

sumably were tsunamis. During the first Sangam, the south of Sri Lanka was 'grabbed' by the ocean (*kadalkol*); and literature surviving today refers to the rivers Pehruli and Kumari and the land lost by them. Settar also discussed the legend of a sunken continent around South India called Lemuria.

Sukumar spoke on animal behaviour before and after the tsunami. Strangely, very few animals perished in it. Could it be because animals have a hidden sixth sense that tells them of such threats beforehand? Or could it be because animals like elephants, which communicate by sound waves around 10 Hz, can sense seismic signals, and can hear the approaching waves of the ocean? He cited an instance of eight tame elephants in Thailand that bolted away from the coast. There were reports of flocks of birds that left the Tamil Nadu coast, and wild animals which moved inland before the tsunami. One may ask if animal behaviour can be used to warn about quakes. In 1985, Chinese scientists predicted an earthquake based on their observations of rats coming out of their burrows everywhere, although the method was later discontinued.

The session on the 26 December tsunami event brought in reports of some first-hand experiences of people who were either in the affected areas at the time or reached there soon after the disaster. From the Andaman Islands there was a vivid account by V. V. Bhat, who was in charge at Port Blair. There were many practical problems during relief operations, e.g. the huge number of bodies of victims along the coastlines, difficulties in extracting and disposing of dead bod-

ies, and delays in arrival of relief and help at Port Blair because of damaged runways, and bodies lying on the airstrip.

Sanjay Lewin (St. John's Medical College, Bangalore) spoke of how his disaster relief teams participated in tsunami relief in the Andaman Islands. He shared the challenges faced by the teams and highlighted the need for being prepared to face a large-scale emergency situation, training people to provide relief in a productive way, prioritizing medical needs for providing essential drugs, and the need for disease surveillance, preventive measures, vaccinations, curative care, psychological counselling and local field assessments.

The kind of investments being made in sensor systems and other technologies seemed in direct contrast to the lack of funding support for the rehabilitated tsunami victims at Chennai. A film clipping projected by Thelma Narayan, an epidemiologist with Community Health Cell, Bangalore showed how miserable living conditions were in the relief camps. The material used for the dwellings became so hot that the residents were forced to go out, where squalor, trash and disease co-exist. Women and children were not safe, and men did not earn enough to eat. The day before the meeting, she said, these dwellings had caught fire and many had died. These tsunami victims only prove the fact that to be poor in India is a sin.

Rama Govindarajan (JNCASR, Bangalore) presented an observer's viewpoint on the relief operations. She said that there were many volunteers but manpower was not properly used. There was desperate need for equipment like earth-

movers, trained volunteers, and proper allotment and distribution of work. There was shortage of skin ointments, bandage kits, scissors, and local anaesthetics that are basic needs in a situation like this. Abundance of unwanted old clothes was the biggest hindrance in relief operations.

The last session was a panel discussion chaired by Arcot Ramachandran. Baldev Raj (IGCAR, Kalpakkam) dwelt on measures taken in the township and surrounding areas; S. S. Meenakshisundaram (NIAS) on rehabilitation and reconstruction strategies in general; D. Sengupta (IISc) on the need for research on disaster management and appointing right people for it; and Thelma Narayan on post-tsunami public health response to meet community needs. The meeting came to an end with Kasturirangan summarizing the proceedings of the day and with closing remarks by R. Narasimha.

It was clear from the workshop that we have tsunami relief teams all over the country, numerous NGOs girding their loins to outdo each other in helping the victims, a 'tsunami response watch' etc., but the question remains when we will be in a position we are better equipped to deal with another such multi-dimensional disaster, if one were to occur in the near future.

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## MEETING REPORT

### Bird and environment\*

There were nine plenary lectures, 25 invited talks, 60 oral and 51 poster presentations in the International Conference on Bird and Environment. Over 160 ornithologists, conservation biologists, gov-

ernment representatives and naturalists including 31 from 17 countries participated in the conference.

In the first and second sessions, namely 'The biology of avian vocal behaviour' and 'Advances in avian bioacoustics', speakers covered a substantial range of topics, examining numerous aspects of biology of singing behaviour such as diversity of acoustic communication, sex-

ual selection and neurobiology of bird song, discrimination of temporal fine structures of songs by birds, etc.

In the first session, Peter Marler (Univ. of California, Davis, USA), father of the 'Avian communication system', in his plenary talk entitled 'The science of bird songs: nature's music' said, 'Environmental factors influence the communicative efficiency of acoustic signals

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\*A report on the International Conference on Bird and Environment held in Gurukula Kangri University, Haridwar from 21 to 24 November 2004.

and thus their evolution with consequences for their use by conservationists in monitoring population of endangered species'. Presentations were made on various aspects of use of songs and calls in the social life of birds by six senior scientists of the field including Dietmar Todt (Free Univ., Berlin) and J. E. Vielliard (Univ. Estadual de Campinas, Brazil).

In the second session, Clive K. Catchpole (Univ. of London, UK) delivered a plenary lecture on 'Neurobiology of birdsong'. He pointed out that the main driving force behind the evolution of song is sexual selection and female choice has exerted pressure to make male songs more complex and attractive to females. Seven other participants contributed significantly to the theme of this session.

The role of birds in agricultural ecosystem is well known. In the session on 'Agriculture ornithology', scientists discussed strategies developed for the management of avian diversity in agricultural ecosystem, so that the requirements of all the species are met, benefits of insectivorous birds in pest control could be explored and the pressure of granivorous birds on crop could be minimized. In his invited talk, B. M. Parasharya (Anand Agricultural Univ., Anand) pointed out that for the conservation of agriculture birds, eco-friendly management of agricultural landscapes is required.

With increasing industrialization and urbanization of the landscapes in India and abroad, it has become important to protect ecologically important habitats from further human impacts. Under the sessions on 'Avian biodiversity and conservation I and II', the current status and distribution of birds in IBAs (important bird areas) and other landscapes were discussed. In addition, the presentations provided an update on the situation in India, highlighting a number of critically threatened sites of high biodiversity values. It has been realized that a systematic and regular biomonitoring of the wetlands in bird sanctuaries and wildlife habitats of India is required.

Lei Fumin (Chinese Academy of Sciences, Beijing) delivered a plenary lecture in the session 'Avian biodiversity conservation I' and emphasized that Hengduan mountains to Qinling mountains in southeastern China along the eastern,

southeastern and northeastern Tibetan plateau should be promoted as the hottest area of Chinese biodiversity with the highest conservation priority. Lalitha Vijayan (SACON, Coimbatore), and H. S. A. Yahya (Aligarh Muslim Univ., Aligarh) described the avifauna of Andaman and Narcondam Islands respectively, and suggested that some mangrove forests and moist deciduous forests in the middle Andaman may be declared as protected areas.

Under the session 'Avian biodiversity and conservation II', a plenary talk was delivered by Lalitha Vijayan on the conservation of wetland birds in India. She pointed out that a total of 655 wetlands were identified and surveyed for birds all over India and all the wetlands showed contamination by heavy metals and pesticide residues.

The session on 'Avian endocrinology, photoperiodism and seasonal reproduction' highlighted the role of hormones, annual changes in day length, temperature and humidity in causing or phasing seasonal events in birds, like migration and reproduction. This knowledge has implications to issues related to conservation and management of threatened and endangered species and adaptation of birds to the threat of global warming. A plenary lecture in this session was delivered by Asha Chandola-Saklani (Garhwal Univ., Srinagar) on seasonal reproduction in birds of the tropics. Through two models, viz. baya weaver, *Ploceus philippinus* and spotted munia, *Lonchura punctulata*, she explained how tropical/subtropical birds have provided significant insights into environmental control of seasonal reproduction in birds. During this session, Vinod Kumar (Univ. of Lucknow, Lucknow) in his invited talk pointed out that melatonin, which is a part of avian circadian system, did not play a direct role in photoperiodic induction of circadian rhythms-mediated seasonal reproduction. Saumen Kumar Maitra (Viswa Bharati Univ., Santiniketan) showed that the seasonal recovery of gametogenesis might not be a function of photoperiods and/or the pineal organ in roseringed parakeet, *Psittacula krameri*.

Global climatic change is probably the most important environmental challenge that faces our planet. In the session on

'Avian ecology and breeding biology I', the impact of these changes on the lives of birds was discussed. In her invited talk, Michele Loneux (Zool. Inst., Van Beneden, Belgium) reported the effect of climatic fluctuations and global warming on European black grouse population dynamics. Lo-Liu-Chih (Shu-Te Univ., Taiwan) and Anoop Das (SACON) also presented their findings on avian ecology and breeding biology. It was discussed that aspects of avian behaviour and ecology could be used as informative indicators of large-scale climatic change.

Under the session on 'Avian ecology and breeding biology II', Wina Meckvichai (Chulalongkorn Univ., Bangkok, Thailand) and T. Shivanandappa (CFTRI, Mysore) delivered invited talks on the breeding biology of island birds in Andaman Sea and Ranganathittu Bird Sanctuary respectively.

S. A. Hussain (Karkala, Karnataka) and Hans Winkler (Austrian Academy of Sciences, Austria) delivered invited talks in the session on 'Avian migration, habitat use and general behaviour'. Hussain described the bird migration pattern in the Indian subcontinent and gave an overview of the most recent research work conducted in this field. Hans Winkler reported that migrants possessed smaller brains than residents.

With the participation of 51 presenters, three poster sessions exhibited avian biodiversity at a global scale, including reports from deteriorating habitats of the world and their impact on bird biodiversity.

In the valedictory session, Peter Marler presented the conference report and suggested the need of such conferences to be organized to fill the mega gap in the conservation efforts at a global level. A few recommendations of the conference were presented by Hussain.

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