



Nature at Work: Ongoing Saga of Evolution. V. P. Sharma (ed.). Publication of the National Academy of Sciences, India. Springer (India) Private Limited, New Delhi 110 002. 1st edn. 2010. 394 pp. Price: € 89.

The National Academy of Sciences, India (founded 1930) has taken the ambitious task of quality publications by eminent scholars for inculcating scientific temper and for providing a forum for interaction among aspiring research scientists. To commemorate the bicentenary of British naturalist Charles Darwin (born 1809), the Academy entrusted the task to V. P. Sharma (the former President of the Academy) to compile the volume. The bicentenary celebrations of Darwin that coincided with three major discoveries in palaeontology, viz. *Darwinius masillae* (named in the honour of Charles Darwin) from Germany, skeleton of winged Dinosaur from China, and fossilized Dinosaur eggs from India, remind us of Darwin's inquisitiveness, conviction, courage and scientific thought that provided the foundation for modern scientific investigations. The editor has done a commendable job for having chosen topics that would interest everyone across the scientific fraternity. The book comprises 23 lead articles grouped into five different sections, each with a distinct theme that showcases Darwinian evolution, and builds on evidence-based understanding of life at all levels of existence from microbes to man.

It was in 1859 that the seminal publication by Darwin *On the Origin of Species by Means of Natural Selection or the Preservation of Favoured Races in the Struggle for Life* moved the mankind away from religious dogmas. It changed

the human understanding of life forever that supports unequivocally Dobzhansky's remark – 'nothing in biology makes sense except in the light of evolution'. In the first section, chapters are dedicated to Darwin's legacy on evolution underlining that all life forms have emerged from common ancestors by means of natural selection. P. Dayanandan (Madras Christian College, Chennai) gives a comprehensive review of the descent of man and relationships among hominins with time-scale. The chapter on the discovery of Ida (The fossil: a link in the evolution of monkeys, apes and man) by V. P. Sharma is an interesting account of a fossil record of the Eocene period, which is presently subject to a debate among palaeontologists. Veena Tandon and G. Maitra revisit Darwin's theory of evolution underscoring the philosophy that 'the only permanent thing in life is change' so much so that evolution and change are synonymous, and are central to any discussion on evolution even today. K. R. Dronamraju reminisces the life and research work of his mentor J. B. S. Haldane in India (a distinguished British scientist who died as an Indian) with special reference to his mathematical theory of evolution, which combined the evolutionary process defined by Darwin and the science of genetics founded by Mendel. An essay by Amit Sharma (International Centre for Genetic Engineering and Biotechnology, New Delhi) on Charles Darwin makes a strong case for agnosticism (towards adopting evidence-based existence) by empirical data on web of life based on genome sequencing of numerous biological specimens.

The second segment includes chapters on biodiversity and evolution of microbes, viruses and fungi that threaten food production and human health. Anupam Varma (Indian Agricultural Research Institute, New Delhi) gives an illustrative overview of phylogeographic evolution of plant viruses which have emerged as severe constraints in improving crop productivity. The chapter on the evolution of HIV-1 (in relation to genetic subtypes and geographical distribution in India) highlights the differential rates of disease progression, antiretroviral therapy and prospects of vaccine development. The chapter on microbial evolution is attributed to modern knowledge of genomics and proteomics that have helped in understanding the genome-wide map of

selection linking gene variation to phenotype and ecology. With the information generated through modern tools, the chapter 'Evolutionary relationships among cyanobacteria, algae and plants' attempts to link Darwinism, neo-Darwinism and systematic Darwinism for a better understanding of evolution of land plants mediated through algae and endosymbiotic events. A review article on 'Biodiversity, phylogeny and evolution of fungi' contributes to the understanding of phylogenetic hypothesis and evolutionary relationships.

The third section draws its strength in understanding evolution and speciation in insects taking classic examples such as *Drosophila* (the queen of genetics) by B. N. Singh (Banaras Hindu University, Varanasi) on the origin of reproductive isolating mechanisms; a chapter on adaptive radiations in insects providing appraisal of Darwin's bridge between microevolution and macroevolution; a review article by Karamjit S. Rai providing insights from mosquito evolution encompassing research contributions on Aedine mosquitoes (at the Vector Biology Laboratories, University of Notre Dame, USA), and a chapter on the fascinating area of pollination biology by Rajesh Tandon (University of Delhi) that raises concern on the conservation of flora and crop production.

The section on genomics relates to post-Darwinian developments in biology providing an evidence of unification at the molecular level and genetic disorders. A. K. Sharma (University of Calcutta) highlights the role of high amount of non-coding repeat sequences, mobile genetic elements, and the emergence of RNA as a primitive molecule of life. He also mentions the role of small RNAs in defense, growth, differentiation and speciation. P. Majumder (Indian Statistical Institute, Kolkata) reports a comprehensive study of genetic diversity of the innate immune system in population of eastern India suggestive of natural selection operating among individuals with a high load of microbial and other pathogens.

The last section includes case studies including chapters on macroevolution processes in relation to Indian plate; on *Drosophila* (testing melanism-desiccation hypothesis, origin and evolution of human malarial parasite, evolutionary trends in soil-inhabiting nematodes, evolution of the cerebral cortex in amniotes,

evolving secondary metabolome and biochemical pathway diversity in medicinal and aromatic plants, and the Himalayan bio-resources conservation and biodiversity.

Each chapter is contributed by subject experts in their own chosen field of research, and is self-illustrative providing a good resource of references for supplementary readings. This book recapitulates Darwin's hallmark contribution and is indeed a good read and a must-have

collection for college libraries. It reinforces the Darwinian school, inspiring scientific thought and observations and enabling future generations in making contributions that benefit mankind. This publication also marks the significance of the fact that the General Assembly of the United Nations has declared 2010 'The International Year of Biodiversity' perceiving threats in the face of climate change, habitat loss/deforestation and change in land cover. Evolution is an

ongoing saga, understanding of which would promote ecosystem-services approach to conservation for sustainable development.

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