**Disagreement about invasive species does not equate to denialism.**

**A response to Russell and Blackburn**

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The growth of academic and societal attention to invasive species, their impacts and their control, has been accompanied by frequent controversies and conflicts surrounding management and policy responses. These often include disagreements not just about scientific evidence and its application, but also about ethical, cultural and political differences and divergent assessments of risk [1]. Russell and Blackburn [2] argue that challenges to scientific consensus surrounding biological invasions are on the rise. They introduce the concept of invasive species denialism, characterising science denialism as “the rejection of undisputed scientific facts”, typically by “groups with a vested interest in opposition”. We agree with them that unsubstantiated refutation and misreporting of scientific evidence should be robustly challenged. We also agree that the disingenuous manufacture of uncertainty surrounding issues on which there is largely scientific consensus is problematic. However, we are concerned that their article blurs important differences between honest disagreement and science denialism, and could be counterproductive.

Science denialism has elsewhere been identified as “the employment of rhetorical arguments to give the appearance of legitimate debate where there is none”, with “the ultimate goal of rejecting a proposition on which a scientific consensus exists” [3]. Denialist movements have refuted scientific consensus surrounding climate change, vaccinations, and smoking. Russell and Blackburn propose that consensus surrounding invasive species is similarly, and increasingly, being challenged “in a framework of science denialism”. We disagree that there is scientific consensus around invasive species and propose that much debate in this field stems from legitimate disagreement, not disingenuous rhetoric.

Russell and Blackburn provide little support for their claims and the sources they cite do not deny the problem of invasive species. Rather, they: express scepticism about the way specific evidence is used to make broader scientific and political claims[[1]](#endnote-1); challenge the suitability, efficacy and ethics of various management responses[[2]](#endnote-2); and/or summarise ongoing debates – including among scientists – about the relative importance of species’ origins and impact[[3]](#endnote-3),[[4]](#endnote-4). Popular commentaries are sometimes provocative and stylistically theatrical, but most acknowledge that species introductions can have significant, disruptive, and potentially irreversible impacts. We do not doubt that some who contest specific conclusions and recommendations of invasion biologists disbelieve or disregard the evidence presented. However, this does not necessarily equate with widespread (or rising) denialism towards invasive species.

It is also apparent from the invasion science literature that there is not, and has never been, scientific consensus about biological invasions, but continuous, healthy debate (both within and beyond academia) about how to understand, evaluate and respond to the challenges they pose [1,4,5]. A key, recurrent issue is the use of contested frames, language and metaphors in invasion science. For some, ‘invasive’ and ‘alien’ are loaded concepts with nationalist and nativist connotations [6]. They are also linked to a particular version of ecology that has firm spatial boundaries and temporal states against which perturbations are measured and judged as positive or negative; facts and values cannot, therefore, be neatly separated in invasion science. Russell and Blackburn appreciate that there are inherent normative dimensions to the field, particularly when evidence is applied to policy and management recommendations. However, people who challenge dominant views within invasion biology – for example, who disagree that “ethical duties of humans differ between native and alien species” [2], or express optimism about novel ecosystems – are not necessarily denying scientific evidence. More often, they are interpreting evidence differently, drawing alternative conclusions, and challenging norms. However unpopular these unorthodox views might be, they are legitimate contributions with an important role to play. Raising challenging questions should be possible without being accused of denialism, and might be most productively engaged with through listening, acknowledgement and open discussion, rather than rebuttal (as suggested in [7]).

We are therefore concerned that the tone of Russell and Blackburn’s article is counter to its stated message that “there should be a vibrant and robust dialogue” about invasive species. Labelling those who challenge dominant views ‘deniers’, and assuming their “motivations are disingenuous”, is not conducive to good quality public, or indeed scientific, debate. Furthermore, such labelling might easily be misused as a means of shutting down valid concerns about the principles, recommendations, and scientific outputs of invasion biology.

We are struggling to conserve biodiversity in what has been labelled a ‘post-truth’ world, in which the value and power of the scientific process may not be appreciated as much, or by as many, as we might like. Russell and Blackburn suggest we rely on an established approach, where invasion biologists do their science, lead discussions and report on “current scientific evidence”. Yet we know this approach is often ineffective, especially in applied arenas [8]. Instead, a more productive approach, being trialled in other fields, is to initiate early public engagement, co-develop hypotheses, co-produce evidence, and make democratic decisions about policy and practice [9].

**References**

1 Estévez, R.A. *et al.* (2015) Clarifying Values, Risk Perceptions, and Attitudes to Resolve or Avoid Social Conflicts in Invasive Species Management. *Conserv. Biol.* 29, 19–30

2 Russell, J.C. and Blackburn, T.M. (2016) The Rise of Invasive Species Denialism. *Trends Ecol. Evol.* DOI: 10.1016/j.tree.2016.10.012

3 Diethelm, P. and McKee, M. (2009) Denialism: What is it and how should scientists respond? *Eur. J. Public Health* 19, 2–4

4 Humair, F. *et al.* (2014) Understanding misunderstandings in invasion science: why experts don’t agree on common concepts and risk assessments. *NeoBiota* 20, 1–30

5 Young, A.M. and Larson, B.M.H. (2011) Clarifying debates in invasion biology: a survey of invasion biologists. *Environ. Res.* 111, 893–898

6 Fall, J.J. (2013) Biosecurity and ecology: beyond the nativist debate. In *Biosecurity: The socio-politics of invasive species and infectious diseases* (Dobson, A. et al., eds), pp. 167–181, Routledge

7 Richardson, D.M. and Ricciardi, A. (2013) Misleading criticisms of invasion science: a field guide. *Divers. Distrib.* 19, 1461–1467

8 Weber, E.U. and Stern, P.C. (2011) Public understanding of climate change in the United States. *Am. Psychol.* 66, 315

9 Young, J.C. *et al.* (2014) Improving the science-policy dialogue to meet the challenges of biodiversity conservation: having conversations rather than talking at one-another. *Biodivers. Conserv.* 23, 387–404

1. **Resources**

   [www.newscientist.com/article/mg22730372-000-invasive-species-caused-nearly-half-of-extinctions-its-hearsay/](http://www.newscientist.com/article/mg22730372-000-invasive-species-caused-nearly-half-of-extinctions-its-hearsay/) [↑](#endnote-ref-1)
2. <http://www.economist.com/news/leaders/21679471-most-campaigns-against-foreign-plants-and-animals-are-pointless-and-some-are-worse> [↑](#endnote-ref-2)
3. [www.nytimes.com/2016/03/01/science/invasive-species.html](http://www.nytimes.com/2016/03/01/science/invasive-species.html) [↑](#endnote-ref-3)
4. [www.economist.com/news/international/21679447-nobody-likes-interloper-invasive-species-are-more-benign-generally](http://www.economist.com/news/international/21679447-nobody-likes-interloper-invasive-species-are-more-benign-generally) [↑](#endnote-ref-4)