
Plasticity cannot explain itself

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Abstract

The assumption that plasticity is nothing more than a property of the genotype and that it is specific to particular traits within a given range of environments is based on the idea that the precise scientific – genetic – notion of "phenotypic plasticity" and a more general – sometimes metaphorical – notion of "plasticity" used across different disciplines of biology (in evolution, behavioral ecology or in cellular biology) can be assimilated. By focusing on the theoretical analysis of phenotypic plasticity, biologists have mainly addressed the issue of what its mechanistic bases are (Schlichting & Smith 2002) and they have tried to reach a general consensus assuming that phenotypic plasticity should be considered as an *explanandum* – its *explanans* being the process of natural selection to which is added the assumption of a genetic basis for plasticity. However, theoreticians of the Extended Synthesis – whose aim is to offer an extended view of evolutionary theory based on recent data – have assumed that the same phenomenon of phenotypic plasticity is not only an *explanandum* of evolution but that it is also an *explanans* of evolution (Pigliucci 2010). This assumption has led to a certain confusion concerning the explanatory status of phenotypic plasticity. In this presentation, I will show how a general notion of plasticity (distinguished from the specific notion of "phenotypic plasticity") might either be considered as an *explanans* of variation or as an *explanandum* of natural selection. I will argue that a distinction between "phenotypic plasticity" and a more general notion of "plasticity" is important in order to offer a clarification on the explanatory status of plasticity. I will argue that this clarification sheds light on the reasons for a recurrent use of a general notion of plasticity in all disciplines of biology alongside the existence of the genetic notion of phenotypic plasticity.

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