quent collaborator Carol Greider, and an early collaborator, Jack Szostak, together won the Nobel prize in Medicine and Physiology for 2009 for their pioneering work on telomeres and the enzyme telomerase.

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Clouds in the Perturbed Climate System: Their Relationship to Energy Balance, Atmospheric Dynamics, and Precipitation. J. Heintzenberg and R. J. Charlson (eds). The MIT Press, Cambridge, Massachusetts. 2009. xv + 597 pp. Price: $40.

Global warming will be the most difficult problem that human beings have to tackle in the 21st century. By 2100, the global mean surface temperature may be 2–5°C above that in the middle of 20th century. If the global mean temperature increases by 2°C, the impact of the warming on the biosphere may be manageable. On the other hand, if the mean temperature increases by more than 3°C, the impact on the biosphere will be catastrophic. Hence, it is essential to predict precisely the amount of warming that will occur by 2100. We cannot predict the amount of warming accurately because we do not know how clouds will change in response to the warming. A 1% change in cloud fraction has a greater impact on climate than doubling of carbon dioxide in the atmosphere. Our understanding of how clouds form and decay is still at its infancy. Clouds form and dissipate in the atmosphere within a couple of hours. Most clouds form over the ocean. Data on clouds over the ocean was not available until the emergence of satellites. Till 1980, satellites provided information about the height of the cloud tops and cloud reflectivity. After 1980, we were able to get information about cloud microphysics through the use of microwave sensors in satellites.

Our present understanding of the impact of clouds on climate has been presented cogently in the book under review by more than 50 authors who are at the forefront of climate research. In the first chapter, the editors of the book provide an overview of the interaction between clouds and aerosols in the earth system. In the remaining 23 chapters, all aspects of the interaction between the clouds, aerosols and the environment have been covered. Most of the authors use the information on aerosols and clouds from satellites. This information provides new insight with regard to the interaction between clouds and aerosols but provides no information on the vertical variation of clouds and aerosols. The data on clouds obtained from the ground and satellites have begun to converge and hence have improved our confidence about the quality of ground measurements and reliability of satellite retrieval methods. Observations as well as models show that extreme rainfall events will increase as the global mean temperature increases. In chapter 5 of the book there is an excellent discussion on the temporal variation of extreme precipitation from shallow clouds. The role of tropical plumes and mesoscale tropical convergence is discussed in detail. The authors have argued that the global mean precipitation is constrained by the atmospheric radiative cooling rate rather than the atmospheric moisture content. In chapter 7, there is an interesting discussion on the study of clouds in the laboratory. The laboratory study of clouds permits one to examine the impact of aerosols on clouds in a controlled environment. In chapter 9, the importance of deep convective clouds is highlighted. The authors advocate the use of cloud-system resolving model to improve parameterization of deep convection in atmospheric general circulation models. The factors that control the formation of cirrus clouds are discussed in chapter 11. The authors underscore the need for real-time measurement of ice nucleation in cirrus clouds. They have highlighted the important role played by Lidar and cloud radar in understanding the evolution of cirrus clouds. The interaction between aerosols and clouds from micro to the cloud scale is examined in chapter 14. In chapter 16, the interaction between air pollution and rainfall is explored. The authors have argued that we still do not know if air pollution decreases or enhances rainfall.

All the articles in the book are well-written and provide new insight about our understanding of how clouds perturb the climate system of the earth. This book will be very useful to scientists and graduate students who are doing research on the impact of clouds on climate. The book cannot be used as a textbook in a graduate course but can be used as supplementary reading material.

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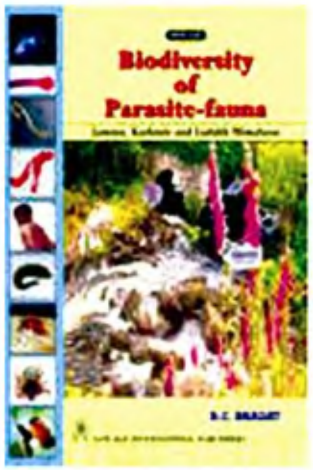

Biodiversity of Parasite-Fauna: Jammu, Kashmir and Ladakh Himalayas. R. C. Bhagat. New Age International (P) Limited, 4835/24, Ansari Road Daryaganj, New Delhi 110 002. 2008. 211 pp. Price: Rs 395.

Parasites are organisms in or on the body of another organism or host. They are metabolically dependent on their host and derive their nutrient requirements directly from them. In recent years,

faunistic – biodiversity of different groups of parasites – has attracted the attention of scientists, experts and students working in different fields of zoology, agriculture, veterinary, medical, forestry, environmental science and biotechnology. The book under review encompasses topics on diverse parasite groups belonging to Jammu, Kashmir and Ladakh Himalayan regions, of paramount bio-geographical significance. The parasite fauna includes protozoans, helminths (trematodes, cestodes, acanthocephalans and nematodes), leeches (parasitic), parasitic arthropods (crustaceans, acari and entomophagous parasitic insects), parasitizing diverse hosts, belonging to different groups of invertebrate and vertebrate hosts (fishes, amphibians, reptiles, birds, mammals, including man), besides plants (wild, economically important and crops).

The present book has been organized into eight broad chapters. Chapter 1 focuses on parasitic protozoans infecting insects, fishes, birds, domestic animals and man. Microsporidians (*Nosema* spp.), responsible for causing nosema disease and pebrine disease in honey bees (*Apis* spp.) and silk worm (*Bombyx mori*) respectively, are widely prevalent in Jammu and Kashmir Himalyan regions. White–spot and myxosporidian are fish protozoan diseases prevalent in various regions. The parasitic protozoans of domestic animals, belonging to genera *Bavesia*, *Theileria*, *Trypanosoma*, *Eimeria*, etc, show wide occurrence. In addition to these, about ten species of protozoans are reported to cause different diseases in human populations.

The platyhelminths (trematodes and cestodes), parasitic on molluscs, fishes, amphibians, birds, mammals (wild and domestic) and man, are discussed in chapter 2. Till-date, a total of 105 species of trematode parasites and 48 species of cestode parasites are known to parsitize diverse host species, some of these are responsible for causing serious diseases in poultry, domestic mammals and human beings. The diseases in domestic animals and humans include inter alia, hydatidosis, alveococcosis, hymenolepiasis and taeniasis. The acanthocephalans, as endoparasites of vertebrates, show wide diversity pertaining to their known 24 species with common prevalence in fishes, inhabiting rivers, lakes and other water bodies, in different regions, are included in chapter 3.

An overview of parasitic nematodes and parasitic leeches is given in chapter 4, incorporating animal nematodes, infecting insects and vertebrates (fishes, amphibians, reptiles, birds, mammals including human). Some of these cause serious diseases, like nematodiasis, lungworm diseases, oesophagostomomiasis, hemorrhagic filariasis and thelaziasis, etc. in domestic animals. Among the human nematodes (five species), *Ascaris lumbricoides*, causing ascariasis, has shown high prevalence and endemicity in all parts of Kashmir and amongst plant-parasitic nematodes, more than 93 species reported so far from wide localities are responsible for causing damage to diverse plant species, including valuable crops (fruits, cereals, vegetables) and other economically important plant species. Apart from these, parasitic leeches on various hosts, are also included in this chapter. Parasitic crustaceans (copepods), as ectoparasites of fishes and acari have been reported to parasitize wide hosts such as insects and different vertebrates, including domestic animals and human, with details on various diseases transmitted by different tick species of medical and veterinary importance, are given in chapter 5.

The taxonomic survey, host range and diversity of parasitic insects such as fleas, lice, parasitic-bugs, mosquitoes, dipteran flies-haematophagous, myiasis-causing flies, with the role of many of these species in causing disease and as vectors of different diseases in animal and human populations in wide localities and regions, are provided in chapters 6 and 7. The last chapter is solely devoted to entomophagous insects (parasites/parasitoids), including dipteran (conopids, muscids, sarcophids and tachinids) and hymenopteran covering aphelinids, aphidiids, braconids, chalcidids, cynipids, encyrtids, eulophids, eupelmid, eurytomids, ichneumonids, megespilids, mymarids, pteromalids, scelionid, troymids and trichogrammatids, highlighting the faunistic/systemic survey, host range and species richness of these insect parasite groups, known to exist in wide areas of Jammu and Kashmir Himalayan regions, besides the role of some parasites/parasitoids, as biological control agents of insect pests of agricultural, horticultural, silvicultural and forestry importance, is also included in this chapter.

It may be emphasized that the book encapsulates vast information on parasite-biodiversity published during the past century, lying scattered in numerous Indian and foreign research journals, monographs, books, etc. The book is also laced with a number of updated checklist, catalogues and bibliography, besides it is well-equipped with subject and author index. Undoubtedly, the present reference/research book is a pioneer effort, significant in bio-wealth knowledge of important zoogeographical regions of Indian sub-continent and will prove an indispensable tool for researchers, experts and students in various fields of biodiversity in general and parasite and parasitoids in particular.

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