
What is biodiversity? How to better observe it and understand it in the 21st century?

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Abstract

Until the end of the 19th century, biodiversity data collection was focusing on species taxonomy, collecting specimens with few field notes often limited to the country of origin. As floras became more refined, biologists started to dedicate more effort to the data related to their species observations, adding notes on the exact locality and finally exact coordinates when GPS became available, just a few decades ago.

Nowadays, recording accurately georeferenced species observations has become the norm which, combined with gazetteers of georeferenced localities, allows to generate detailed species distribution maps essential for biodiversity studies. But biodiversity is more than being about species and where we find them. Recording accurate information on the habitat and on population state is still widely considered as optional metadata to species records (as was the exact locality for the 19th century botanist). As a result, species distribution maps contribute very little to knowledge on ecosystem distribution, very little on the species ecology, and very little on the stage of species invasion for different types of habitats of different regions.

Here we present an information system, developed in Seychelles but applicable worldwide, which is based on observation and databasing of biodiversity using four reference indexes: taxonomic, geographic (TDWG), ecosystemic and populational. The ecology of sites where biological observations are made is characterised by the detailed observation of 'ecosystem characters' (substrate, drainage, etc.) using standardized terminologies that are made available to the observer directly on the field through a smartphone-based data collection system designed with Open Foris Collect Mobile. We believe that such a system is the key to enabling the collection of virtual ecosystemic specimens leading to progress in ecosystem taxonomy. The data collection system is compatible with most of the habitat classification systems developed during the last few decades, by combining hierarchy and modularity, and by combining relative scales. We believe that a more complex vision of biodiversity focused on direct observations on the field will be essential to better understand biodiversity at species and ecosystem levels.

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