

Are hypotheses necessary in ecology and evolution?

Matthew Betts¹, Adam Hadley¹, David Frey¹, Sarah Frey¹, Dustin Gannon¹, Scott Harris¹, Hankyu Kim¹, Kara Leimberger¹, Katy Moriarty¹, Joseph Northrup², Ben Phalan³, Josee Rousseau¹, Thomas Stokely¹, Jonathon J. Valente¹, and Diego Zarrate-Charry¹

¹Oregon State University

²Trent University

³University of Cambridge

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Abstract

Research hypotheses have been a cornerstone of science since before Galileo. Many have argued that inclusion of multiple hypotheses (1) encourage discovery of mechanisms, and (2) reduce bias – both features that should increase transferability and reproducibility. However, we are entering a new era of big data and highly predictive models where some argue the hypothesis is outmoded. Indeed, using a detailed literature analysis, we found prevalence of hypotheses in eco-evo research is very low (6.7-26%) and static from 1990-2015, a pattern mirrored in an extensive literature search (N=302,558 articles). Our literature review also indicates that neither grant success or citation rates were related to the inclusion of hypotheses, which may provide disincentive for hypothesis formulation. Here we confront common justifications for avoiding hypotheses and present new arguments based on benefits to the individual. Although hypotheses are not always necessary, we expect their continued and increased use will help our fields move toward greater understanding, reproducibility, prediction, and effective conservation of nature.

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