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Taxonomics—next-generation taxonomists

Ana Sofia P. S. Reboleira[1] · **Henrik Enghoff**[1]

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Abstract "Taxonomics" is proposed as a short name for the discipline of discovering, recognising, describing and classifying biological entities.

Keywords Taxonomics · Taxonomy · -Omics · Classification

Following the current tendency of giving "-omics" names to more and more fields of biological research, we propose the term "taxonomics" for the discipline of discovering, recognising, describing and classifying biological entities. Taxonomics includes morphological, ethological, biochemical as well as genetic approaches for understanding species and their evolutionary relationships.

Just as next-generation sequencing can stitch together small fragments of sequence and thus help to understand the complete genome of an organism, next-generation taxonomists must be able to stitch together numerous small (and large) contributions to help to understand the entire complement of species inhabiting Earth—the global taxome—the sum of all taxa on Earth; see, e.g., Mallet (2014).

The efficiency of genomics, metabolomics and other members of the "-omics" family for differentiating taxa based on their molecules, in combination with the decline of classical taxonomy, potentially threatens the understanding of the association between form and function of organisms. A combination of classical and new approaches is needed if society wants a deep insight into global biodiversity and ecosystem functioning. Taxonomics can be construed as a global large-scale effort aiming to document all the organisms of the planet by embracing novel techniques and at the same time not losing "ground connection" in the form of physical depository of specimens in registered collections, allowing long-term validation, and the classical morphological approach, facilitating broad access to and broad understanding of taxonomic information also for non-specialist citizens.

In addition to the new techniques overviewed by Raupach et al. (2015), taxonomics also needs further layers of components, including biodiversity informatics and large-scale initiatives like, e.g., All-Taxa Biodiversity Inventories (ATBIs) and Planetary Biodiversity Inventories (PBIs) (Deharveng et al. 2015; Page 2008). A combination of all these with the classical and "-omics" approaches will provide biodiversity research, including taxonomy, with a most powerful multitask tool.

The term taxonomics appears scattered through the biological literature (Blaxter and Floyd 2003; Owen 2004), however without a proper definition and often a synonym of taxonomy. However, "taxonomy" is understood in quite different ways by different authors. In what is perhaps the broadest available definition of taxonomy, it includes the following: description, revision, naming and classification of taxa; phylogeny; study of infraspecific variation; construction and use of identification tools; and inventories (Enghoff and Seberg 2006), cf. also the broad definition adopted by the Global Taxonomy Initiative under the Convention on Biological Diversity (CBD 2016). For many people, however, taxonomy is understood in a much narrower sense, e.g., as "a purely descriptive science" or "a subset of systematics concerned with classification"; see Enghoff and Seberg (2006) and Wheeler (2004). By introducing the term "taxonomics" in the sense proposed here, disagreements about what taxonomy is can be avoided.

✉ Ana Sofia P. S. Reboleira
sreboleira@snm.ku.dk

[1] Natural History Museum of Denmark (Zoological Museum), University of Copenhagen, Universitetsparken 15, 2100 København Ø, Denmark

Can a new word really make a difference? We believe so—words remain a primary vehicle of communication: think of how fast words like biodiversity and DNA-barcoding have become integrated in the languages of science and society. The word taxonomics is herewith offered.

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