made employing the software, *e-granthalaya*. 142 visitors visited the Museum.



Staff and guests during the celebration of the Republic Day



Student visitors at DRC

Publication:

1. Bohra, P. and Sultana, R. 2010. Description of two new species of *Dorylaimellus* Cobb, 1913 (Nematoda: Dorylaimida) from Kumbhalgarh Wildlife Sanctuary, Udaipur. *Nematol. medit.* 38-46.
2. Mitra, A., Dow, R., Subramanian, K.A. and Sharma, G. 2010. The status and distribution of dragonflies and damselflies (Odonata) of the Eastern Himalaya. In: *The Status and Distribution of Freshwater Biodiversity in the Eastern Himalaya* (Allen, D.J., Molur, S., Daniel, B.A. (Compilers). *The IUCN Red List of Threatened Species*. Published by IUCN, Cambridge, UK and Gland, Switzerland. pp. 54-66.
3. Sharma, G. 2011. Studies on the faunal diversity of Rajasthan and Gujarat state by the Desert Regional Centre, Zoological Survey of India, Jodhpur from 1960 to 2010 and discovery of new species. *Proceedings of National Symposium on Invertebrates for Biomonitoring Ecosystem Health* held at Hislop College, Nagpur on 17-18 January, 2011. pp. 51-74.
4. Sharma, G. and Vashistha, S. 2011. Studies on reproductive behaviour of dragonfly, *Orthetrum glaucum* (Brauer) (Odonata: Insecta) at Gyan Sarover, Mount Abu, Rajasthan. *Proceedings of National Symposium on Invertebrates for Biomonitoring Ecosystem Health* held at Hislop College, Nagpur on 17-18 January, 2011. pp. 129-130.



Sand Dunes at Bikaner

Spotted Deer, *Axis axis* at Sariska Tiger ReserveEgyptian Vulture, *Neophron percnopterus* at BikanerDesert Monitor, *Varanus griseus* at Bikaner

Central Zone Regional Centre, Jabalpur

During the month, 4 species of aquatic Hemiptera, 15 species of terrestrial Hemiptera, 2 species of Scarabaeid beetles (Coleoptera) and 10 species of Odonata were identified and registered out of the backlog of unidentified collections at the Centre. 17 species of Scarabaeid beetles (Coleoptera) were identified and registered from Veerangana Durgavati Wildlife Sanctuary, Madhya Pradesh. 35 species of butterflies, 45 species of moths, 4 species of Mollusca and 2 species of spiders were identified and registered from Singhori Wildlife Sanctuary, Madhya Pradesh. Four species of Mollusca received from the State Forest Research Institute, Jabalpur for identification were identified. Dr. Kailash Chandra, Scientist-F and Officer-in-Charge attended the 38th Meeting of the Research Advisory Committee of State Forest Research Institute, Jabalpur on 10th January and the 'National Seminar on Status of Biodiversity in Madhya Pradesh' at Bhopal on 29th January and presented therein a lead paper on "Faunal Diversity of Central India including Madhya Pradesh and Chhattisgarh". The seminar was jointly organized by Barkatullah University, Bhopal and Madhya Pradesh Biodiversity Board, Madhya Pradesh. Identification and advisory services were rendered to the Director,

Ujjain Reptile Conservation & Research Centre, Ujjain, on Lizards and Snakes of Madhya Pradesh. Information on Avifauna of Madhya Pradesh was provided to Department of Zoology & Biotechnology, Govt. Science College, Jabalpur. Identification services on the seized material of wild animals were rendered to the Wildlife, SOS, Chhattisgarh Centre. Dr. Talmale, Assistant Zoologist of the Centre attended the "National Symposium on Invertebrates for Biomonitoring Ecosystem Health" held at Hislop College, Nagpur on 17th-18th January, 2011 and presented a paper. Scientists and Research Scholars of the Centre submitted four abstracts for the National Seminar on "Progress in Life Sciences for Human Welfare", organized by the Department of Zoology and Biotechnology, Govt. Model Science College (Autonomous), Pachpedi, Jabalpur (M.P.)

Publications:

1. Thilak, J. and Praveen Ojha. 2010. First record of *Erethistes hara* (Hamilton, 1822) Siluriformes: Erethistidae) from Madhya Pradesh, India. *Rec. Zool. Surv. India*, 110 (Part-3): 35-36 (Published by the Director, *Zool Surv. India*, Kolkata).
2. Chandra, K., and Singh, S. P. 2010. Scarabaeid beetles (Coleoptera) of Achanakmar Wildlife Sanctuary, Chhattisgarh. *National Journal of Life Sciences*, 7(1):71-74.

Spiders and Odonata of Singhori Wildlife Sanctuary, Madhya Pradesh



Nephila maculata (Fabricius)



Argiope aemula (Walckenaer)



Ceriagrion coromandelianum (Fabricius)



Rhodischnura nursei (Morton)

Estuarine Biology Regional Centre, Gopalpur-on-Sea

A field survey in the Bhudabalanga estuary, Baleswar district, Orissa was undertaken from 15th to 20th January, 2011 to study the fauna of the estuary and representative faunal elements collected. During the survey it was observed that catfishes and mullets of various sizes were abundant in the estuary. Out of the unidentified collection from the Cauvery estuary, 4 species of Mollusca and 3 species of fishes were identified. A scientist of the Centre studied the type and non-type specimens in the freshwater fish Section of Zoological Survey of India, Kolkata for confirmation of the specimens identified from the collection of Namdapha National Park and Tiger Reserve, Arunachal Pradesh. Two research papers were published.

Publications:

1. Vishwanath, W., Ng, H.H., Britz, R., Kosygin Singh, L., Chaudhry, S., and Conway, K.W. 2010. The status and distribution of freshwater fishes of the eastern Himalaya region. Pp 22-41. In *The status and Distribution of freshwater Biodiversity in the Eastern Himalaya* (Compilers: Allen, D.J., Molur, S. and Daniel, B.A.), IUCN, Cambridge, U.K. and Gland, Switzerland.
2. Kosygin, L. Devi, L.S. and Dhamendra, H. 2010. Fish and Fisheries of Iril river, Manipur, with a note on conservation strategies for threatened species. *J. Environ. & Sociobiol.*, 7(2): 85-92.



A view of Bhudabalanga estuary from Balaramgadi near Chandipur, Baleswar district, Orissa



Catfishes collected from the Bhudabalanga estuary, Orissa

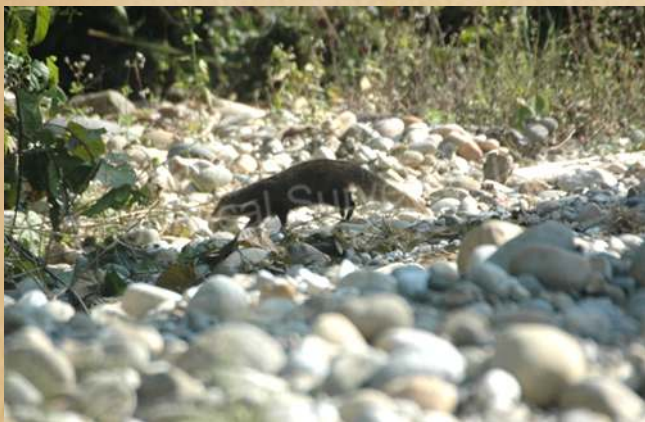
Arunachal Pradesh Regional Centre, Itanagar

A field survey was undertaken in Pakke Tiger Reserve of Arunachal Pradesh from 3rd-9th January 2011, to study the small mammals of Arunachal Pradesh. The team surveyed mainly two different locations namely, Khari and Panchali and setup Sherman traps. Apart from the indirect evidence of the occurrence of the common Indian hare *Lepus nigricollis* abundantly in many places of the reserve, the team also recorded Orange-bellied Himalayan Squirrel *Dremomys lokriah* in secondary and evergreen patches of the reserve. The team also recorded for the first time an elusive Crab-eating Mongoose *Herpestes urva*- a large mongoose found mainly in north-eastern parts of the country. Besides small mammals, the

team also recorded many birds such as *Lophura leucomelanos lathami*- a subspecies of Kalij Pheasant, Red Junglefowl *Gallus gallus*, Crested Serpent Eagle *Spilornis cheela*, Oriental Pied Hornbill *Anthraceroceros albirostris*, Chestnut-tailed Starling *Sturnus malabaricus*, a huge colony of Small Pratincole *Glareola lactea* on the shores of Nameri River. A research paper on a new species of fish of the genus *Barilius* was published.

Publication:

Nath, P., Dam, D., and Kumar, A. (2010) A new fish species of the genus *Barilius* (Cyprinidae: Rasborinae), from river Siang, D'Ering Memorial Wildlife Sanctuary, Arunachal Pradesh, India. *Rec. zool. Surv. India* 110(3): 19-33.



Crab-eating Mongoose



Kalij Pheasant



Orange-bellied Himalayan Squirrel



Part of huge colony of Small Pratincole

North Eastern Regional Centre, Shillong

During the month, 2 species of amphibians and 9 species of freshwater fishes were identified and registered. Also 6 genera of ephemeropteran nymphs were examined and identified.



Students in NERC during their study tour

Identification service was rendered to 6 students of St. Edmund's College, Shillong for their study course project report. Students from Cachar College, Silchar, Assam visited the Centre's museum and faunal depository during their study tour.



Sunderban Regional Centre, Canning

A local survey was conducted in and around Canning and Dabu and representative fauna collected. During the month, 8 species of fishes were identified and registered. Dr. D. Suresh Chand, Scientist-C and Officer-in-Charge, participated in a State level Seminar on Climate Change and Biodiversity of Sunderban on 6th & 7th January, 2011, at Rashmoni Sadan, Nimpith, South 24 Parganas, organized by the Lokamata

Rani Rashmoni Mission, Nimpith Ashram. Mr. J. K. Seth, Zoological Asstt., participated in the Exhibition cum seminar on "Climate change: Global warming and sustainable development" held at Sunderban MahaVidyalaya, Kakdwip from 19th-21st January 2011. A total of 32 posters were displayed in connection with Climate change and sustainable development. Around 500 visitors including students and teachers actively participated and interacted.



A poster displayed during the exhibition cum seminar on Climate Change



During the poster presentation by the Centre in the seminar on Climate Change

Gangetic Plains Regional Centre, Patna

In continuation of the faunal surveys in the River Damodar in Jharkhand and West Bengal, 11 species of Mollusca and 14 species of fishes were identified and registered during the month. 35 specimens of false spider crabs were collected from River Ganga during the month. Dr. Gopal Sharma, Scientist-C attended a one



False spider crab, *Hymenicoidea carteri* Kemp

day training programme on water analysis in the Dept. of Geology, Patna University, Patna on 16th January, 2011. Dr. Arun Kumar, Reader in Zoology, Magadh University, visited the Centre for organizing a seminar and during his visit, consulted the library and faunal depository of identified molluscan collection of the Centre. Twenty one visitors paid their visits to the museum.



Freshwater mussel, *Scaphula celox*

Marine Biology Regional Centre, Chennai

On behalf of the Zoological Survey of India, Chennai, scientists of the Centre participated in the 'Pride of India Expo 2011' of the 98th Indian Science Congress' at SRM University, Kattankolathur. Approximately 10,000 visitors paid their visits to the stall.

A field survey to Palk Bay and Gulf of Mannar Islands to study the status of corals in the Palk Bay and Gulf of Mannar in connection with the EIA of *Sethu Samudram Shipping Canal Project* was conducted. This survey tour was undertaken under collaboration with the scientists of National Institute of Oceanography. During the month, 4 species of Gorgonids and 5 species of Ostracods were identified and registered. Dr. C. Venkatraman, Scientist -C attended the scientific committee meeting of the Chennai science festival 2011 organized by the Science City and Institute for

Ocean Management, Anna University, at Chennai. Dr. L. Bindu, Scientist-C and Dr. G. Sivaleela, Asstt. Zoologist attended the sensitization meeting on 'Exposure to women scientists in career and funding opportunities' organized by the Department of Zoology, Madras University. Advisory service was rendered to the Wildlife Trust of India, Gulf of Kachchh, on the identification of Scleractinian coral species. A document on the "Fauna of Raj Bhavan" was released by the Governor of Tamil Nadu, based on the field surveys carried out by the scientists of ZSI, Chennai. Two research papers were published during the month.

Publications:

1. Bindu. L. 2010. Free-living protozoan diversity of West Bengal. *J. Environ. & Sociobiol.* 7 (2): 195-196

2.Rajan Rajkumar, Raghuraman, R. & Sathyanarayana, Ch. (2010). New records of

Sceleractinians from Andaman Islands. *Records of the Zoological Survey of India*, Vol. 110 (Part-3), 77-92.



Stall of ZSI, Chennai, at the 'Pride of India Expo' of the 98th Indian Science Congress

Southern Regional Centre, Chennai

During the month, 16 species of fishes, 5 species of Reptilia and 2 species of Diptera were identified. Further, 12 species of fishes were identified for MBRC. Two identification and advisory services were rendered to outside parties involving the identification of 13 species of fishes and freshwater planktons, for two research scholars, of ATREE, Bangalore and Anna University, Chennai. 3 manuscripts were refereed for an outside journal. One paper was published and four others were submitted for publication. A survey team proceeded on a 10 day faunal survey tour to Javadi & Elagiri Hills in the Eastern Ghats. Dr K. Ilango, Scientist 'D' was selected as the executive member of the Entomological Society of India and he attended the general body meeting of the society held on 29th January. Dr Jayashree Thilak, Scientist-C attended the Sensitization meeting on '*Exposure to Women Scientists in career and funding opportunities*' funded by the DST, New Delhi held at the University of Madras, Chennai on 5th January 2011. A team of scientists of the Centre attended the plenary session on 'Biodiversity



The SRC field survey team in Kolli Hills

Conservation' at the Indian Science Congress held in SRM University on 7th January.

Publication:

Thilak J and Praveen Ojha. 2010. First record of *Erethistes hara* (Hamilton, 1822), (Siluriformes: Erethistidae) from Madhya Pradesh, India. *Rec. zool. Surv. India*: 110 (Part-3): 35.

High Altitude Regional Centre, Solan

Two research publications were brought out by the scientists of the Centre including the description of a new species of fish. One paper was corrected as per referee's comments. Various chapters pertaining to the faunal document on Churdhar Wildlife Sanctuary are under compilation. Two scientists of the Centre participated in the annual waterfowl counting programme at Pong Dam wetland, from 29th - 31st of the month and recorded over 40 species of birds. Vocalizations of few species of



Bar-headed Goose At Pong Dam Wet Land

waterbirds were also recorded.

Publications:

1. Nath, P., Dam, D and Kumar, A. (2011): A new fish species of genus *Barilius* (Cyprinidae: Rasborinae) from River Siang, D'Ering Memorial Wildlife Sanctuary, Arunachal Pradesh. *Rec. zool. Surv. India* 110(3): 19-33.
2. Sharma, I. and Menha, H. S. (2011): Studies on snow trout *Schizothorax richardsonii* (Gray) in River Beas and its tributaries, Himachal Pradesh), India. *Rec. zool. Surv. India. Occ. Paper no. 323*: 1-69.



Common Pochard at Pong Dam Wet Land

Marine Aquarium cum Regional Centre, Digha

The aquarium received an average of 450 tourists per day during the month. 82 live marine ornamental exhibits were collected for exhibition in aquarium galleries. The major attractions for tourists were Bat fish *Platax sp.*, Spiny lobster *Panulirus ornatus* and the marine catfish *Plotosus lineatus*. Through local surveys 46 examples were collected under the annual plan of research work. In total 34 specimens from the recent collection and 65 specimens from the old collections were identified which included *Upeneus taeniopterus*, *Acanthurus mata*, *Setipinna tenuifilis* and *Scorpaenopsis cirrhosa*. Two manuscripts based on new records were communicated to Records of ZSI during the month and a research paper published. A group

of PG students of Environmental sciences from Fakir Mohan University, Vyasa Vihar, Odisha visited the Aquarium under their study excursion. On the Republic Day, staff of the Centre planted several tree saplings in the campus. Dr. Prasanna Yennawar, Scientist-C and Officer-in-Charge of the Centre delivered a valedictory lecture in DST-INSPIRE Internship Science Camp-2011 organised by Jagadis Bose National Science Talent Search, Kolkata.

Publication:

- Anil Mohapatra & P.G.S. Sethy. 2010. Eco-degradation to eco-restoration of Chilika lagoon: an overview. *Journal of Environment & Sociobiology*: 7 (2): 107-112.

Staff planting tree saplings on 26th January

Students visiting the marine aquarium

Western Regional Centre, Pune

A field survey was undertaken in Phansad Wildlife Sanctuary, Raigad district from 6th -15th January, 2011. Scientists of the Centre identified 3 species of Orthoptera, 11 species of Cladocera, 14 species of Odonata, 2 species of Amphibia and 7 species of Mollusca. Three mantid specimens were identified for Institute of Social and Economic Change (ISEC), Bangalore. Fish specimens were identified for Wadia College, Fergusson College, and Ramakrishna More College, Pune. One specimen of Red Sand Boa (*Eryx johani*) was identified for Maharashtra Forest Department, Nagar Division. Two Blackbuck (*Antelope cervicapra*) skins were also identified for Maharashtra Forest Department. Dr R.M. Sharma, Scientist-D and Officer-in-Charge, attended the International Conference on Biodiversity & its Conservation on 28th January at Modern College of Arts, Science & Commerce, Pune and delivered a talk on “Need for Conservation”. He also acted as a panelist during the Panel discussion on 30th January. Dr K.A. Subramanian, Scientist-C, participated in the Western Ghats Ecology Expert Panel meeting at Kerala Forest Research Institute, Peechi, Trichur, Kerala and presented the talk, “Biodiversity and Status of Riverine Ecosystems of the Western Ghats”. Dr. R. Bano, Scientist-C, attended the National Conference

on “Current Trends in Biological Sciences” on 29th-30th, January at R. K Talreja College of Arts, Science and Commerce, Ulhasnagar and presented a paper on “Below ground diversity of soil arthropod fauna in red soil of semiarid India”. Two manuscripts were reviewed for the *Journal of Threatened Taxa*. Students of the Ornithology course organized by ELA Foundation and Garware College, Pune visited the Centre and studied bird specimens.

Publications:

1. Madhav Gadgil, R. J. Ranjit Daniels, K. N. Ganeshaiah, S. Narendra Prasad, M. S. R. Murthy, C. S. Jha, B. R. Ramesh and K.A. Subramanian (2011). Mapping ecologically sensitive, significant and salient areas of Western Ghats: proposed protocols and methodology. *Current Science*, 100(2):176-182.



During the field survey at Phansad WLS

2. Amit Mitra, Rory Dow, K.A. Subramanian and Gaurav Sharma (2011). The status and distribution of dragonflies and damselflies (Odonata) of the Eastern Himalaya. In: Status and Distribution of Freshwater Biodiversity in the Eastern Himalaya. Pages 54-66. IUCN, Cambridge, UK.



Poecilotheria regalis in Phansad WLS

3. Kavita Gupta, Shashi Bhalla, Beche Lal, Manju Lata Kapur, Charan Singh, Ruquaeya Bano, Subadas Singh, Manju Thakur and R K Khetarpal (2011). Interception of insect pests in exotic seed germplasm. *Indian Journal of Agricultural Sciences*, 81 (1): 100103.



Students of Ornithology course at WRC, Pune

Freshwater Biology Regional Centre, Hyderabad

A field survey was conducted at the Palair Lake, for studying the winter season impact on abiotic environmental and biotic components predominantly zooplankton community, associated wetland faunae, fish nekton, etc., their abundance and distribution. The varied lake-types, of different dimensions and entrophic status, following increasing urbanization and anthropogenic disturbances, continued to be surveyed for long term limnoecological evaluation. Besides analyses of abiotic factors impacting zooplankton abundance, diversity and distribution, laboratory studies remained focused on observation on the academically intriguing ecological phenomenon of seasonal phenotypic morphological variations. The proximate and ultimate factors

triggering spines and helmet and the adaptive advantage of cyclomorphosis were analysed. Efforts were made for setting up a full fledged DNA Sequencing Laboratory with DNA Sequencer ABI PRISM, 3730, (48 capillaries) Table Top Centrifuge /PCR Machine, Freezer, U 410, and associated analytical tools / disposables.



Purple heron - *Ardea purpurea*



Open Bill stork - *Anastomus oscitans*

Western Ghat Regional Centre, Kozhikode (Calicut)

A survey for Caecilians was conducted at Sringeri and Kemmanugundi, Karnataka, along with other amphibian experts from 13th to 21st January 2011.

Based on the scientific studies on Hymenoptera (Insecta), two species of Pteromalidae have been described as new to science from the Namdapha Tiger Reserve, Arunachal Pradesh and a paper submitted. A manuscript was prepared on the revision of the genus *Psilocera* Walker (Pteromalidae) from the Oriental region. Description and illustration work of 50 species under 26 genera of Platygastriidae (Hymenoptera) from the agro ecosystems of Kozhikode district have been completed. A new species of Platygastriidae (Hymenoptera) has been described and a paper submitted. In addition 3 species of Pteromalidae (Hymenoptera) from Southern Western Ghats, 18 species of Odonata from Kanniyakumari Wildlife Sanctuary and 22 species of Amphibia from Namdapha Tiger Reserve, Arunachal Pradesh have also been identified.

During the month, 7 research papers were submitted for publication. Two research papers were reviewed for the departmental journal

and comments offered.

Four identification & advisory services were rendered to the forest officials and college students of Kozhikode district. Dr. K. Rajmohana, Scientist-C, supervised the research works of the JRF of the Centre and also that of a PG student of Loyola College, Chennai, attached to the Centre for a M. Sc. project work.

Dr. P.M. Sureshan, Scientist-C delivered a lecture on the topic “A glimpse on faunal wealth of India, Status and Conservation” to the Degree and Postgraduate students of St. Joseph's College, Devagiri on 14th January. Dr. Muhamed Jafer Palot, Asstt. Zoologist, as a scientific expert, visited Wayanad district in connection with the inspection of an ecologically fragile land, as requested by the Additional District Judge and Forest Tribunal, on 18th January. Dr. Muhamed Jafer Palot appeared before the First Class Magistrate Court as an expert witness in connection with confiscation of wild birds from pet shops in Kozhikode city on 24th January, 2011. During the month, 1653 visitors paid their visits to the museum. The Centre celebrated the 62nd Republic Day on 26th January.



“Healing is a matter of time, but it is sometimes also a matter of opportunity”-Hippocrates
[Photographed near Malabar Wildlife Sanctuary, Kozhikode, Kerala]



During the celebrations of the 62nd Republic Day in WGRC, ZSI, Kozhikode



During the New Year celebrations in WGRC, ZSI, Kozhikode

CHECK LIST OF FAUNA OF INDIA

1. Scelioninae (Hymenoptera: Insecta) - updated
2. Sea snakes of India

[Visit www.zsi.gov.in/....]

ANIMAL OF THE MONTH

Himalayan Salamander *Tylototriton verrucosus* Anderson, 1871

Himalayan Salamander or Newt (*Tylototriton verrucosus* Anderson, 1871) is a unique and rare Amphibian species. It is the only tailed amphibian found in India. It is found in the cold mountain wetlands, generally at the height of 1300–2200 meters above sea level. Though they inhabit terrestrial (moist forest) habitats, they generally stay close to water. Breeding occurs in the shallow areas of water bodies like pools, streams, etc.

Adult males are smaller (14–17 cm) than adult females (15–20 cm). Due to its lizard-like appearance, a layman can confuse it with a reptile; hence the common name, Crocodile Salamander. The presence of a mid-dorsal vertical ridge and cranial ridges on the head and two rows of knob-like porous glands (each with 14–18 glands) on either side of the dorsum are the best characters to identify the Himalayan Salamander. The tail of the species is almost equal to the head and body length. The body colour is chocolate brown with pale orange on lips, lower jaw, chin, throat, palm and feet.

They survive for 5–7 years, maximum recorded being 11 years. This salamander attains sexual maturity by third or fourth year. Mating occurs during rainy season as sustained rain triggers ovulation. Himalayan Salamanders perform courtship display before mating. The female lays fertilized eggs in water having thick aquatic vegetation where further developments occur. The larval stage is relatively short. After the active rainy season, the species undergo hibernation during the dry periods. No evidence of neoteny is known.

Their feeding habits are diverse. They prey upon both terrestrial and aquatic organisms. The main diet of adults includes beetles, molluscs, crustaceans, earthworms, tadpoles and eggs of frogs, termites and other insects.



[Text: North Eastern Regional Centre,
Zoological Survey of India, Shillong]

The species is found in India, Nepal, China, and suspected to be available in Laos, Myanmar and Vietnam. In India, it is restricted to West Bengal, Sikkim, Arunachal Pradesh and Manipur. Although it is classified under Least Concern under IUCN Red List Category, in India it is considered endangered (Schedule-II) and is protected under the Indian Wildlife Protection Act, (1972). The major threat to the species is siltation and draining of wetlands for construction or agriculture purposes. Another major threat is water pollution by detergents and pesticides, as it causes larval mortality. Introduction of carp fishes in high altitude water bodies is yet another threat, as they feed upon the eggs and larvae of these salamanders.

Further reading:

1. Deuti, K and Hegde, V. D. 2007. *Handbook on Himalayan Salamanders*. Nature Books India, New Delhi. Page 1–43, Plates I–XII.
2. <http://www.iucnredlist.org/apps/redlist/details/59487/0>

ZSI IN NEWS

News from ANRC, Port Blair

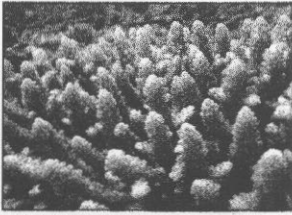
(Increase the magnification to read)

**The Daily
Telegrams** Wednesday
January 26, 2011

Role of ZSI on monitoring the coral reefs of A&N Islands

The coral reefs of Andaman and Nicobar Islands are the biodiversity hot spot of India. There are three major types of reefs: fringing reefs, barrier reefs and atolls. Fringing reefs form just off the coast of a continent or an island and usually progress from a shallow sandy lagoon to the reef crest where the most wave resistant corals grow, to the reef face where the majority of the coral species are found. Barrier reefs form farther offshore, usually 10-100 kilometers from the coast, and often form massive walls of coral separated from the coast by a large channel or lagoon. Atolls are circular reefs surrounding a lagoon that form when volcanic islands sink into the ocean over millions of years. Coral reefs are found throughout the warm, shallow tropical oceans of the world. Andaman & Nicobar Islands are surrounded by fringing reef on their eastern side, and the barrier reef on their western side between 10°26'N and 13°40'E for a distance about 360 km. These islands offer a varied and complex animal life of which colourful coral reefs constitute the most fragile and interesting energy. Hard corals use zooxanthellae, helper algae, to combine calcium and carbonate from the water and from respiration, to form a strong limestone underlying skeleton. The coral and zooxanthellae exist in a symbiotic relationship. The coral reef is an entire living system, a structure built by colonies of tiny coral animals over millions of years. Teeming with as much biodiversity as terrestrial rainforests, coral reefs, with their extraordinary beauty, bright palette of colors, and oddly patterned inhabitants are one of Earth's most important ecosystems. The coral reefs are called as marine rainforest as the biodiversity of the reef system supports a vast interdependent food web, from microscopic plants and animals to humans. These corals need some ecological condition on the basis of which it will continue its life span those are tolerable range of rocky or solid substratum, temperature, salinity, water pH, wave action, free of sedimentation, eutrophic conditions, pollution free from

faunal element as elsewhere in Indo-Pacific Reefs. The two marine national parks are designated to conserve the corals reef as well as coral associated or marine biodiversity. However the most of the islands falls outside the national park are also well distributed by healthy reefs of corals and its associated marine animals which started from the continental shelf of the islands and nominated as the fringing reef characters of that island. Andaman & Nicobar Islands are the combination of 572 islands in the chain, some of which are volcanic with an area of 8293 km² with a coastline of 1962 km and account for 30% of the Indian Exclusive Zone. These group of islands is located in the southeast of Bay of Bengal, between 6°-14° N Latitude and 91°-94° E Longitude. There are 106 protected areas in these islands, 56 designated as wildlife sanctuaries, 9 national parks and one biosphere reserve. Among 9 national parks, 2 are marine national parks where as the other 4 marine national parks are situated at the adjacent areas of mainland of this country. The two marine heavy metals and oil etc. This group of islands has been supporting with very much diversified ecological conditions which are very beneficial for the sustainable development of the coral reefs from the long past to upcoming future. If there is even the slightest change in water quality, the zooxanthellae could leave the coral to die. The amount of damage depends on not only the rate and extent of climate change, but also on the ability of coral reefs to cope with change. Importantly, the natural resilience of reefs, that maintains them in a coral dominated state, is being undermined by stresses associated with human activities on the water and on the land. Coral bleaching is a stress response that results when the coral-algae relationship breaks down. The term 'bleaching' describes the loss of colour that results when zooxanthellae are expelled from the coral hosts or when pigments within the algae are degraded. Because the photosynthetic pigments found in zooxanthellae give corals most of their colouration, the loss of



national parks such as Mahatma Gandhi Marine National Park and Rani Jhansi Marine National Park are situated in South Andaman Archipelago. It the Marine National Park with three islands named as John Lawrence Island, Henry Lawrence Island and Outram Island. Corals are animals from the class Anthozoa that form communities called coral reefs. Corals, like other anthozoans, have a simple body structure that has only one body opening, the mouth. The individual coral animal body unit is called a 'polyp'. Each polyp has a mouth surrounded by a ring of tentacles leading to the stomach. Coral polyps are zooxanthellae renders the tissue largely transparent. The white of the calcium carbonate skeleton is then clearly visible through the unpigmented tissue, making the coral appear bright white or 'bleached'. The frequency of coral bleaching events has increased dramatically during the past two decades. Bleaching is associated with abnormal sea surface temperature or salinity changes in tropical oceans worldwide. Last year mass bleaching of corals were reported throughout the world and it was also reported in this group of islands. Recovery potential relates to the community's capacity to maintain or recover its structure and function in spite of coral mortality. These properties at the coral colony and coral community level are termed 'resilience' and 'resilience', respectively. In the year 2010 several extensive surveys have been conducted with the active participation of the scientists and researchers of Zoological Survey of India, Port Blair to monitor the health of coral reefs of Andaman and Nicobar

connected to other polyps in a colony. There are two main types of coral: non-reef builders (ahermatypic) and reef builders (hermatypic). Ahermatypic corals, such as soft corals and solitary hard corals, do not contribute substantially to the formation of the reef. Solitary corals grow as individual polyps that do not form colonies. Soft corals are colonial corals that have a flexible skeleton and depend on toxic chemicals in their tissues to protect themselves from predators. Hermatypic, or reef building corals, are hard corals that form large colonies from thousands of connected polyps living together, sharing food and islands for effective conservation and management. Apart from that, 11 permanent monitoring plots with an area of 100 x 100 m² per plot in selected islands covering entire A&N archipelago have been set-up in order to monitor the corals. The parameters such as salinity, temperature, dissolved oxygen, pH, turbidity, transparency, primary and secondary productivities, coral growth, new recruitment, diversity, density, distribution, coral associated organisms, predation, disease etc. are being monitoring periodically in the plots. As a result of surveys and studies carried out by ZSI, the database on corals of A&N Islands created by National Coral Reef Research Institute of ZSI has been updated with 461 species which constitutes about 60% of coral species reported from world waters. Among them, over 225 species are newly recorded from Andaman and Nicobar Islands during the year 2008-10 alone. The total live coral cover in these islands is

(Contd. on Page 13)

Role of ZSI
(Contd. from Page 8)

calculated as 47 to 73%. On the observation of coral bleaching in the coastal waters of A&N Islands during April to May 2010 due to increase in the surface seawater temperature in Andaman Sea with the maximum of 32°C, ZSI has undertaken several rapid surveys along with the officials of Dept. of Environment and Forests, A&N Administration in order to assess extent of bleaching. It was estimated that about 35 to 77% of corals have been bleached in these islands, however, subsequent surveys conducted during September to December 2010 indicated that the recolonisation of bleached corals under process. About 27% of bleached corals are already recovered, besides several new recruits of coral colonies observed in most of the islands. In addition, the impact of climate change, natural and anthropogenic threats to the coral reef ecosystem of these islands are also being studied by ZSI. ♦

News from HARC, Solan

Rare Butterfly found in Himachal Valley

<http://www.thehindu.com/sci-tech/energy-and-environment/article974132.ece>

OUT OF THE BOX

Survey finds 200 bird species in Wayanad part of Western Ghats

<http://www.thehindu.com/news/states/kerala/article1124581.ece>

Life on earth began in space

<http://www.deccanherald.com/content/130725/life-earth-began-space-nasa.html>

PAINTINGS FROM ZSI HERITAGE ALBUM

Snow leopard

Uncia uncia (Schreber, 1775)

