



DANIEL BARRIOS-O'NEILL



RESEARCH PROFILE

I study consumer-resource interactions as fundamental determinants of population stability and coexistence. Understanding the impacts of global change stressors on consumer-resource interactions is at the core of my work, and I particularly focus on biological invasions and habitat modification. I quantify interactions and their consequences using laboratory and *in situ* experiments, in conjunction with ODE and agent-based modelling. Together, these have helped me to develop new concepts in ecology. For example, I introduced the idea of Context-Dependent Scaling (CDS) and, recently, I proposed the existence of transient keystone function resulting from ecosystem feedbacks. At my early career stage, I have worked rapidly to publish these and other ideas in leading journals. Moving forward, I'm seeking to build on established collaborations nationally, and in Canada, South Africa and Switzerland, to develop my ideas further and—particularly—to apply them to conservation, fisheries and food security objectives.

CONTACT



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PUBLICATION HIGHLIGHTS

Barrios-O'Neill, D., Bertolini, C. & Collins, P.C. (in press). Trophic cascades and the transient keystone concept. *Biological Conservation*

Pritchard, D.W., Paterson, R.A., Bovy, H.C. & **Barrios-O'Neill, D.** (2017) frair: a package for fitting and comparing consumer functional responses in R. *Methods in Ecology & Evolution*, doi: 10.1111/2041-210X.12784

Barrios-O'Neill, D., Kelly, R., Dick, J. T. A., Ricciardi, A., & Maclsaac, H. J. & Emmerson, M. C. (2016). On the context-dependent scaling of consumer feeding rates. *Ecology Letters*, 19, 668–678.

Dick, J. T. A., Laverty, C., Lennon, J. J., **Barrios-O'Neill, D.**, Mensink, P. J., Britton, J. R., ... Caffrey, J. M. (2016). Invader Relative Impact Potential: a new metric to understand and predict the ecological impacts of existing, emerging and future invasive alien species. *Journal of Applied Ecology*, doi: 10.1111/1365-2664.12849

Barrios-O'Neill, D., Dick, J. T. A., Emmerson, M. C., Ricciardi, A., & Maclsaac, H. J. (2015). Predator-free space, functional responses and biological invasions. *Functional Ecology*, 29, 377-384.

Barrios-O'Neill, D., Dick, J. T. A., Emmerson, M. C., Ricciardi, A., Maclsaac, H. J., Alexander, M. E., & Bovy, H. C. (2014). Fortune favours the bold: a higher predator reduces the impact of a native but not an invasive intermediate predator. *Journal of Animal Ecology*, 83, 693–701.

Barrios-O'Neill, D., Dick, J. T. A., Ricciardi, A., Maclsaac, H. J., & Emmerson, M. C. (2014). Deep impact: in situ functional responses reveal context-dependent interactions between vertically migrating invasive and native mesopredators and shared prey. *Freshwater Biology*, 59, 2194-2203.

EDUCATION & CAREER

2015 – present: Postdoctoral Research Fellow, Queen's University Belfast. NERC-funded Marine Ecosystems Research Programme. Empirical and meta-analytical methods to resolve the scaling of functional responses; parameterisation of whole-sea ecosystem models; meta-community stability.

2011 – 2015: PhD (Ecology), Queen's University Belfast.

Thesis: Consumer-resource interactions and biological invasions: insights from an invasive Ponto-Caspian study system.

2007 – 2011: Marine Biologist, Northern Ireland Environment Agency.

Marine monitoring and community assessment of benthic invertebrates, intertidal macrophytes, phytoplankton and estuarine fish for Marine Strategy Framework and Water Framework Directives.

2006 – 2007: Phycologist, Sherkin Island Marine Station

Lead marine phycologist on the Bantry Bay phytoplankton survey. Assistant biologist on intertidal and bird surveys.

2002 – 2005: BSc (Marine Biology), University of Wales, Bangor.

First class with honours. Dissertation: The effects of temperature and light intensity on the re-establishment of symbiosis in *Aptasia* following bleaching.

TEACHING & SUPERVISION

- 2016:** Level 3 Climate Change and GIS. Lectures: the physical basis and ecological consequences of climate change.
- 2016:** Level 2 Marine Ecology. Lectures: Predator-prey interactions and population ecology.
- 2016:** Level 1 Environmental Biology. Practicals: biological monitoring methods.
- 2016:** Level 1 Environmental Biology. Lectures: predator-prey interactions and community ecology.
- 2016:** Supervision: honours projects students (James Edgar and Gavin O'Connor).
- 2015:** Postgraduate and faculty. Functional response analysis methods in R. Functional response workshop, Stellenbosch.
- 2015:** Supervision: Nuffield Foundation research student (Chloe McKee).
- 2011–2015:** Level 1 Environmental Biology. Demonstrator: hedgerow survey methods, marine seine netting, intertidal taxonomy and survey methods, and quantification of predator-prey interactions.
- 2012:** Supervision: Nuffield Foundation research student (Cathal Burke).

SEMINARS & WORKSHOPS

- 2017:** Marine policy workshop. Debate chair. Marine Biological Association Conference, University of Exeter.
- 2016:** Context-dependent scaling of consumer feeding rates. Oral presentation. British Ecological Society Aquatic Ecology Special Interest Group. Charles Darwin House, London.
- 2016:** Functional response analysis: empirically resolving type and making comparisons. Oral presentation. Functional response workshop, Stellenbosch.
- 2015:** Landscapes of biotic resistance: context-dependencies restructure the scaling of predator-prey interactions. Oral presentation. ASLO, Granada.
- 2014:** Understanding impact: biological invasions and consumer-resource interactions. Oral presentation. Ecology, Evolution, Behaviour and Environmental Economics Seminars, Queen's University Belfast.
- 2013:** Understanding the invasion success and ecological impacts of invasive species: a comparative functional response methodology. Oral presentation. International Conference on Aquatic Invasive Species, Niagara.

SCHOLARSHIPS & FUNDING

- 2015:** NERC public outreach grant. Grant awarded to promote several NERC funded projects at Queen's via a mobile outreach platform we dubbed Canned Ecology. Value: £4,660.
- 2014:** Special Research Scholarship, Queen's University Belfast. Selected for a continuation of PhD research as a result of outstanding progress and publication record. Value: £13,726.
- 2013:** Emily Sarah Montgomery Travel Scholarship, Queen's University Belfast. Selected following application, and provision of a conference proceedings report. Value: £550.

ALL PUBLICATIONS

- 1. Barrios-O'Neill, D.,** Bertolini, C., & Collins, P. C. (in press). Trophic cascades and the transient keystone concept. *Biological Conservation*.
- 2. Pritchard, D. W.,** Paterson, R. A., Bovy, H. C., & **Barrios-O'Neill, D.** (2017). frair: an R package for fitting and comparing consumer functional responses. *Methods in Ecology and Evolution*.
- 3. Dick, J. T. A.,** Laverty, C., Lennon, J. J., **Barrios-O'Neill, D.,** et al. (2017). Invader Relative Impact Potential: a new metric to understand and predict the ecological impacts of existing, emerging and future invasive alien species. *Journal of Applied Ecology*.
- 4. Laverty, C.,** Green, K. D., Dick, J. T. A., **Barrios-O'Neill, D.,** et al. (2017). Assessing the ecological impacts of invasive species based on their functional responses and abundances. *Biological Invasions*, 19(5), 1653–1665.
- 5. Dick, J. T. A.,** Alexander, M. E., Ricciardi, A., Laverty, C., Paul, O., Xu, M., ... **Barrios-O'Neill, D.,** et al. (2017). Functional responses can unify invasion ecology. *Biological Invasions*, 19(5), 1667–1672.
- 6. Barrios-O'Neill, D.,** et al. (2016). On the context-dependent scaling of consumer feeding rates. *Ecology Letters*, 19(6), 668–678.
- 7. Barrios-O'Neill, D.** (2016). The Serengeti Rules, S.B. Carroll (Ed.). Princeton University Press, Oxford (2016). 263 pp. *Basic and Applied Ecology*.
- 8. Wasserman, R. J.,** Alexander, M. E., Weyl, O. L. F., **Barrios-O'Neill, D.,** Froneman, P. W., & Dalu, T. (2016). Emergent effects of structural complexity and temperature on predator–prey interactions. *Ecosphere*, 7(2).
- 9. Barrios-O'Neill, D.,** et al. (2015). Predator-free space, functional responses and biological invasions. *Functional Ecology*, 29(3), 377–384.
- 10. Bovy, H. C.,** **Barrios-O'Neill, D.,** et al. (2015). Predicting the predatory impacts of the “demon shrimp” *Dikerogammarus haemobaphes*, on native and previously introduced species. *Biological Invasions*, 17(2), 597–607.
- 11. Wasserman, R. J.,** Alexander, M. E., **Barrios-O'Neill, D.,** Weyl, O. L. F., & Dalu, T. (2015). Using functional responses to assess predator hatching phenology implications for pioneering prey in arid temporary pools. *Journal of Plankton Research*, 38(1), 154–158.
- 12. Barrios-O'Neill, D.,** et al. (2014). Fortune favours the bold: a higher predator reduces the impact of a native but not an invasive intermediate predator. *The Journal of Animal Ecology*, 83, 693–701.
- 13. Barrios-O'Neill, D.,** et al. (2014). Deep impact: *in situ* functional responses reveal context-dependent interactions between vertically migrating invasive and native mesopredators and shared prey. *Freshwater Biology*, 59(10), 2194–2203.