MEETING REPORT

Avian biology*,†

A workshop on avian biology was organized recently to focus on capacity building with the following goals: (i) to expose the researchers to new and exciting ideas and directions in modern avian biology; (ii) to equip them with basic conceptual and technical tools to ask and answer relevant research questions; (iii) to promote interaction among ornithologists in different parts of the country, and (iv) to help them write a better research proposal.

The workshop mainly consisted of the following four types of activities: thematic lectures, special lectures, mini-workshops and intervening poster sessions. Forty-six participants (young faculty, research scholars and postgraduate students) from different institutions and universities covering 14 Indian states attended the workshop. A team of 17 eminent scientists, who have significantly contributed to the field of avian biology, trained the young researchers during this workshop. Six thematic lectures, two special lectures, six mini-workshops and four intervening poster sessions were conducted. Lectures and mini-workshops covered a substantial range of topics, examining numerous aspects of avian biology such as bird diversity and biogeography, bird community ecology, research methods for bird populations, techniques in avian physiology, behavioural and evolutionary ecology, mathematical and statistical modelling techniques, GIS and landscape ecology, avian communication, avian genetics and evolution, avian conservation science, etc.

In thematic lecture (1), R. J. Ranjit Daniels (Care Earth, Chennai) shed light on the origin, distribution and diversity of Indian birds. He explained that the feathers first evolved during the Jurassic in a group of dinosaurs known as Theropods and land birds capable of flight probably first emerged and diversified in temperate Eurasia. According to him, peninsular India joined Eurasia around 45 million years ago and alternating wet and dry periods determined the distribution and diversity of birds in India. He also highlighted the importance of temperate Eurasia, Africa and Southeast Asia as the most important source pools from where the major avifaunal zones within the subcontinent derived their species.

Under special lecture (1), Abdul J. Urfi (University of Delhi) talked on the significance of bird study in ecology and conservation. He pointed out that due to varied lifestyles, conspicuousness, diurnal habits, and interesting plumage and calls, birds are known as wonderful models exploring a number of questions of ecological and conservation significance. He discussed with the participants regarding behavioural ecology of birds, with explanations of different hypotheses/models like 'food availability–breeding time' hypothesis, the economic defendability model, etc.

In mini-workshop (1), Dinesh Bhatt and Vinaya Kumar Sethi (Gurukula Kangri University, Haridwar) trained the students on the techniques of analysis of acoustic signals of birds. They pointed out the importance of acoustic signals in the lives of birds and put various research questions of global importance such as song development, repertoire size estimation, function of a song, neighbour–stranger discrimination etc., before the participants to be resolved.

In thematic lecture (2), T. R. Shankar Raman (Nature Conservation Foundation, Mysore) interacted with the participants on various issues of bird community ecology. He pointed out that population-level research forms the cornerstone of our understanding of bird ecology, behaviour and species conservation. Shankar Raman, jointly with R. Jayapal (Group for Nature Preservation and Education, Chennai) organized a mini-workshop (2) entitled 'Research methods for bird populations and communities', in which they used an interactive approach to introduce research methods for the study of bird populations and communities. This mini-workshop addressed some key aspects such as: the basic principles underlying design of a research study or project; bird census; measurements of occurrence, abundance and density of bird species; estimation and use of species richness and community composition to describe and understand dynamics of community structure and change; field methods and robust analytical methods to estimate population and community parameters, etc.

In thematic lecture (3), Vinod Kumar (Lucknow University) talked on 'Avian physiology in the temporal environment'. He pointed out that avian species exhibit clear differences between day and night. Birds also control the time and duration of the different life-history stages that make up the annual cycle; vernal migration, reproduction, molt and autumnal migration. Both daily events and annual life-history stages are cyclic (rhythmic), and generated by endogenous 'timekeepers' that coordinate the passage of time from molecular through cellular and systems levels. To explain such concepts practically, Sangeeta Rani (Lucknow University) and Sanjay Bhardwaj (C. C. S. University, Meerut) jointly conducted a mini-workshop (3) entitled 'Techniques in avian physiology'. They exposed the participants to the principles and methodologies of various techniques to study temporal behaviour, seasonal changes in physiology, physiology of migration and endocrinology in birds.

Praveen Karanth (Indian Institute of Science, Bangalore) delivered the thematic lecture (4) on 'Avian genetics and evolution'. He emphasized that genetic information could be used as a tool to help us understand the ecology and evolution of populations and species. He mentioned that genetic data could be obtained at three biological levels: species, populations and individuals. In thematic lecture (5), Suhel Quader (National Centre for Biological Sciences (NCBS), Bangalore) discussed with the participants about various questions lying within the domains of behavioural and evolutionary

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†Dedicated to the late Ravi Sankaran, Director, Salim Ali Centre for Ornithology and Natural History, Anaikatty, Coimbatore, who chaired the valedictory session of this workshop and also delivered a thematic lecture.

ecology, such as how are birds adapted to their environment? What traits do they have that help them survive and reproduce? How do they cope with changes in ecological conditions? Using examples from across the world, he also underlined prominent themes in behavioural and evolutionary ecology like optimal foraging, sexual selection, evolution of social behaviour, cooperation and conflict, and evolution of life histories.

The mini-workshop (4) entitled 'Mathematical and statistical modelling techniques' was set out by Quader and Jagdish Krishnaswamy (ATREE, Bangalore). They illustrated the significance of the hypothetico-deductive method which involves specifying different possible mechanisms (or models) that could generate the pattern, deriving predictions from these models, designing observations or experiments to test these predictions, collecting data, analysing the data, most often in a statistical framework, and using the results to reject and refine the possible explanatory models. They focused on three aspects: asking questions of interest, generating and examining models and their predictions, and confronting these models with data within a framework that incorporates model and process uncertainty, sampling error and measurement error.

The mini-workshop (5), an outdoor event, was organized at Wildlife Institute of India (WII), Dehradun, where under the guidance of K. Ramesh (WII, Dehradun) the participants learnt the basics of remote sensing and GIS along with the applications of various tools and methods in landscape ecology and environmental monitoring and assessment. A special lecture (2) on 'Indian wetland birds: ecology, migration and conservation' was delivered by Arun Kumar (Zoological Survey of India, Dehradun). He touched upon various issues of avian ecology and migration with special reference to the avifauna of 'Asan Conservation Reserve' of Dehradun. Using an attractive repertoire of pictures of different birds and landscape, he discussed the various threats faced by Indian wetland birds and important measures for their conservation.

Under the mini-workshop (6) entitled 'Molecular methods and their applications', Uma Ramakrishnan (NCBS) put-forth some important points, viz. geographical distribution of genetic variation across a species range, or phylogeography, to determining rates of gene flow, or migration between multiple pairs of populations and to use genetic variation to reconstruct past changes in size in the recent past etc., before the participants and explained the methods for the solution of such issues. She also pointed out that fast mutating molecular markers such as microsatellites could be used to distinguish individuals from each other and this would have tremendous application in conservation, including the ability to estimate population density. The science of avian conservation was well explained by Ravi Sankaran (Salim Ali Centre for Ornithology and Natural History, Coimbatore) in thematic lecture (6). He explicated the root causes of various threats to birds and emphasized the importance of citizen science for the conservation of biodiversity in general and birds in particular.

During the intervening poster sessions, the participants presented posters depicting their interests and contributions to the field of ornithology and during interaction, subject experts encouraged them and gave suggestions for better planning of their work. Also, some of the participants presented their research proposals before the experts and received their feedback to strengthen their plan of work for better presentation before the funding agencies.

Participants were asked to give their responses about the overall assessment of the workshop in a feedback form. Besides, in the valedictory session, participants were invited to present their views. According to the participants: (i) The lectures delivered and mini-workshops conducted were the best in the field of avian biology. (ii) The performance of the resource persons invited for the workshop was excellent in their respective fields; all of them interacted freely with the participants and gave them an opportunity to discuss topics even during meal and tea breaks. (iii) The workshop was a rare event for them, where they had a chance to discuss their research ideas/methodologies with a number of leading ornithologists from India. (iv) The use of various tools and statistical software was a unique feature of this workshop. (v) It would have been better if this workshop was of longer duration along with the inclusion of field trips and moderators for sessions.

Vinaya Kumar Sethi, Dinesh Bhatt* and Amit Kumar, Avian Diversity and Bioacoustics Lab, Department of Zoology and Environmental Science, Gurukula Kangri University, Haridwar 249 404, India.
*e-mail: dineshharidwar@gmail.com