Function in ecology: description of the scientific uses and an epistemological framework

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Abstract

Functional explanations and ascriptions are ubiquitous and central in contemporary ecology, more specifically, in the Biodiversity and Ecosystem Functioning research program (BEF). This research program, which emerged in the early 1990s, has proposed a series of important changes in ecological thought. Although the functional explanations play a critical role in it, there is no epistemological foundation mentioned in the scientific literature for the uses of function, which is simply assumed as a self-evident notion. In this work we have two goals. First, we present an analysis of the uses of function in ecology. This descriptive analysis allows to map the more salient uses of function in the BEF, as well as their respective epistemological assumptions. The result is a typology with four uses of function in the BEF, which are associated, respectively, to a particular object of functional ascription (biodiversity, items of biodiversity, the ecosystem seen as a whole and, finally, the ecosystem seen as a part). Second, with a more normative goal and also taking as a starting point the descriptive analysis, we advance an epistemological framework to ground the ascriptions of function to the items of biodiversity. In this framework function in the BEF is defined as a precise effect of a given constraining action on the flow of matter and energy performed by a given item of biodiversity, in an ecosystem closure of constraints. After the presentation and explanation of this epistemological model, we apply it to a case study, evaluating the implications for ecology.

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