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## Editorial



Arid environment presents a set of harsh environmental conditions where available freshwater limits the growth of living organisms. Selected species of animals and plants have adopted to survive the harsh arid conditions, where they face limited inter-specific competition. Arid environment occupies some 31% (hyper-arid 4.2%, arid 14.6%, and semiarid 12.2%) of the total land area. Though arid environment provides some 6% of the global forest cover (global sink for carbon), and supports limited rain-fed agricultures and sedentary livestock, especially in the semiarid areas; yet the major part of this vast tract supports pastoral livestock and prized wildlife resources. Arid environment has a simple and fragile ecosystem, and needs careful management, so that it continues playing its role in the global ecosystem and providing livelihood for the dependent communities. The reliable estimations on different wild/livestock species are fundamental for the effective management of bio-resources of arid areas.

Arid environment presents difficult working conditions for researchers: harsh working environment, vast area, difficult terrain, patchy suitable habitat and distributions of animals/plants, low productivity and low density of animal populations; all requiring specially designed study techniques for getting reliable population estimates. Arid environment has attracted relatively fewer researchers, and workable methodologies used are scattered in the literature. Through this special issue on “Abundance Estimation in an Arid Environment” we wanted to provide a forum where the methodological innovations and their reliability as applicable under field conditions of arid environment could be shared between working scientists; and could act as a torch light for the budding researchers. The main emphasis of the special issue was on highlighting methodological details and analysis techniques/software, or indicating limitations of some conventionally used population estimation techniques under conditions of arid environment.

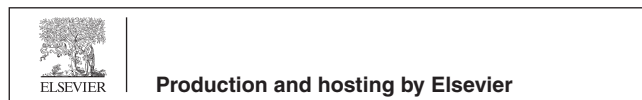
In response to our call, we received an enthusiastic response. However, most of the received manuscripts either did not concentrate of estimation methodologies or be concerned with

other aspects of species biology. Manuscripts concerning with estimation techniques and/or their application to arid conditions passed through the process of independent review, as per policy of the journal. We have included 9 papers in this special issue, which probably does not cover all possible population estimation methodologies expected for all the different animal groups or habitat variability of arid environment.

Two papers of the present special issue concern population abundance estimates of ungulates from high altitude arid environment of Karakoram-Pamir mountains (Marco polo sheep, blue sheep and Siberian ibex) and Central Karakoram National Park (Himalayan ibex), depending on sample survey from suitable vantage points. Hybrid model developed for estimation of elk population in high latitude cold sandy desert has been presented in one of the papers, using helicopter/airplane. Another paper has described strip transect sampling technique to estimate abundance of large mammal species in a wildlife sanctuary, depending on encounter rate. This paper though concerns with forested mountain tract, but the technique can be suitably adjusted when applied to arid environment, where the effective transect band could be wider. There is an interesting paper on possible use of owl pellets in determining relative abundance of small mammals with the assumption that owl hunt randomly and owl pellet is a random sampling of prey species. Fossil owl pellets collected from a cave and rodent bones recovered from these pellets when arranged on time sequence helped in analysis of past local abundance and extinction of small mammals in the area. Analysis of squamate (snakes and lizard) diversity through intensive search of 10 ha sample plots in croplands of semiarid Pakistan is the theme of another paper of this issue. Presence/absence data over 1 km<sup>2</sup> sampling area has been used to work out the habitat selection of Scimitar horned Oryx. Different models have been tried to know extinction probability of Hassawi cattle from Saudi Arabia; which can be used for other wildlife species with suitable adjustments.

Basic initiative for taking out this special issue was provided by Prof. Dr. Khaled Al-Rasheid, former Editor in Chief of the journal. Having experience of working on animal population ecology in arid environment and realizing the difficulties/problems of working under arid conditions, I accepted his offer. His continuous support enabled us to take out this issue. Dr. Rizwan Irshad remained the pivot and effectively coordinated the day to day activities along with his other colleagues at the editor’s office. The present issue was not possible

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without the support of Prof. Dr. Ahmed Hamid Alghamidi, Editor in Chief. I am also privileged of having support of Prof. Steve Buckland, University of St. Andrew, Scotland, and Dr. Jeff Laake, Alaska Fisheries Science Centre, USA. Their guidance helped us in resolving a proper focus for the issue, and also in initial screening of the manuscripts. I am personally thankful to authors/researchers expressing their interest in this

issue, though many of the manuscripts could not be included in this issue, for various reasons.

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