

## The effects of climate change on biodiversity: Pressing issues and research priorities

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On a global scale, the Middle East is the only transition zone between three major biogeographic units, the Palaearctic, Afrotropical and Oriental Realms, resulting in an outstanding biogeographic significance and unique biological diversity. Biodiversity, which is part of our life-support system, is of particular ecological, economic, spiritual, cultural, and aesthetic importance. The countries in the Middle East have ratified the United Nations Convention on Biological Diversity, with obligations to document and conserve the floras and faunas on their territories. In recent years, numerous projects focusing on sustainable use and conservation of biological diversity have been initiated. However, the scientific and academic baselines are often lacking. The “Middle Eastern Biodiversity Network” (MEBN), founded in 2006 by six universities and research institutes in Iran, Jordan, Germany, Lebanon and Yemen was designed to fill this gap.

The overall goal of the MEBN is to strengthen, within a multi-faceted network, the capacity of countries throughout the Middle East in documenting and analysing the Region’s biodiversity, promoting sustainable resource use, and conservation. Given the transboundary nature of biodiversity issues a regional approach is required. Consequently, networking is the preferred solution. The results of baseline research carried out in the framework of the MEBN are of utmost importance for many applied fields,

such as conservation, coastal zone management, fisheries management, agriculture, and forestry. It is imperative that these results be available to peers, decision makers, and the general public. A wide range of activities are carried out in the framework of the Network, including regional capacity building in establishing professionally managed nature museums, developing university curricula in biodiversity, conducting scientific research, and organising workshops and conferences on Middle Eastern biodiversity. Finally, a key task is translating biodiversity research into conservation and sustainable development.

The “First Middle Eastern Biodiversity Congress” was held in Aqaba, Jordan from 20 to 23 October 2008. However, strictly speaking, this was not the first conference of its kind. A symposium on Biodiversity in the Middle East was organised in 1951 by the late Professors H.A.F. Gohar, K. Kosswig and H. Steinitz in Istanbul, Turkey. In 1985, a second “Symposium on the Fauna and Zoogeography of the Middle East” was held in Mainz, Germany, organised by R. Kinzelbach, F. Krupp and W. Schneider. Many colleagues, who participated in that conference 23 years ago, attended the Aqaba Congress. The 40 participants of the Mainz Symposium came up with visions, plans, and recommendations for future activities to promote regional scientific collaboration, and the conference in Aqaba offered an excellent opportunity to evaluate what has been achieved and to decide where to go from here. The community of scientists involved in biodiversity research, education, and conservation has grown significantly. More than 500 colleagues registered for the Aqaba Congress and more than 300 attended (Fig. 1).

Besides following up on themes addressed in the past, emerging issues received attention, particularly climate change, which is considered one of the most pressing global problems of mankind. Reliable scenarios for pathways of future climate change are available, though little is known about the consequences. The biosphere is reacting to climate change and the effects will be highly complex, affecting speciation and extinction rates, geographic distribution of species, composition and functioning of ecosystems, ecophenotypic adaptation, and biogeochemical cycles. All these processes are still very poorly understood. Since humans are part of and directly depend on biodiversity it is essential that biologists now join forces to get a better understanding of what our living world will look like in the near future. Thus, in Aqaba a specialised symposium discussed the effects of climate change on biodiversity, identifying the most pressing issues and research priorities in the Region.

The Middle East is plagued by conflicts, which have major impacts on biodiversity and the present situation in the Region is not conducive to cooperation across national boundaries. Being aware of the importance of a regional dialogue, the organisers of the Aqaba Congress took up a challenge in bringing together scientists from all parts of the Region. Given the ecological and economic importance of biodiversity research, education and conservation – above all in the light of climate change – we as biodiversity researchers must find ways to overcome present barriers to fulfilling our societal duties, building on the great potential that science offers for bridging gaps. The very survival of the Region’s flora and fauna is at stake, and we are still far away from viable

solutions to these pressing problems. The participation of scientists from Europe, Asia, Africa, the Americas and Australia underline the global significance of Middle Eastern biodiversity and opportunities for international cooperation.

This special issue of "BioRisk – Biodiversity and Ecosystem Risk Assessment" contains 15 papers presented during the First Middle Eastern Biodiversity Congress, addressing a wide range of themes ranging from plant and animal biodiversity, ecology and conservation, impact of development, and the effects of climate change, to biodiversity networking in other parts of the world. Out of 32 authors contributing to this issue, 23 are from the Region, while nine are from Europe and North America. In the proceedings of the Mainz Symposium (Krupp et al. 1987), only eight out of 28 authors were from the Middle East. This is a clear sign of the growing attention biodiversity research is receiving in the Region. Papers addressing systematic zoology are included in a special issue of ZooKeys, which is being published simultaneously.

The First Middle Eastern Biodiversity Congress was jointly organised by the Senckenberg Research Institute and Museum of Nature, Frankfurt am Main, Germany; and the Marine Science Station, Aqaba, Jordan, two institutions with a long history of collaboration in biodiversity research, education, and conservation. Many organisations and individuals have supported the conference, too many to be mentioned by name. We are particularly grateful to the German Academic Exchange Service (DAAD) for financially supporting the MEBN during its first three years of existence and for making this Congress a reality. Several Jordanian organisations, institutions and companies financially supported the Congress: The Middle East Science Fund, the University of Jordan, Yarmouk University, the Aqaba Special Economic Zone Authority, the Jordan Higher Council for Science and Technology, Ayla Resort, the Jordan Commercial Bank, and the Aqaba Development Corporation. We are most grateful to all member institutions of the MEBN, our partners in organising the Congress and the commercial sponsors. Our colleagues in Aqaba and Frankfurt, particularly Maroof Khalaf, Fuad Al-Horani, Riyad Manasrah, Saber Al-Rosan, Nadia Manasfi, Eike Neubert and Matthias Schneider put a tremendous amount of skilful effort into organising this conference. Our thanks are also due to the authors contributing to this issue, the referees who reviewed the papers, and to Pensoft Publishers for a very fruitful collaboration. The publication of this special issue of BioRisk was financially supported by the Biodiversity and Climate Research Centre (BiK-F), Frankfurt am Main, which is part of the research funding programme "LOEWE – Landes-Offensive zur Entwicklung Wissenschaftlich-ökonomischer Exzellenz" of the Ministry of Higher Education, Research and Arts, State of Hesse, Germany.

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**Figure 1.** Participants of the First Middle Eastern Biodiversity Congress in Aqaba, Jordan (photo Yasser Geneid, 23 October 2008).