

Dr. Ross N. Cuthbert

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Current Position

Jan 2020 – Present **Alexander von Humboldt Postdoctoral Research Fellow**
GEOMAR Helmholtz Centre for Ocean Research Kiel (hosted by Dr. Elizabeta Briski)

Visiting Scholar
Queen's University Belfast

Honorary Research Associate
South African Institute for Aquatic Biodiversity

Education & Employment History

Sep 2016 – Dec 2019 **Ph.D.** Biological control of *Culex* mosquitoes using multiple predators
Queen's University Belfast/University of Reading (supervised by Prof. Jaimie T.A. Dick, Dr. Neil Reid and Prof. Amanda Callaghan)
 Pass

Feb 2019 – Aug 2019 **Visiting Ph.D. Research Fellow**
 Sep 2017 – Apr 2018 *South African Institute for Aquatic Biodiversity*
 Ecological impacts of invasive fish; biological control agent screening from ephemeral pond ecosystems

Oct 2018 – Nov 2018 **Visiting Ph.D. Research Fellow**
CEREEP-Ecotron Île-de-France
 Abiotic context-dependencies of invasive fish interaction strengths

Jun 2018 – Sep 2018 **Visiting Ph.D. Research Fellow**
University of Reading
 Behavioural responses of mosquitoes to natural enemies; impacts of microplastics in freshwater ecosystems

- Sep 2014 – Sep 2016 **M.Sc. Ecological Management and Conservation Biology**
Queen's University Belfast
Pass with Distinction (82 %)
Research Project: Invasive aquatic macrophytes: Invasion risk modelling and chemical control viability for *Lagarosiphon major*
- Feb 2015 – Aug 2016 **Positional Improvement Quality Control Operator**
Land and Property Services, Dept. of Finance Northern Ireland
Digitisation and analysis of land registry using Geographical Information Systems (GIS); managing performance of team of staff
- June 2014 – Aug 2014 **Mapping and Charting Officer**
Land and Property Services, Dept. of Finance Northern Ireland
Digitisation of agricultural boundaries using GIS
- Sep 2011 – Sep 2014 **B.Sc. (Hons) Geography**
Queen's University Belfast
First Class (73 %)
Research Project: Investigating the distribution and environmental impacts of the invasive intertidal cordgrass *Spartina anglica*

Research Interests & Background

I am an experimental ecologist with broad interests surrounding biotic interactions and environmental change. In particular, I focus on the implications of environmental modulations for consumer-resource interaction strengths, and consequently the outcomes for ecosystem stability. I have a wide range of skills, from field-based methodologies conducting surveys and sampling, to laboratory experiments and analyses. I also possess strong quantitative skills surrounding the development and use of statistical models to answer complex ecological questions. During my Honours and Masters research, I applied a range of field and laboratory methodologies to understand the impacts of invasive species, including ecological surveys, alongside geochemical and ecotoxicity analyses. In addition, I have applied my skillset in both academic and applied settings, having been employed in a managerial position within a spatial analysis domain during my Masters degree. During my Ph.D., I applied and developed my skillset to address questions relating to the biotic resistance of natural enemies towards pests, disease vectors and invasive species. A major focus of this work involved quantifying biotic interaction strengths relevant to natural enemy selection in order to facilitate effective target population regulation, particularly in the context of mosquito-borne disease. Most recently, I have been examining the interplays between environmental change and biological invasions, and developing measures of invasive species economic costs. My research has hitherto combined field and laboratory experiments with cutting-edge statistical techniques to aid the inference of species interactions, and has ecological, economic and public health relevance. In addition, I have developed novel metrics for stakeholders and practitioners to quantify ecological impacts under shifting environmental contexts, particularly surrounding the coupling of functional and numerical responses. I am involved in a wealth of collaborative projects with researchers both nationally and internationally, as evidenced by my strong publication record.

Papers Published or In Press

2020

91. Buxton, M., Nyamukondiwa, C.*, Dalu, T., **Cuthbert, R.N.**, Wasserman, R.J. 2020. Implications of increasing temperature stress for predatory biocontrol of vector mosquitoes. *Parasites and Vectors*, in press.
90. Dalal, A.*, Gallogly, J., **Cuthbert, R.N.**, Lavery, C., Dickey, J.W.E, Dick, J.T.A. 2020. Ecological impacts of an invasive predator are mediated by reproductive cycle. *Biological Invasions*, in press.
89. Coughlan, N.E.*, Lyne, L., **Cuthbert, R.N.**, Cunningham, E.M., Lucy, F.E., Davis, E., Caffrey, J.M., Dick, J.T.A. 2020. In the black: information harmonisation and educational potential amongst international databases for invasive alien species designated as of Union Concern. *Global Ecology and Conservation*, in press.
88. Dickey, J.W.E.*, **Cuthbert, R.N.**, Steffan, G., Dick, J.T.A., Briski, E. 2020 Sea freshening may drive the ecological impacts of emerging and existing invasive alien species. *Diversity and Distributions*, in press.
87. Dalu, T.*, Tshivhase, R., **Cuthbert, R.N.**, Murungweni, F.M., Wasserman, R.J. 2020. Metal distribution and sediment quality variation across sediment depths of a subtropical Ramsar declared wetland. *Water*, 12: 2779.
86. Dalu, T.*, **Cuthbert, R.N.**, Taylor, J.C., Magoro, M.L., Weyl, O.L.F., Froneman, P.W., Wasserman, R.J. 2020. Benthic diatom-based indices and isotopic biomonitoring of nitrogen pollution in a warm temperate Austral river system. *Science of the Total Environment*, 748: 142542.
85. Crane, K. †, **Cuthbert, R.N.* †**, Ricciardi, A., Kregting, L., Coughlan, N.E., MacIsaac, H.J., Reid, N., Dick, J.T.A. 2020. Gimme Shelter: Differential utilisation and propagule creation of invasive macrophytes by native caddisfly larvae. *Biological Invasions*, in press.
84. Mutshekwa, T., **Cuthbert, R.N.***, Wasserman, R.J., Murungweni, F.M., Daku, T. 2020. Nutrient release dynamics associated with native and invasive leaf litter decomposition: a mesocosm experiment. *Water*, 12: 2350
83. **Cuthbert, R.N.***, Kotronaki, S.G., Dick, J.T.A., Briski, E. 2020. Salinity tolerance and geographic origin predict global alien amphipod invasions. *Biology Letters*, 16: 20200354.
82. Wasserman, R.J.*, Sanga, S., Buxton, M., Dalu, T., **Cuthbert, R.N.** 2020. Invasive river red gum (*Eucalyptus camaldulensis*) alters leaf litter decomposition dynamics in an arid zone temporary river. *Inland Water*, in press.
81. Dalu, M.T., **Cuthbert, R.N.**, Muhali, H., Chari, L.D., Manyani, A.T., Masunungure, C., Dalu, T.* 2020. Is awareness on plastic pollution being raised in schools? Understanding perceptions of primary and secondary school educators. *Sustainability*, 12: 6775.
80. Netshiongolwe, N.R., **Cuthbert, R.N.**, Maenetje, M.M., Chari, L.D., Motitsoe, S.N., Wasserman, R.J., Munyai, L.F., Dalu, T.* 2020. Quantifying metal contamination and

potential uptake by *Phragmites australis* (Cav.) Steud. (Poaceae) along a subtropical river system. *Plants*, 9, 846.

79. Dalu, T., Murudi, T.T., Dondofema. F., Wasserman, R.J., Chari, L.D., Mrugunweni, F.M., **Cuthbert, R.N.*** 2020. Balloon milkweed *Gomphocarpus physocarpus* distribution and drivers in an internationally protected wetland. *Bioinvasions Records*, 9: 627-641.

78. Tladi, M., Nyamukondiwa, C., **Cuthbert, R.N.**, Wasserman, R.J.* 2020. Emergent effects of light and temperature on hatching success of *Streptocephalus cafer* (Branchiopoda: Anostraca) resting eggs. *Austral Ecology*, in press.

77. Coughlan, N.E.* , **Cuthbert, R.N.**, Dick, J.T.A. 2020. Aquatic biosecurity remains a damp squib. *Biodiversity and Conservation*, 21: 3091-3093.

76. Coughlan, N.E.*, Cunningham, E.M., Potts, S., McSweeney, D., Healey, E., Dick, J.T.A., Vong, G.Y.W., Crane, K., Caffrey, J.M., Lucy, F.E., Davis, E., **Cuthbert, R.N.** 2020. Steam and flame applications as novel methods of population suppression for invasive Asian clam *Corbicula fluminea* and Zebra mussel *Dreissena polymorpha*. *Environmental Management*, 66: 654-663.

75. Gotcha, N., Machekano, H., **Cuthbert R.N.**, Nyamukondiwa, C.* 2020. Heat tolerance may determine activity time in coprophagic beetle species (Coleoptera: Scarabaeidae). *Insect Science*, in press.

74. Mutshekwa, T., **Cuthbert, R.N.**, Wasserman R.J., Murungweni, F.M., Dalu, T.* 2020. Macroinvertebrate colonisation associated with native and invasive leaf litter decomposition. *Knowledge and Management of Aquatic Ecosystems*, 421: 32.

73. Haubrock, P.J.* †, **Cuthbert, R.N.** †, Veselý, L. †, Balzani, P., Baker, N., Dick, J.T.A., Kouba, A. 2020. Predatory functional responses under increasing temperatures of two life stages of an invasive gecko. *Scientific Reports*, 10: 10119

72. **Cuthbert, R.N.***, Wasserman, R.J., Dalu, T. 2020. Arid-adapted paradiaptomid copepods contribute to mosquito regulation. *African Zoology*, 55: 185-186.

71. **Cuthbert, R.N.***, Dalu, T., Wasserman, R.J., Weyl, O.L.F., Froneman, P.W., Callaghan, A., Dick, J.T.A. 2020. Inter-population similarities and differences in predation efficiency of a mosquito natural enemy. *Journal of Medical Entomology*, in press.

70. Lucy, F.E.*, Davis, E., Anderson, R., Booy, O., Bradley, K., Britton, R., Bryne, C., Caffrey, J., Coughlan, N.E., Crane, K., **Cuthbert, R.N.**, Dick, J.T.A., Dickey, J.W.E, Fisher, J., Gallagher, C., Harrison, S., Jebb, M., Johnson, M., Lawton, C., Lyons, D., Mackie, T., Maggs, C., Marnell, F., McLoughlin, T., Minchin, D., Monaghan, O., Montgomery, I., Moore, N., Morrison, L., Muir, R., Nelson, B., Niven, A., O'Flynn, C., Osborne, B., Ramsay, R., Reid, N., Roy, H., Sheehan, R., Stewart, D., Sullivan, M., Tierney, P., Treacy, P., Tricarico, E., Trodd, W. 2020. Horizon scan of invasive alien species for the island of Ireland. *Management of Biological Invasions*, 11: 155-177.

69. **Cuthbert, R.N.***, Wasserman, R.J., Dalu, T., Kaiser, H., Weyl, O.L.F., Dick, J.T.A., Sentis, A., McCoy, M.W., Alexander, M.E. 2020. Influence of intra- and interspecific variations in predator-prey body size ratios on trophic interaction strengths. *Ecology and Evolution*, 10: 5946-5962.

68. Froneman, P.W.S.*, **Cuthbert, R.N.** Ratio-independent prey preferences by an estuarine mysid. 2020. *Journal of Plankton Research*, 42: 398-401.
67. **Cuthbert, R.N.***, Bacher, S., Blackburn, T.M., Briski, E., Diagne, C., Dick, J.T.A., Essl, F., Genovesi, P., Haubrock, P.J., Latombe, G., Lenzner, B., Meinard, Y., Pauchard, A., Pyšek, P., Ricciardi, A., Richardson, D.M., Russell, J.C., Simberloff, D., Courchamp, F. 2020. Invasion costs, impacts, and human agency: response to Sagoff 2019. *Conservation Biology*, in press.
66. Coughlan, N.E.*, O'Hara, S., Crane, K., Dick, J.T.A., MacIsaac, H.J., **Cuthbert, R.N.** 2020. Touch too much: aquatic disinfectants and steam exposure treatments can inhibit further spread of invasive bloody-red mysid shrimp *Hemimysis anomala*. *Wetlands Ecology and Management*, 28: 397-402.
65. Mbedzi, R., **Cuthbert, R.N.**, Wasserman, R.J., Murungweni, F., Dalu, T.* 2020. Spatiotemporal variation in microplastic contamination along a subtropical reservoir shoreline. *Environmental Science and Pollution Research*, 27: 23880-23887.
64. **Cuthbert, R.N.***, Vong, G.Y.W., Paolacci, S., Dick, J.T.A., Callaghan, A., Coughlan, N.E. 2020. Aquatic plant extracts and coverage mediate larval mosquito survivorship and development. *Biological Control*, 145: 104263.
63. **Cuthbert, R.N.***, Dalu, T., Wasserman, R.J., Weyl, O.L.F., Froneman, P.W., Callaghan, A., Dick, J.T.A. 2020. Examining intraspecific multiple predator effects across shifting predator sex ratios. *Basic and Applied Ecology*, 45: 12-21.
62. Coughlan, N.E.*, Bradbeer, S.J., **Cuthbert, R.N.**, Cunningham, E.O., Crane, K., Potts, S., Caffrey, J.M., Lucy, F.E., Dunn, A.M., Davis, E., Renals, T., Quinn, C., Dick, J.T.A. 2020. Better off dead: assessment of aquatic disinfectants and thermal shock treatments to prevent the spread of invasive freshwater bivalves. *Wetlands Ecology and Management*, 28: 285-195.
61. Buxton, M., **Cuthbert, R.N.**, Dalu, T., Nyamukondiwa, C., Wasserman, R.J.* 2020. Complementary impacts of heterospecific predators facilitate improved biological control of mosquito larvae. *Biological Control*, 144: 104216.
60. Dickey, J.W.E.*, **Cuthbert, R.N.**, South, J., Britton, J.R., Caffrey, J., Chang, X., Crane, K., Coughlan, N.E., Fadaei, E., Farnsworth, K.D., Ismar, S.M.H., Joyce, P.W.S., Julius, M., Lavery, C., Lucy, F.E., MacIsaac, H.J., McCard, M., McGlade, C.L.O., Reid, N., Ricciardi, A., Wasserman, R.J., Weyl, O.L.F., Dick, J.T.A. 2020. On the RIP: Using the Relative Impact Potential metric to assess the ecological impacts of invasive alien species. *NeoBiota*, 55: 27-60.
59. Buxton, M., **Cuthbert, R.N.**, Dalu, T., Nyamukondiwa, C., Wasserman, R.J.* 2020. Cattle-induced eutrophication favours disease-vector mosquitoes. *Science of the Total Environment*, 715: 136952
58. Crane, K.*, Coughlan, N.E., **Cuthbert, R.N.**, Dick, J.T.A., Kregting, L., Ricciardi, A., MacIsaac, H., Reid, N. 2020. Friends of mine: an invasive freshwater mussel facilitates growth of invasive macrophytes and mediates their competitive interactions. *Freshwater Biology*, 65: 1063-1072

57. Coughlan, N.E.*, Armstrong, F., **Cuthbert, R.N.**, Eagling, L.E., Kregting, L., Dick, J.T.A., MacIsaac, H.J., Crane, K. 2020. Dead and gone: steam exposure kills layered clumps of invasive curly waterweed *Lagarosiphon major*. *Aquatic Botany*, 162: 103204.
56. Buxton, M., **Cuthbert, R.N.**, Dalu, T., Nyamukondiwa, C., Wasserman, R.J.* 2020. Predator density modifies mosquito regulation in increasingly complex environments. *Pest Management Science*, 76: 2079-2086.
55. Dalu, T.*, **Cuthbert, R.N.**, Chabalala, T., Froneman, P.W., Wasserman, R.J. 2020. Assessing sediment particle-size effects on benthic algal colonisation and total carbohydrate production. *Science of the Total Environment*, 710: 136348.
54. Bradbeer, S.J., Coughlan, N.E., **Cuthbert, R.N.**, Crane, K., Dick, J.T.A., Caffrey, J.M., Lucy, F.E., Renals, T., Davis, E., Warren, D.A., Pile, B., Quinn, C., Dunn, A.M.* 2020. The effectiveness of disinfectant and steam exposure treatments to prevent the spread of the highly invasive killer shrimp, *Dikerogammarus villosus*. *Scientific Reports*, 10: 1919.
53. **Cuthbert, R.N.***, Sithagu, R., Weyl, O.L.F., Wasserman, R.J., Dick, J.T.A., Callaghan, A., Froneman, P.W., Foord, S., Dalu, T. 2020. Water volume differentially modifies copepod predatory strengths on two prey types. *Limnologica*, 81: 125747.
52. Crane, K., **Cuthbert, R.N.**, Cunningham, E.M., Bradbeer, S.J., Eagling, L., Kregting, L., Dick, J.T.A., Dunn, A.M., Smith, E.R.C., Shannon, C., Caffrey, J.M., Davis, E., Coughlan, N.E.* 2020. Tomorrow Never Dies: biodegradation and subsequent viability of invasive macrophytes following exposure to aquatic disinfectants. *Management of Biological Invasions*, 11: 26-43.
51. **Cuthbert, R.N.***, Dalu, T., Wasserman, R.J., Weyl, O.L.F., Froneman, P.W., Callaghan, A., Dick, J.T.A. 2020. Sex demographics alter the effect of habitat structure on predation by a temporary pond specialist. *Hydrobiologia*, 847: 831-840.
50. **Cuthbert, R.N.***, Dalu, T., Wasserman, R.J., Monaco, C.J., Callaghan, A., Weyl, O.L.F., Dick, J.T.A. 2020. Assessing multiple predator, diurnal and search area effects on predatory impacts by ephemeral wetland specialist copepods. *Aquatic Ecology*, 54: 181-191.
49. Khosa, D.*, South, J., **Cuthbert, R.N.**, Wasserman, R.J., Weyl, O.L.F. 2020. Temperature regime drives differential predatory performance in Young of the Year Largemouth Bass and Florida Bass. *Environmental Biology of Fishes*, 103: 67-76.
48. **Cuthbert, R.N.***, Coughlan, N.E., Dick, J.T.A., Callaghan, A. 2020. Sink trap: duckweed and dye attractant reduce mosquito populations. *Medical and Veterinary Entomology*, 34: 97-104.
47. Dalal, A.*, **Cuthbert, R.N.**, Laverty, C., Dick, J.T.A., Sentis, A., Barrios-O'Neill, D., Ortiz-Perea, N., Callaghan, A., Gupta, S. 2020 Prey size and predator density modify impacts by natural enemies towards mosquitoes. *Ecological Entomology*, 45: 423-433.
46. **Cuthbert, R.N.***, Dalu, T., Wasserman, R.J., Weyl, O.L.F., Froneman, P.W., Callaghan, A., Dick, J.T.A. 2020. Lack of prey switching and strong preference for mosquito prey by a temporary pond specialist predator. *Ecological Entomology*, 45: 369-372.

45. **Cuthbert, R.N.***, Cunningham, E.M., Crane, K., Dick, J.T.A., Callaghan, A., Coughlan, N.E. 2020. In for the kill: novel biosecurity approaches for invasive and medically important mosquito species. *Management of Biological Invasions*, 11: 9-25.
44. **Cuthbert, R.N.***, Callaghan, A., Sentis, A., Dalal, A., Dick, J.T.A. 2020. Additive multiple predator effects can reduce mosquito populations. *Ecological Entomology*, 45: 243-450.
43. Dalal, A.* , **Cuthbert, R.N.**, Dick, J.T.A., Gupta, S. 2020. Prey preferences of notonectids towards larval mosquitoes across prey ontogeny and search area. *Pest Management Science*, 76: 609-616.
42. **Cuthbert, R.N.***, Dalu, T., Wasserman, R.J., Weyl, O.L.F., Froneman, P.W., Callaghan, A., Coughlan, N.E., Dick, J.T.A. 2020. Alternative prey impedes the efficacy of a natural enemy of mosquitoes. *Biological Control*, 141: 104146.
- 2019
41. **Cuthbert, R.N.***, Dalu, T., Wasserman, R.J., Weyl, O.L.F., Froneman, P.W., Callaghan, A., Dick, J.T.A. 2019. Additive multiple predator effects of two specialist paradiaptomid copepods towards larval mosquitoes. *Limnologica*, 79: 125727.
40. **Cuthbert, R.N.***, Callaghan, A., Dick, J.T.A. 2019. A novel metric reveals biotic resistance potential and informs predictions of invasion success. *Scientific Reports*, 9: 15314.
39. Mbedzi, R., Dalu, T., Wasserman, R.J., Murungweni, F., **Cuthbert, R.N.*** 2019. Functional response quantifies microplastic uptake by a widespread African fish species. *Science of the Total Environment*, 700: 134522.
38. **Cuthbert, R.N.***, Coughlan, N.E., Dickey, J.W.E., Rae, M., Laverty, C., South, J., Crane, K., McCard, M., Dick, J.T.A. 2019. Shell shocked: high predatory impacts on native prey by non-native terrapins irrespective of benthic habitat context. *Aquatic Invasions*, 14: 758-774.
37. Dalu, T.*, Malesa, B., **Cuthbert, R.N.** 2019. Assessing factors driving the distribution and characteristics of shoreline macroplastics in a subtropical reservoir. *Science of the Total Environment*, 696: 133992.
36. Sukiato, F., Wasserman, R.J.*, Chern Foo, S., Wilson, R.F., **Cuthbert, R.N.** 2019. The effects of temperature and shading on mortality and development rates of the dengue-vector mosquito, *Aedes aegypti* (Skuse). *Journal of Vector Ecology*, 44: 264-270.
35. Mofu, L.*, **Cuthbert, R.N.**, Dalu, T., Woodford, D., Wasserman, R.J., Dick, J.T.A., Weyl, O.L.F. 2019. Impacts of non-native fishes under a seasonal temperature gradient are forecasted using functional responses and abundances. *NeoBiota*, 49: 34986.
34. **Cuthbert, R.N.***, Dalu, T., Mutshekwa, T., Wasserman, R.J. 2019. Leaf inputs from invasive and native plants drive differential mosquito abundances. *Science of the Total Environment*, 689: 652-654.
33. Coughlan, N.E.* , **Cuthbert, R.N.**, Potts, S., Cunningham, E.M., Crane, C., Caffrey, J.M., Lucy, F.E., Davis, E., Dick, J.T.A. 2019. Beds Are Burning: eradication and control of

invasive Asian clam, *Corbicula fluminea*, with rapid open-flame burn treatments. *Management of Biological Invasions*, 10: 486-499.

32. **Cuthbert, R.N.***, Dalu, T., Wasserman, R.J., Dick, J.T.A., Callaghan, A., Froneman, P.W., Weyl, O.L.F. 2019. Quantifying reproductive state and higher predator effects on copepod motility in ephemeral ecosystems. *Journal of Arid Environments*, 168: 59-61.

31. **Cuthbert, R.N.***, Weyl, O.L.F., Wasserman, R.J., Dick, J.T.A., Froneman, P.W., Callaghan, A., Dalu, T. 2019. Combined impacts of warming and salinisation on trophic interactions and mortality of a specialist ephemeral wetland predator. *Freshwater Biology*, 64: 1584-1592.

30. **Cuthbert, R.N.***, Dickey, J.W.E., Coughlan, N.E., Joyce, P.W.S., Dick, J.T.A. 2019. The Functional Response Ratio (FRR): advancing comparative metrics for predictions of invader ecological impact. *Biological Invasions*, 21: 2543-2547.

29. Joyce, P.W.S., **Cuthbert, R.N.**, Kregting, L., Crane, K., Vong, G.Y.W., Cunningham, E.M., Dick, J.T.A., Coughlan, N.E.* 2019. Stay clean: direct steam exposure to manage biofouling risks. *Marine Pollution Bulletin*, 142: 465-469.

28. **Cuthbert, R.N.***, Callaghan, A., Dick, J.T.A. 2019. Differential interaction strengths and prey preferences across larval mosquito ontogeny by a cohabiting predatory midge. *Journal of Medical Entomology*, 56: 1428-1432.

27. Joyce, P.W.S.* , Dickey, J.W.E., **Cuthbert, R.N.**, Dick, J.T.A., Kregting, L. 2019. Using functional responses and prey switching to quantify invasion success of the Pacific oyster, *Crassostrea gigas*. *Marine Environmental Research*, 145: 66-72.

26. **Cuthbert, R.N.***, Ortiz-Perea, N., Dick, J.T.A., Callaghan, A. 2019. Elusive enemies: consumptive and ovipositional effects on mosquitoes by predatory midge larvae are enhanced in dyed environments. *Biological Control*, 132: 116-121.

25. Coughlan, N.E.*, Dickey, J.W.E., **Cuthbert, R.N.**, Kelly, T.C., Jansen, M.E.K., Dick, J.T.A. 2019. Driver's seat: understanding divergent zoochorous dispersal of propagules. *Frontiers in Ecology and Evolution*, 7: 70.

24. Dalal, A.*, **Cuthbert, R.N.**, Dick, J.T.A., Gupta, S. 2019. Water depth-dependent notonectid predatory impacts across larval mosquito ontogeny. *Pest Management Science*, 74: 2610-2617

23. **Cuthbert, R.N.***, Dalu, T., Wasserman, R.J., Weyl, O.L.F., Callaghan, A., Froneman, P.W., Dick, J.T.A. 2019. Sex-skewed trophic impacts in ephemeral wetlands. *Freshwater Biology*, 64: 359-366.

22. Coughlan, N.E.* , **Cuthbert, R.N.**, Dickey, J.W.E., Caffrey, J.M., Lucy, F.E., Davis, E., Dick, J.T.A. 2019. Better biosecurity: spread prevention of the invasive Asian clam, *Corbicula fluminea* (Müller, 1774). *Management of Biological Invasions*, 10: 111-126.

21. **Cuthbert R.N.**, Crane, K., Dick, J.T.A, Caffrey, J.M., MacIsaac, H.J., Coughlan, N.E.* 2019. Die Hard: impact of aquatic disinfectants on the survival and viability of invasive *Elodea nuttallii*. *Aquatic Botany*, 154: 11-17.

20. Crane, K.*, **Cuthbert, R.N.**, Dick, J.T.A., Kregting, L., MacIsaac, H.J., Coughlan, N.E. 2019. Full steam ahead: direct steam exposure to inhibit spread of invasive aquatic macrophytes. *Biological Invasions*, 21: 1311-1321.

19. **Cuthbert, R.N.***, Dalu, T., Wasserman, R.J., Callaghan, A., Weyl, O.L.F., Dick, J.T.A. 2019. Using functional responses to quantify notonectid predatory impacts across increasingly complex environments. *Acta Oecologica*, 95: 116-119.

18. McSweeney, D., Coughlan, N.E.*, **Cuthbert, R.N.**, Halton, P., Ivanov, S. 2019. Micro-sonic sensor technology enables enhanced grass height measurement by a Rising Plate Meter. *Information Processing in Agriculture*, 6: 279-284.

17. **Cuthbert, R.N.***, Callaghan, A., Dick, J.T.A. 2019. The effect of the alternative prey, *Paramecium caudatum* (Peniculida: Parameciidae), on the predation of *Culex pipiens* (Diptera: Culicidae) by the copepods *Macrocyclus albidus* and *Megacyclops viridis* (Cyclopoida: Cyclopidae). *Journal of Medical Entomology*, 56: 276-279.

16. **Cuthbert, R.N.***, Al-Jaibachi, R., Dalu, T., Dick, J.T.A., Callaghan, A. 2019. The influence of microplastics on trophic interaction strengths and oviposition preferences of dipterans. *Science of the Total Environment*, 651: 2420-2423.

2018

15. Dickey, J.W.E.*, **Cuthbert, R.N.**, Rea, M., Laverty, C., Crane, K., South, J., Briski, E., Chang, X., Coughlan, N.E., MacIsaac, H.J., Ricciardi, A., Riddell, G.E., Xu, M., Dick, J.T.A. 2018. Assessing the relative potential ecological impacts and invasion risks of emerging and future invasive alien species. *NeoBiota*, 40: 1-24.

14. Al-Jaibachi, R., **Cuthbert, R.N.**, Callaghan, A.* 2018. Examining effects of ontogenic microplastic transference on *Culex* mosquito mortality and adult weight. *Science of the Total Environment*, 651: 871-876.

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3. **Cuthbert, R.N.***, Callaghan, A., Dick, J.T.A. 2018. Dye another day: the predatory impact of cyclopoid copepods on larval mosquito *Culex pipiens* is unaffected by dyed environments. *Journal of Vector Ecology*, 43: 334-336.
2. **Cuthbert, R.N.***, Callaghan, A., Dick, J.T.A. 2018. Interspecific variation, habitat complexity and ovipositional responses modulate the efficacy of cyclopoid copepods in disease vector control. *Biological Control*, 121: 80-87.
1. **Cuthbert, R.N.***, Dick, J.T.A., Callaghan, A., Dickey, J.W.E. 2018. Biological control agent selection under environmental change using functional responses, abundances and fecundities; the Relative Control Potential (RCP) metric. *Biological Control*, 121: 50-57.

*Corresponding author, †equal contributions

Research Grants & Funding

2019

- G and M Williams fund: £2000 to support research at Queen's University Marine Laboratory into quantifications of predator-predator interactions.
- Irish Marine Institute travel grant: £1000 to support conference networking and travel costs.
- G and M Williams fund: £1000 to support research at Queen's University Marine Laboratory into mosquito biocontrol using botanical derivatives.
- Rhodes University Postdoctoral Fellowship: offered £21,000 postdoctoral funding; *not accepted*.
- Groupe de Recherche Interuniversitaire en Limnologie (GRIL) and Liber Ero (co-funding) Postdoctoral Fellowship at McGill University: offered £60,000 postdoctoral funding; *not accepted*.

- Alexander von Humboldt Foundation Postdoctoral Fellowship at GEOMAR Helmholtz Centre for Ocean Research Kiel: offered £88,000 postdoctoral funding: *accepted*.

2018

- European AQUACOSM Transnational access project (CEREPEE-Ecotron ÎleDeFrance): £20,000 to conduct mesocosm-based research to examine the ecological impacts of existing and emerging invasive aquatic species under ranging environmental contexts.

2017

- William and Betty MacQuitty travel grant: £1000 to support research concerning mosquito biological control and ephemeral pond trophic interactions at the South African Institute for Aquatic Biodiversity.

2016

- Department for the Economy (DfE) Northern Ireland studentship: offered £58,000 PhD funding (Biological mosquito control using multiple predators: *accepted*)
- Department for the Economy (DfE) Northern Ireland studentship: offered £58,000 PhD funding (The impacts of permafrost degradation on boreal ecosystems in the central Northwest Territories, Canada: *not accepted*)
- Natural Environment Research Council (NERC) IAPETUS studentship: offered £82,000 PhD funding (Valuing neo-native species: Is naturalised Scots pine a threat or benefit for climate resilience?: *not accepted*).

2014

- Queen's University Belfast (QUB) postgraduate scholarship: £2500 to undertake M.Sc. Ecological Management and Conservation Biology.
- Estyn Evans Prize: £100 for submitting the best undergraduate dissertation in B.Sc. Geography.

Research Skills

Field experience- Survey sampling design and implementation; GPS and map reading; undertaking ecological fieldwork in both temperate and tropical regions; biomonitoring of freshwaters; field techniques for invertebrates (gravid trapping, sweep netting; kick sampling); field techniques for ichthyology (seine netting, fyke netting; snorkel surveying); experience in captive breeding of insects and crustaceans as well as cultivation of aquatic macrophytes.

Laboratory skills- Design and execution of predator-prey dynamics experiments; geochemical analyses (scanning electron microscopy; loss-on-ignition); ecological sample processing for biomonitoring; ecotoxicology experiments; taxonomy and identification of insects and crustaceans; parasite load quantifications; collection and husbandry of animals (particularly aquatic invertebrates).

Data analysis- R-package (frequent: lme4, frair, emmeans, ggplot2, car, betareg, ordinal, ape); statistical model assumptions and selection; functional response analyses; species distribution modelling; ArcGIS; Spatial Studio; ImageJ; InkScape; SPSS.

Interpersonal skills- Leadership/Management skills: Throughout my career, I have developed excellent leadership and management skills across both academic and industrial backgrounds. I have managed projects, demonstrated and supervised students at both Honours and Masters level, and led teams to meet targets in industrial settings.

Team work: Although I am highly capable of working independently, much of my work has been collaborative, involving expertise from academics across the globe. Further, I have experience in participating within and leading teams during both field and laboratory work in both temperate and tropical regions. I feel I am a strong team-player, and that this is an essential attribute for the success of research projects.

Communication: I have a lot of experience in communicating to both specialist and non-specialist audiences, across both written and verbal mediums. I believe that this is an essential element of any piece of research in order to increase scope and impact, and for wide dissemination of results.

Teaching & Supervision

Teaching- Masters, Current Topics in Marine Ecology module (M.Sc. Biological Oceanography, GEOMAR): lecture and seminar.

Undergraduate, Level 1 Biodiversity module (B.Sc. Biological Science, Queen's University Belfast): demonstrating in field and laboratory practicals.

Supervision- Involved in the overseeing of seven Honours (four B.Sc. Biological Sciences, Queen's University Belfast; one B.Sc. Biological Sciences, University of Reading; one B.Sc. Conservation Biology, University of Venda; one B.Sc. Biological Sciences, Senckenberg) projects and three Masters (one M.Sc. Ecological Management and Conservation Biology, Queen's University Belfast; two M.Sc. Environmental Science, University of Venda) projects, including experimental design and implementation, data analyses and thesis writing. Also supervised the summer project of one Nuffield Foundation placement student at Queen's University Belfast.

Selected Press

“Reading study finds 'new pathway' for plastic pollution”, BBC

“Mosquitos are eating plastic and contaminating food chains, according to new research”, The Telegraph

“Microplastics can spread via flying insects, research shows”, The Guardian

“Mosquitoes eating microplastics raise fears of pollution harming birds and bats”, Independent, UK

“Microplastics may enter foodchain through mosquitoes”, Phys

“Microplastics are introduced into the food chain by mosquitoes and other flying insects that eat the waste when they hatch in water, scientists warn”, Daily Mail

“Microplastics may enter food chain through mosquitoes”, The Straits Times

“Mosquitoes are eating plastic and spreading it to new food chains”, New Scientist

“Mosquitoes may be contaminating ecosystems with tiny bits of plastic”, Science Magazine

“Mosquitoes are eating plastic. Why that's a big problem”, CNBC

This particular research was picked up by 63 news outlets in total.

“New directions in mosquito control”, SAIAB Features

Additional Experience & Qualifications

- Full, clean UK driving licence.
- Conversational Spanish, French and German.
- First Aid at Work certification (St John Ambulance, 2017).
- Academic writing for science (QUB, 2016).
- Demonstrator course (QUB, 2016).
- Taxonomic course for plants, bats and birds (QUB, 2015).
- Advanced GIS course (QUB, 2014).

Professional Activities

- Reviewer for *Global Change Biology*, *Conservation Biology*, *Diversity and Distributions*, *Science of The Total Environment*, *Freshwater Biology*, *Marine Biology*, *Biological Invasions*, *Global Ecology and Conservation*, *Ecology*, *PeerJ*, *Ecological Entomology*, *BioInvasions Records*, *Aquatic Invasions*, *Biological Control*, *Aquaculture Research*, *Journal of Fish Biology* and *Journal of Vector Ecology*.
- Guest Editor for special issue in *International Journal of Environmental Research and Public Health*, November 2019 – November 2020.
- Hosted workshop on statistical approaches for consumer-resource modelling at Queen’s University Belfast, November 2019.
- Participated in INVACOST workshop to quantify invasive species economic costs at University of Paris Saclay, November 2019.
- Participated in invasive species horizon scanning exercise for island of Ireland at IT Sligo, April 2017.
- Member of British Ecological Society.
- Member of Society for Vector Ecology.
- Member of Environmental Science Association of Ireland.
- Member of Irish Ecological Association.
- Member of European Mosquito Control Association.
- Member of Entomological Society of America.

Conference Presentations

Salinity and geographic origin mediate global alien amphipod invasions (September, 2020), NeoBiota conference, Vodice, Croatia

Biotic resistance from native predators predicts mosquito invasion success and informs biocontrol strategies (October, 2019), International Conference on Aquatic Invasive Species, Montreal, Canada.

Towards improved quantifications of interaction strengths in temporary ponds (July, 2019), Zoological Society of Southern Africa conference, Skukuza, South Africa

Intermediate predator naïveté and sex-skewed vulnerability predict the impact of an invasive higher predator (September, 2018), NeoBiota conference, Dublin, Ireland.

Biological control of the emerging mosquito problem in the UK and Ireland (April, 2017), ENVIRON conference, Athlone, Ireland.

Referees

Prof. Jaimie T.A. Dick, Queen's University Belfast, 19 Chlorine Gardens, Belfast, BT9 5DL, UK. Email: j.dick@qub.ac.uk

Prof. Amanda Callaghan, University of Reading, Whiteknights, Reading, RG6 6AS, UK. Email: a.callaghan@reading.ac.uk

Prof. Olaf L.F. Weyl, South African Institute for Aquatic Biodiversity, Somerset Street, Grahamstown, 6140, South Africa. Email: o.weyl@saiab.ac.za