

LifeWebs: A (global) database of bipartite ecological interaction networks

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Abstract

The structure and dynamics of ecological interactions are nowadays recognized as a crucial challenge to comprehend the assembly, functioning and maintenance of ecological communities, their processes and the services they provide. Nevertheless, while standards and databases for information on species occurrences, traits and phylogenies have been established, interaction networks have lagged behind on the development of these standards. Here, we discuss the challenges and our experiences in developing a global database of bipartite interaction networks.

LifeWebs^{*1} is an effort to compile community-level interaction networks from both published and unpublished sources. We focus on bipartite networks that comprise one specific type of interaction between two groups of species (e.g., plants and herbivores, hosts and parasites, mammals and their microbiota), which are usually presented in a co-occurrence matrix format. However, with LifeWebs, we attempt to go beyond simple matrices by integrating relevant metadata from the studies, especially sampling effort, explicit species information (traits and taxonomy/phylogeny), and environmental/geographic information on the communities.

Specifically, we explore 1) the unique aspects of community-level interaction networks when compared to data on single inter-specific interactions, occurrence data, and other biodiversity data and how to integrate these different data types. 2) The trade-off between user friendliness in data input/output vs. machine-readable formats, especially important when data contributors need to provide large amounts of data usually compiled in a non-machine-readable format. 3) How to have a single framework that is general enough to include disparate interaction types while retaining all the meaningful information.

We envision LifeWebs to be in a good position to test a general standard for interaction network data, with a large variety of already compiled networks that encompass different types of interactions. We provide a framework for integration with other types of data, and formalization of the data necessary to represent networks into established biodiversity standards.

Keywords

network ecology, interaction networks, food webs, database, biodiversity, data standards, data management

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Conflicts of interest

Endnotes

*1 <http://www.lifewebs.net/>