

Digitization and Morphometric Characterization of Botanical Collection of Indian Arid Zones as Informatics Initiatives Addressing Conservation Issues in Climate Change Scenario

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Abstract : Indian Thar desert being the seventh largest in the world is the main hot sand desert occupies nearly 385,000km² and about 9% of the area of the country harbours several species likely the flora of 682 species (63 introduced species) belonging to 352 genera and 87 families. The degree of endemism of plant species in the Thar desert is 6.4 percent, which is relatively higher than the degree of endemism in the Sahara desert which is very significant for the conservationist to envisage. The advent and development of computer technology for digitization and data base management coupled with the rapidly increasing importance of biodiversity conservation resulted in the invention of biodiversity informatics as discipline of basic sciences with multiple applications. Aichi Target 19 as an outcome of Convention of Biological Diversity (CBD) specifically mandates the development of an advanced and shared biodiversity knowledge base. Information on species distributions in space is the crux of effective management of biodiversity in the rapidly changing world. The efficiency of biodiversity management is being increased rapidly by various stakeholders like researchers, policymakers, and funding agencies with the knowledge and application of biodiversity informatics. Herbarium specimens being a vital repository for biodiversity conservation especially in climate change scenario the digitization process usually aims to improve access and to preserve delicate specimens and in doing so creating large sets of images as a part of the existing repository as arid plant information facility for long-term future usage. As the leaf characters are important for describing taxa and distinguishing between them and they can be measured from herbarium specimens as well. As a part of this activity, laminar characterization (leaves being the most important characters in assessing climate change impact) initially resulted in classification of more than thousands collections belonging to ten families like Acanthaceae, Aizoaceae, Amaranthaceae, Asclepiadaceae, Anacardeaceae, Apocynaceae, Asteraceae, Aristolochiaceae, Berseraceae and Bignoniaceae etc. Taxonomic diversity indices has also been worked out being one of the important domain of biodiversity informatics approaches. The digitization process also encompasses workflows which incorporate automated systems to enable us to expand and speed up the digitisation process. The digitisation workflows used to be on a modular system which has the potential to be scaled up. As they are being developed with a geo-referencing tool and additional quality control elements and finally placing specimen images and data into a fully searchable, web-accessible database. Our effort in this paper is to elucidate the role of BIs, present effort of database development of the existing botanical collection of institute repository. This effort is expected to be considered as a part of various global initiatives having an effective biodiversity information facility. This will enable access to plant biodiversity data that are fit-for-use by scientists and decision makers working on biodiversity conservation and sustainable development in the region and iso-climatic situation of the world.

Keywords : biodiversity informatics, climate change, digitization, herbarium, laminar characters, web accessible interface

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