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ECOLOGICAL COMPLEXITY

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Abstract: Complexity has received substantial attention from scientists and philosophers alike. There are numerous, often conflicting, accounts of how complexity should be defined and how it should be measured. Much less attention has been paid to the epistemic implications of complexity, especially in Ecology. How does the complex nature of ecological systems affect ecologists' ability to study them? This Element argues that ecological systems are complex in a rather special way: they are causally heterogeneous. Not only are they made up of many interacting parts, but their behaviour is variable across space or time. Causal heterogeneity is responsible for many of the epistemic difficulties that ecologists face, especially when making generalisations and predictions. Luckily, ecologists have the tools to overcome these difficulties, though these tools have historically been considered suspect by philosophers of science. This is an updated philosophical account with an optimistic outlook of the methods and status of ecological research.

Keywords: complexity, heterogeneity, ecology, generality, prediction

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