

## In this issue

### Concepts of species and modes of speciation

Species is a basic unit of classification and a taxonomic rank. Since ancient times, philosophers and naturalists realized the necessity for a basic unit by which biodiversity on this planet may be described and estimated. But the development of a scientific theory of classification is relatively a recent phenomenon. Aristotle was the father of biological classification and regarding evolution, he proposed the idea of ladder of life, a series in which organisms could be arranged in the order of increasing complexity. His idea was also a kind of typological or essentialism as far as species is concerned. The idea of Linnaeus, a great taxonomist and also called as 'father of taxonomy', was that of an essentialist for whom the species reflects the existence of fixed, unchangeable type (essence). He also proposed the binominal nomenclature.

Survey of taxonomic literature shows that there are a large number of species concepts which have been suggested by naturalists, taxonomists and evolutionary biologists from time to time. A particular species concept is associated with a definition and definitions differ in different concepts of species. Nearly all of the older definitions of the species refer to the morphological similarities of individuals of the same species. Later on, the typological definition of the species was found inappropriate and an entirely new species concept (biological species concept) was developed and elaborated on the basis of reproductive behaviour, hybrid sterility and reproductive isolation. In the light of biological species concept, Mayr defined the species as a group of potentially or actually interbreeding natural populations which are reproductively isolated from other such groups. However, Dobzhansky, being an evolutionary geneticist, defined species as a reproductive community of sexually and cross-fertilizing individuals which share in a common gene pool. In spite of certain difficulties in its application, the biological species concept is most widely accepted.

Singh (page 784) has also discussed different modes of speciation (cladogenesis) based on three sets of variables

suggested by White: (i) genetic mechanisms generating genetic variability, (ii) genetic mechanisms leading to the origin of reproductive isolation and (iii) geographic components which provide basis for various possible models of speciation. The important modes of speciation such as allopatric, sympatric, parapatric and stasipatric (chromosomal) have been discussed with suitable examples.

### Female song in a tropical bird

Among passerines, song is typically believed to be the preserve of male songbirds and has been considered under sexual selection through male-male competition and female choice. Females of some avian species have been reported to sing, yet female song has been a widely overlooked phenomenon. Initially, female song was considered as a functionless by-product of temporarily high levels of androgen. However, later few studies emphasized their biological relevance. At present, there is growing evidence that female song in birds is not so uncommon as previously thought but



instead may be an adaptive plastic trait in females. Still, avian bioacousticians around the globe agree on a common point that female songbirds are struggling hard to be heard in the scientific world. In other words, female song in birds appears to be an important feature of female behaviour that needs to be studied carefully and intensively.

Sethi *et al.* (page 827) describe the structure and context of female song in a tropical bird species, the Pied Bush Chat (PBC). The authors compare different song characteristics between sexes and report that female song characteristics do not differ significantly when compared

with male. However, females keep small song repertoire than males. The study reveals that females PBC sing during aggressive interactions with floater or neighbouring females. Females also sing while intersexual vocal communication through song-answering. This study provides strong evidence that female song in PBC is not rare or anomaly; rather females do sing essentially during certain breeding stages for mate defense and probably to convey some pair bond information to the mate.

### Climate change projections for India: A multi-model multi-scenario approach

Recently, a new set of emission scenarios called Representative Concentration Pathways (RCPs) replacing the previous Special Report on Emission Scenarios (SRES) of the Intergovernmental Panel on Climate Change (IPCC) has been developed. Climate change projections based on these RCP scenarios are made by different climate modelling groups across the world under the Coupled Model Inter-comparison Project-5 (CMIP5).

Chaturvedi *et al.* (page 791) present climate change projections for India, based on the results from 18 global circulation models for four RCP scenarios: RCP2.6, RCP4.5, RCP6.0 and RCP8.5. This is the first time a comprehensive climate projection based on multiple models and multiple scenarios has been made for India. Model validation against the observed climate over 1970–2000, demonstrates the CMIP5 ensemble mean climate to be closer to the observed climate than any individual model. For *business-as-usual* (between RCP6.0 and RCP8.5) scenario, the study finds that the CMIP5 ensemble mean warming for India is in the range of 1.7–2°C by 2030s and 3.3–4.8°C by 2080s relative to pre-industrial period, and all-India precipitation is projected to increase from 4% to 5% by 2030s and from 6% to 14% towards the end of the century (2080s) compared to the 1961–1990 baseline. The authors suggest that the ensemble mean climate projections could be used for future assessments of impacts of climate change and adaptation planning in India.