agreed truth, can ever be the only determinant of policy. Other political, social, and economic realities (themselves also 'truths') must obviously be taken into account. By contrast, when we speak to the public, either directly or through the media, the priority must be to set the public mood and the agenda. This is where we need simple truths rather than detailed arguments. What is more, our interaction with policy makers is itself likely to be driven by any influence we can have on the public mood, since it is the public mood that plays a major part in defining the prevailing political and social realities.

I cannot pretend that the world would certainly be saved if only we were to arm ourselves with metaphors. However, we should not imagine that if we just carry on as before, explaining patiently, maintaining our scientific integrity, and proceeding with caution, then eventually everyone will see the light. We must at least reconsider the ways in which we have been framing our arguments. We must abandon any feeling that behaving in the way we believe a scientist should behave is more important than achieving our desired outcome. We should use our expertise not to parade our expertise, but to devise, and then to adopt, simple and repeatable messages that will change the way people think. Indeed, we should stop believing that it is not our role to change the way people think, but rather to give people the facts and let them make up their own minds. Feeling this way is naïve, and our obsession with supposed integrity is self-indulgent.

I am sure that Jonathan Freedland was speaking for many of us when he lamented the attacks on 'liberality' at the close of a dreadful 2016: 'If liberal means holding true to the values of the Enlightenment, including a belief in facts and evidence and reason, then call me a liberal'[iii]. Well, you can call me a liberal too. But, I also believe that we are going to have to learn not only to be liberals but to be effective liberals. And that means adopting a whole new doctrine whenever we present our public face.

Resources

[i] https://mainlymacro.blogspot.co.uk/2016/06/for-economists-project-fear-is-brexit.html

[ii] www.alternet.org/environment/george-lakoff-why-pope-francis-killed-it-addressing-climate-change

[iii] www.theguardian.com/commentisfree/2016/dec/23/dishonest-attacks-metropolitan-liberal-elite

http://dx.doi.org/10.1016/j.tree.2017.03.009

References

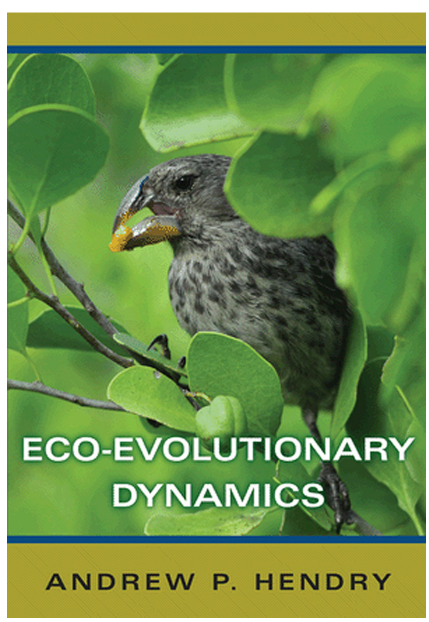
1. Lakoff, G. (2009) *The Political Mind: A Cognitive Scientist's Guide to Your Brain and Its Politics,* Penguin Books
2. Pinker, S. (2006) Block that metaphor! *New Republic* 8 October

---

Book Review

Bridging Ecology and Evolution

Anna Kuparinen[1,*]



Already by the early dawn of evolutionary biology, it was appreciated that ecological differences among species' habitats, resources, and environments were key drivers of evolution and speciation. Thus, research on interactions between ecology and evolution is not a novel endeavor. It has, however, become increasingly popular to provide these interactions with 'a new wrapping', that is, the study of eco-evolutionary dynamics [1]. Consequently, eco-evolutionary dynamics is not a newly developed theory but rather a novel framework within which to study the interplay of ecology and evolution. To this end, Andrew P. Hendry makes a rigorous attempt to provide a structure for the eco-evolutionary framework and to synthesize recent empirical advances within it. Interactions among fundamental evolutionary biologists and ecologists are traditionally rare, but *Eco-evolutionary Dynamics* takes a step towards bridging this gap, by attracting readers from both camps and by demonstrating that an integrated perspective is imperative to comprehend complex biological dynamics.

A current trend in evolutionary biology is to focus on small scales with big tools: genes behind individual traits explored through vast amounts of sequencing. The eco-evolutionary framework provides a fresh counterpoint to these approaches by bringing phenotypes back to the forefront. Namely, despite the fact that evolution modifies genomes, phenotypes are the units at the level at which eco-evolutionary dynamics arise. The eco-evolutionary context thus brings us back to the fundamentals of life histories, such as trade-offs among traits, and the fitness and plasticity of phenotypes [2].

Body size, for example, is one of the most fundamentally and in-depth studied species properties [3,4]. It is also a strong candidate for a keystone trait capable of driving eco-evolutionary dynamics at contemporary time scales. This is because body size has direct ecological implications for demography and species interactions [3] but, simultaneously, it is a trait under strong natural selection [5] and a trait subject to rapid environmental and human-induced alterations. In fishes, increasing temperatures and intensive fishing both can cause rapid shrinking of body sizes [6,7]. As noted by the book, strong eco-evolutionary dynamics operating at short time scales are generally expected in biological systems undergoing rapid changes, which push species away from their adaptive optima.

One key feature of the eco-evolutionary dynamics framework composed by Hendry is the partitioning of the dynamics into its two directions. The eco-to-evo pathway investigates how ecological features drive evolutionary processes, whereas the evo-to-eco pathway explores the ecological consequences of evolutionary changes in phenotypes. Synthesis of the state-of-the-art knowledge reveals that the two sides of the coin remain explored in a very unbalanced manner. There is neither a coherent theory nor a set of predictions about how phenotypic changes translate into ecological dynamics, particularly beyond focal species, through interspecific interactions, community structures, and ecosystem functioning. Hendry's synthesis emphasizes the point that phenotypes, and contemporary changes in phenotype, represent an underexplored aspect to be adopted in ecological studies, to gain a more complete picture of eco-evolutionary interactions and the role of evolutionary processes at ecological time scales.

Syntheses of eco-evolutionary research are strongly inclined to experimental and empirical observations, covering both terrestrial and aquatic systems. In contrast, less attention is focused on modelling-based investigations, such as simulation studies describing eco-evolutionary dynamics. These modelling approaches have recently become particularly popular in the context of fishing-induced evolution [8] and might turn useful also more generally, by providing insights into key feedback mechanisms through which phenotypes affect population dynamics. More generally, simulation-based approaches are most likely necessary to explore rigorously the dynamic nature of eco-evolutionary feedbacks and how they escalate from focal to interacting species through continuous feedbacks back and forth between ecological processes and selective forces. Consideration of such ongoing dynamics interestingly links to the concept of cryptic eco-evolutionary dynamics: stability of a biological system might be maintained by underlying eco-evolutionary feedbacks that muffle each other. Thus, demonstrating the absence or insignificant role of eco-evolutionary dynamics is difficult – a point that should convince the most skeptical minds to open this thought-provoking book.

Eco-evolutionary Dynamics by Andrew P. Hendry. Princeton University Press, 2016. US$65.00/£54.95, hbk (416 pages) ISBN 978-0-691-14543-3.

[1]Department of Biological and Environmental Science, University of Jyväskylä, P.O. Box 35, 40014 Jyväskylä, Finland

*Correspondence: anna.k.kuparinen@jyu.fi (A. Kuparinen).

http://dx.doi.org/10.1016/j.tree.2017.01.005

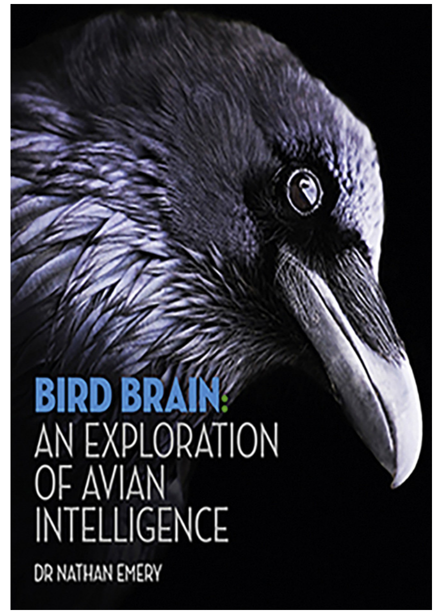
References

1. Bailey, J.K. *et al.* (2009) From genes to ecosystems: an emerging synthesis of eco-evolutionary dynamics. *New Phytol.* 184, 746–749
2. Roff, D.A. (2002) *Life History Evolution,* Sinauer
3. Peters, R.H. (1986) *The Ecological Implications of Body Size,* Cambridge University Press
4. Charnov, E. (1993) *Life History Invariants: Some Explorations of Symmetry in Evolutionary Ecology,* Oxford University Press
5. Kingsolver, J.G. (2001) The strength of phenotypic selection in natural populations. *Am. Nat.* 157, 245–261
6. Law, R. (2000) Fishing, selection, and phenotypic evolution. *ICES J. Mar. Sci.* 57, 659–668
7. Cheung, W.W.L. *et al.* (2012) Shrinking of fishes exacerbates impacts of global ocean changes on marine ecosystems. *Nature Clim. Change* 3, 254–258
8. Dunlop, E.S. *et al.* (2009) Eco-genetic modeling of contemporary life-history evolution. *Ecol. Appl.* 19, 1815–1834

Book Review

Big Bright Bird Brain Bonanza

Kevin Laland[1,*]



The connection between brain and intelligence has befuddled scientists for millennia. The belief that there is a relationship between the magnitude of the brain and complexity of behavior goes back to the ancient Greeks (although, curiously, Aristotle believed that the heart was the seat of intelligence [1]). Yet, the fact that whales can have brains more than six times the volume of the human brain, while a human's brain is just one third of the size of that of an elephant, historically led researchers to the view that the absolute size of the brain was a poor indication of the intellectual prowess of an animal. Larger animals might simply have bigger brains because they have more cells to process and control; bigger limbs to move might require larger nerves to move them. For this reason, for decades, scientific investigations of animal intelligence have concentrated on various measures of 'relative brain size' (brain mass relative to body mass, or the relative size of brain components). Yet, paradoxically, when researchers focused solely on primate brains, they consistently found that absolute brain size correlated with behavioral complexity more strongly than did relative brain size [2,3].

Such findings can only be resolved if we recognize that brain comparisons across