



King Saud University

Saudi Journal of Biological Sciences

www.ksu.edu.sa
www.sciencedirect.com



ORIGINAL ARTICLE

SaudiVeg ecoinformatics: Aims, current status and perspectives



Mohamed A. El-Sheikh ^{a,b,*}, Jacob Thomas ^a, Ahmed H. Alfarhan ^a,
Abdulrahman A. Alatar ^a, Sivadasan Mayandy ^a, Stephan M. Hennekens ^c,
Joop H.J. Schaminée ^c, Ladislav Mucina ^{d,e}, Abdulla M. Alansari ^a

^a Department of Botany and Microbiology, College of Science, King Saud University, P.O. Box 2455, Riyadh 11451, Saudi Arabia

^b Department of Botany, Faculty of Science, Damanhour University, Damanhour, Egypt

^c Team Vegetation, Forest and Landscape Ecology, Alterra Green World, P.O. Box 47, NL-6700 AA Wageningen, The Netherlands

^d School of Plant Biology, The University of Western Australia, 35 Stirling Highway, Crawley WA 6009, Perth, Australia

^e Department of Geography and Environmental Studies, Stellenbosch University, Private Bag X1, Matieland 7602, Stellenbosch, South Africa

Received 6 November 2015; revised 24 January 2016; accepted 7 February 2016

Available online 11 February 2016

KEYWORDS

Arabian Peninsula;
Eco-informatics;
Habitat;
Middle East;
Najd region;
Nature conservation;
Turboveg;
Vegetation

Abstract During the last decade many electronic databases of vegetation plots were established in many countries around the world. These databases contain valuable phytosociological information assisting both governmental and NGO (Non-governmental organizations) agencies to formulate strategies and on-ground plans to manage and protect nature resources. This paper provides an account on aims, current status and perspectives of building of a vegetation database for the Central Region (Najd) of Saudi Arabia – the founding element of the Saudi Vegetation Database (SVD). The data stored by the database are sample plots (vegetation relevés) collected according to the field techniques of the Braun-Blanquet approach (lists of taxa accompanied by semi-quantitative cover assessment), and are accompanied by general vegetation characteristics such as vegetation layering and cover, information on life-form of the recorded species, geographical coordinates, altitude, soil typology, topography and many more. More than 2900 vegetation-plot records (relevés) have so far been collected in the Najd region; of these more than 2000 have already been stored using the Turboveg database platform. These field records cover many habitats such as depressions, wadis (dry river beds), agricultural lands, sand dunes, sabkhas, and ruderal habitats. The ecological information collected in the database is currently the largest set of vegetation data collated into a database in the Middle East. These data are of great importance for biodiversity studies in

* Corresponding author at: Department of Botany and Microbiology, College of Science, King Saud University, P.O. Box 2455, Riyadh 11451, Saudi Arabia.

E-mail address: el_sheikh_eg@yahoo.co.uk (M.A. El-Sheikh).

Peer review under responsibility of King Saud University.



<http://dx.doi.org/10.1016/j.sjbs.2016.02.012>

1319-562X © 2016 The Authors. Production and hosting by Elsevier B.V. on behalf of King Saud University.

This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

Saudi Arabia, since the region is recording a loss of biodiversity at a fast rate due to environmental problems such as global warming and land-use changes. We envisage that this database would catalyze further data collection on vegetation of the entire Arabian Peninsula, and shall serve as one of the most important datasets for classification and mapping of the vegetation of the Kingdom of Saudi Arabia.

© 2016 The Authors. Production and hosting by Elsevier B.V. on behalf of King Saud University. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

1. Introduction

Eco-informatics and biodiversity informatics are two recent and closely related disciplines (Bisby, 2000; Canhos et al., 2004; Bekker et al., 2007; Guralnick and Hill, 2009; Dengler et al., 2011a,b, 2012a). Collating large vegetation data sets is one of the current major focus areas of eco-informatics. The ongoing research in this field aims at ensuring that vegetation data are properly archived and made accessible to both academic studies as well as practical applications. Saudi Arabia is a country experiencing rapid economic, social and climate changes having direct impact on the natural vegetation. It is therefore that the collation of vegetation data in Saudi Arabia became important for agencies funding data collection, as well as for those that use such data to support policy decisions and assessment of compliance with legal obligations of nature resource management and conservation. Accessible vegetation data of known quality are required to meet these obligations. In recent years, the resurgence of interest in vegetation monitoring has resulted in proliferation of data collection activities at local level (e.g. the Department of Conservation agencies, territorial local authorities, and private consultants). However, these data are often not archived or made accessible in a way that would allow the tackling of issues spanning large temporal or spatial scales of national interest. Adequate documentation and storage of data are especially important in long-term studies observing vegetation plots (Dengler et al., 2012b). This activity is one of the pillars of a successful biomonitoring.

In order to meet the demands of modern nature resource management and conservation, Saudi Vegetation Database (SVD) has been founded within a two-year project aimed at creation of a publicly accessible, internet-based tool. The major aim of the SVD is to provide a public repository for vegetation plot data that researchers may use to access freely for the purpose of viewing, searching, downloading, and using vegetation-related information. There are no geographical restrictions for data submission to the Saudi Vegetation Database, but the initial geographical focus is the Central Region (Najd) of Saudi Arabia. As in September 2015, the SVD held about 2900 plots covering much of the Central Region of Saudi Arabia.

This paper reviews the initial stages of building of the SVD, as an essential first step in developing a comprehensive ecological information system for Saudi Arabia. This is the first vegetation database in the Kingdom of Saudi Arabia, containing up-to-date list of plants taxa prepared by taxonomists of the Saudi Flora Group covering to date 2281 vascular plants (<http://plantdiversityofsaudiarabia.info/index.htm>; Migahid 1978; Chaudhary 1999–2001; Collenette, 1999). The SVD also provides a solid foundation for new vegetation-analytical

studies in the fields of vegetation classification, resource mapping, and biodiversity assessment.

The driving motivations underpinning the SVD are:

- (1) implementation of an international approach to address pressing scientific questions that have been spurred by the progressing climate and land-use changes occurring in Saudi Arabia;
- (2) harmonization of the efforts of building the vegetation database in Saudi Arabia with the rest of the world; and
- (3) archiving the legacy vegetation data sets that are in danger of being lost.

Here we present a brief background on the conceptual framework of the database, preliminary inventory of the existing vegetation data sets, and some of the potential products. The ultimate goal of this project is to develop the national vegetation database as the prime repository for ecological data in the Kingdom on vegetation structure and composition, aimed specifically at:

- (1) enhancement of (i) archival data storage of nationally important datasets in the Central Region (Najd) of Saudi Arabia; (ii) availability of the archived data to users, while protecting the interests of data providers, and (iii) encouraging the scientists to use these stored vegetation data;
- (2) collation and evaluation (i) of the extensive knowledge and diverse experience of vegetation scientists from Saudi universities and other research organizations, (ii) of the extensive literature on structure, variability and distribution of vegetation in the Central Region (Najd) of Saudi Arabia, and above all, (iii) of the many national and regional vegetation data and maps already existing, through a well-organized, national collaborative scheme;
- (3) construction of a Standard Plant Species Checklist for Saudi Arabia that would enhance standardization of taxonomic concepts and serving as a crucial communication tool between taxonomists and ecologists;
- (4) facilitating construction of a comprehensive biological information system (modelled on the SynBiosys (Schaminée et al., 2007) platform; Biodiversity models or Biodiversity Monitoring Data Portal) (Schaminée et al., 2007) collating vegetation-plot data, spatial data (vegetation maps), geographic and socio-economic data sets and allowing detection, assessment and prediction of environmental changes; and
- (5) providing baseline data for formulation of the first vegetation classification system and for construction of the first comprehensive vegetation map of the Arabian Peninsula.

Download English Version:

<https://daneshyari.com/en/article/5745638>

Download Persian Version:

<https://daneshyari.com/article/5745638>

[Daneshyari.com](https://daneshyari.com)