

New invasive species breakthrough sparks interest around the world

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A research breakthrough at Queen's University Belfast has sparked interest among aquatic biologists, zoologists and ecologists around the world.

The joint research between Queen's and several South African institutions centred on the behaviour of some of the "world's worst" invasive species, including the large-mouth bass, an invasive fish which typically devastates invertebrate and other [fish communities](#) wherever it is introduced.

Previously, the search for general characteristics of invasive species had been elusive, but work carried out by Professor Jaimie Dick and post-doctoral researcher Mhairi Alexander, both from the School of Biological Sciences at Queen's and Centre for Invasion Biology in Stellenbosch, South Africa, revealed that the ecological impacts of invasive species might be readily predicted from features of their behaviour.

The paper has been selected for F1000Prime, a group which identifies and recommends important articles in biology and medical research publications, as being of special significance in its field.

Using an ecological theory that relates the rate at which an organism consumes resources to the density of that resource - known as the 'functional response curve' – the researchers showed that damaging invaders have consistently higher curves than natives.

Prof Dick explained the technique: "We presented the invasive fish, and local native fish of the same type, with tadpole prey at increasing densities. The invader fish consumed the prey at more than three times the rate of the native fish. The prey populations are simply not able to tolerate this increased mortality, and often go extinct soon after the invaders arrive. The data show that the invaders are predictable in their impacts by relatively simple derivation of their functional response curves as compared to natives".

Until now, the only reliable predictor of the impact of an invasive species has been its prior impacts elsewhere, but this was no use for invaders with no known impact history. Prof Dick continued: "We now have a method that allows us to understand the impacts of current invaders, but also to forecast the impacts of emerging and new invaders. We can also use the technique to predict how changing features of the environment, such as temperature, can increase or decrease the impacts of invaders. Our focus now is to examine if this technique works for a wide range of organisms. We are now testing the idea for other invasive fish, shrimps, wasps, and even plants, as they too can be measured as to their resource uptake rates, for example, with enriched nitrogen."

"The more [invasive species](#) that are tested with our method around the world the more we can draw broad conclusions as to the reliability of the method, but all results so far are very promising," Prof Dick added.

The work has been published in the Royal Society Journal *Biology Letters*.

Provided by Queen's University Belfast

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