

# J. Philip Grime (1935–2021)

The founder of plant functional ecology.

**P**rof. John Philip Grime FRS (hereafter Phil) died on 19 April 2021. Phil will be remembered as perhaps the pre-eminent plant ecologist of his generation. His 1974 *Nature* paper outlining CSR strategy theory revolutionized the theory of plant ecology. CSR theory postulates the existence of three distinct, fundamental avenues of evolutionary specialization (competitors, stress-tolerators and ruderals) that are favoured by different combinations of stress and disturbance. His 1977 *American Naturalist* paper, essentially an expanded version of that *Nature* paper, has been cited over 3,200 times, and few plant ecologists will be without a copy of his 1979 book *Plant Strategies and Vegetation Processes*, or the updated 2001 version, *Plant Strategies, Vegetation Processes and Ecosystem Properties*.

Phil was born on 30 April 1935 in Manchester, United Kingdom. He obtained his undergraduate degree in 1956 and his PhD in 1960, both at Sheffield University, where he spent his entire scientific career, with the exception of a short period at Connecticut Agricultural Experiment Station, United States (1963–64). He was Deputy Director, and later Director, of the Natural Environment Research Council (NERC) Unit of Comparative Plant Ecology (UCPE).

Today, a glance at Web of Science shows that generations of ecologists who weren't even born in 1974 are discovering his ideas and applying them to everything from plant invasions and succession to the evolution of crop plants and the functioning of green roofs, and to organisms as disparate as lichens, microbes and ants. He also personally collaborated with and inspired a generation of ecologists. Of course, not everyone agreed with him. He was one of the most prominent 'lumpers' in ecological thinking; CSR was about the biggest of 'big pictures,' essentially a theory of everything, and Phil had little patience with contemporaries who were more interested in the detail.

Nevertheless, even if no-one would call Phil diplomatic, those who interacted with him in person found that he was always willing to listen patiently to questions, explain his point of view, and take seriously the counter-arguments of other ecologists, however young or inexperienced.

But Phil was far from a mere theoretician and even further from being focused



Phil Grime in Córdoba, Argentina, in 2010. Credit: Daniel M. Cáceres

on a single theme. What captured his imagination were novel questions, uncharted or untrodden paths in plant ecology, and how to test them empirically. He was the most inventive and resourceful of experimentalists, designing devices to measure plant competitive ability using kitchen funnels and fishing weights, creating habitat heterogeneity with Petri dishes and bits of PVC tube, and generating CO<sub>2</sub>-enriched atmospheres with plastic boxes and foldback clips. He could construct an experiment entirely from the merchandise of the local hardware store, and an inadequate budget, or indeed no budget at all, never stopped him implementing his ideas.

He applied his skills to a wide range of ecological questions, from competition to

drought tolerance, genome size, intraspecific genetic diversity and to interactions with mycorrhizas, herbivores, predators and decomposers. Most of these adventures led to seminal papers. He normally declined to delve deeper and deeper into any of these subjects; he basically opened them up and moved on. As he used to tell his students and junior colleagues, after a breakthrough you can dig more and more into the details and become a real specialist, or you can let others do that while you move on to a new and exciting, fundamental question.

He initiated several collective empirical data undertakings whose influence and value can still be felt today. He started UCPE's enormous vegetation survey of the Sheffield region. He set up the Integrated Screening Programme (ISP), a standardized

search for trait trade-offs on a massive scale, at a time when this topic was far from mainstream; arguably this was the ancestor of the now thriving international field of plant trait ecology. He also established the Buxton Climate Change Impacts Laboratory (BCCIL), now the United Kingdom's longest running climate change experiment.

In all his work, Phil was a constant source of novel ideas. But he was far more than that; he led from the front and was happy getting his hands and feet dirty erecting fence poles at BCCIL, putting coloured rings around thousands upon thousands of tiny seedlings, or being questioned by the police over suspicious climbing of urban walls in search of roosting snails for herbivory experiments.

Outside the lab, Phil was a keen footballer and a very fine cricketer, lethal with both bat and ball, as well as a lifelong Manchester City fan. Combining ecology and sport wasn't always easy, but at the XVI International Botanical Congress in St. Louis, United States, in 1999, he managed to

lose his (very expensive) conference dinner ticket — it later turned out he was using it as a bookmark in his conference programme. Unperturbed, he instead headed off to have a hot dog and some popcorn at the baseball game between the St. Louis Cardinals and the San Diego Padres, which he reported the next day as a very fair exchange.

In the late 1970s Phil was invited to Canada by an old Sheffield colleague, and set off with a large number of graduate students to try his hand at cross-country skiing, despite having no skiing experience of any sort. To this day nobody can recall seeing someone fall over so many times but still have the strength to keep going; face-plant after face-plant did nothing to dent his enthusiasm.

Among a long list of awards and prizes, Phil was elected a Fellow of The Royal Society in 1998, and was an honorary member of both the Ecological Society of America and the British Ecological Society (BES), serving the latter as Vice-President

from 1989 to 1991. He won the BES Marsh Ecology Award in 1997 and the Alexander von Humboldt Medal of the International Association for Vegetation Science in 2011.

Whether one shares Phil's core ideas or not, the quest for generalization in ecology will undoubtedly miss him; his shoes will be hard to fill. □

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#### Additional information

K.T. carried out his PhD under Phil's supervision, and later worked with him for many years in Sheffield. S.D. did a postdoc under Phil's supervision, and later collaborated with him and the UCPE team in international projects.