

# 'Botanical big data' helping to predict how plant species will respond to environmental change

December 22 2015, by Thomas Deane

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Scientists are using a 'botanical big data' approach to predict how different plant species will respond to human-induced disturbances and environmental change in different ecosystems spanning the world's continents.

We are used to shops, websites and companies keeping track of our purchases, what we eat, whom we date, and even when and how we exercise. Keeping track of the most intimate details of life, death and reproduction should not be unique to human populations, though.

There are over 300,000 plant species in the world, and scientists have used a database of detailed survival, growth, and reproductive information for 418 different species, from short-lived weedy thistles to giant redwood trees and from cacti to daffodils, to root around for common patterns for how plants live their lives across the plant kingdom.

"We are digging for answers to some of the most important questions facing a world increasingly affected by human population growth and changing climate, and knowing how species are likely to react to these changes is vital if we are to effectively conserve biodiversity, protect and promote species that we value, and control the damaging species," said Professor of Zoology in the School of Natural Sciences at Trinity College Dublin, Yvonne Buckley.

Professor Buckley and her collaborators found that with only two key characteristics of plant life histories a large amount of variation in their way of life can be explained, regardless of where the plants live, what they look like, or which species they are most closely related to: 1) how fast plants grow vs. how well they survive, and 2) how often, how much and for how long they reproduce.

Knowing the pace of life and reproduction strategy of a plant population can predict how fast its population grows and its response to disturbances, indicating which species may be vulnerable to [environmental change](#).

Professor Buckley added: "Our analysis shows that plants like the wild daffodil may be vulnerable to decline in the wild and that it may not be able to recover quickly after damaging environmental change. Our new categorisation of the plant kingdom will make these kinds of predictions faster and more accurate, enabling us to manage [species](#) before they disappear."

We rely on plants for some of our most basic needs like food, shelter and clothing. It is therefore vital that we know how a diverse range of [plant species](#) make a living in the world so that we can sustainably use and protect them.

"Our database includes demographic records of survival, growth and reproduction, which are used to construct population models," said Dr. Rob Salguero-Gómez, visiting researcher at Trinity College Dublin and first author on the paper.

"This information will enable researchers to address important questions in the fields of conservation biology, ecology and evolution that to date have remained unanswered because the necessary data were not available in a single, openly accessible repository."

Provided by Trinity College Dublin

Citation: 'Botanical big data' helping to predict how plant species will respond to environmental change (2015, December 22) retrieved 23 April 2024 from <https://phys.org/news/2015-12-botanical-big-species-environmental.html>

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