iFAST: The International Forum on Advanced Environmental Sciences and Technology

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8 a.m. CDT, 9 a.m. EDT, 1 p.m. GMT, 9 p.m. China
Wednesday, April 16, 2025

DAVID WARDLE
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David Wardle is a professor of ecology at Umeå University, Sweden. Wardle's research explores the links between aboveground and belowground communities, and how these in turn drive the functioning of terrestrial ecosystems. Most of his focus is on forest and tundra ecosystems, and his work extends from the tropics to the arctic. He has published around 400 peer-reviewed publications, including approximately 30 in *Science* and *Nature* and two books on aboveground-belowground linkages (with Princeton University Press and Oxford University Press). Further, he has supervised a very diverse assortment of 60plus postdoctoral researchers and Ph.D. students, nearly all of whom now hold university faculty positions, or research, policy and management positions, in 20 separate countries and all continents except Antarctica. He has also served on over 10 editorial boards, including the main ecological journals, as well the Board of Reviewing Editors for *Science*. Wardle's work has been cited over 110,000 times and he has been recognized as a highly cited scientist in ecology and environmental science in every list since this form of recognition was instituted. He is also an elected Fellow of the Royal Society of New Zealand, a member of Academia Europaea and a Wallenberg Scholar and the recipient of several recent awards (e.g., the Eminent Ecologist award from the *Journal of Ecology*, and the Whittaker Distinguished Ecologist award from the Ecological Society of America).

Long-term drivers of aboveground-belowground linkages and ecosystem functioning

Abstract All terrestrial ecosystems consist of communities of aboveground and belowground organisms, which interact over short time scales, but which both drive and respond to ecosystem processes over much longer time scales that greatly exceed the duration of experiments and observations. Here I illustrate these linkages across contrasting time scales using three "real world" examples. The first demonstrates, for a group of lake islands in northern Sweden that we have been studying for the past three decades, that fire disturbance is a powerful driver of plant-microbe associations which, in turn, drive ecosystem carbon storage over centuries to millennia. The second involves ecosystem "retrogression", which is the process through which nutrient availability and thus ecosystem processes decline over millennial time scales as due to both abiotic and biotic factors. The third explores how elevation and thus temperature impact on plant N:P stoichiometry and ecosystem functioning for mountains around the world that have developed over geological timescales. These examples each highlight that understanding aboveground-belowground linkages offer insights about ecosystem drivers, including those that operate over lengthy timescales such as climate and geology, as well as those that are relevant to understanding the impacts of human-driven global change.

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