Researchers revise Darwin's thinking on invasive species

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For more than a century and a half, researchers interested in invasive species have looked to Charles Darwin and what has come to be called his "naturalization conundrum." If an invader is closely related to species in a new area, he wrote in his landmark The Origin of Species, it should find a more welcoming habitat. On the other hand, it could expect competition from the related species and attacks from its natural enemies like predators and parasites.

But researchers writing in the latest issue of the *Proceedings of the National Academy of Sciences* say the relatedness of native and introduced species is not as important as the details of how they go about doing their business.

"We thought we understood how things happened, but maybe they didn't happen that way," says Emily Jones, a Rice University researcher in evolutionary ecology who started pondering Darwin's conundrum while a post-doctoral researcher in the Washington State University lab of Richard Gomulkiewicz. She is the lead author of the *Proceedings* paper with Gomulkiewicz and Scott Nuismer of the University of Idaho.

The model they've developed in analyzing Darwin's conundrum could lead to a new way of gauging the potential of invasive species, a major ecological and economic concern as plants and animals have spread into new habitats around the planet.

Darwin focused on ecological relationships between species. But Jones

and her colleagues focused on species' phenotypes, characteristics that emerge as a plant or animal's genes interact with the environment. In the process, they found that ecological relationships alone are a weak predictor of an invader's success.

To be sure, says Jones, researchers will want to see what species an invader is related to and what interactions that species has that are important for understanding its survival.

But then, she says, "you'd want to look at how those interactions work," comparing the mechanism of their interaction and the traits they share.

More information: Revisiting Darwin's conundrum reveals a twist on the relationship between phylogenetic distance and invisibility, www.pnas.org/cgi/doi/10.1073/pnas.1310247110

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