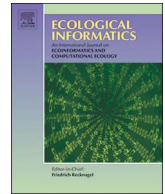




Contents lists available at ScienceDirect

Ecological Informatics

journal homepage: www.elsevier.com/locate/ecolinf

A thesaurus for phytoplankton trait-based approaches: Development and applicability



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ARTICLE INFO

Keywords:

Functional diversity
Phytoplankton trait
Thesaurus
SKOS
Semantic interoperability

ABSTRACT

In the last few decades, functional trait-based approaches have undergone an extraordinary expansion in phytoplankton ecology, due to the relative simplicity and the well-defined traits that determine the ecological niche of these organisms. A large quantity of heterogeneous and distributed data has been produced on phytoplankton traits and their use could be made more effective and efficient if data harmonization and interoperability would be improved.

The use of controlled vocabularies and thesauri is an acknowledged good practice to establish the foundation for semantic interoperability, a critical requirement for reuse and sharing of data. In fact, thesauri, collectively constructed, bypass ambiguity issues in natural language, facilitating the identification and integration of the information available in multiple data sources and allowing both scientists and computer applications to interpret more effectively the meaning of data.

Here we present a semantic resource on phytoplankton functional traits: the PhytoTraits thesaurus (<http://thesauri.lifewatchitaly.eu/PhytoTraits/index.php>). PhytoTraits is the result of the interdisciplinary collaboration of experts both from the phytoplankton functional domain and from information and communication technologies, working together within LifeWatch Italy, the Italian node of the e-science European infrastructure for biodiversity and ecosystem research. PhytoTraits is the first initiative to deal with the semantics of phytoplankton functional traits, focusing on morpho-functional traits towards standardized bio-volume assessment. It reflects the agreement of a scientific expert community to fix semantic properties (e.g. label, definition) of approximately 120 traits.

Following semantic web standard technologies, the thesaurus was implemented in Simple Knowledge Organization System (SKOS), a common data model based on the Resource Description Framework (RDF). PhytoTraits is freely available online, it can be queried through a SPARQL endpoint (<http://thesauri.lifewatchitaly.eu/PhytoTraits/sparql.php>) and is also accessible via API (<http://thesauri.lifewatchitaly.eu/PhytoTraits/services.php>) for integration with other systems. If adopted as a standard and rigorously applied and enriched by the scientific community, PhytoTraits, providing harmonized concepts with associated unique and resolvable URIs, has the potential to significantly reduce the barriers to data discovery, integration, and exchange.

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<http://dx.doi.org/10.1016/j.ecoinf.2017.10.014>

Received 8 August 2017; Received in revised form 24 October 2017; Accepted 27 October 2017

Available online 28 October 2017

1574-9541/ © 2017 Published by Elsevier B.V.