OBITUARY

Richard Southwood (1931–2005)

Entomologist, ecologist and science policy adviser.

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Modern ecology emerged in the 1960s and 1970s as a fusion of scientific natural history, applied biology and more rigorous approaches from population biology and mathematics. Richard (Dick) Southwood, who died on 26 October, was a major figure in forging the new subject. He was influential both for his own research and for the research groups that he built and fostered.

Southwood's background was as an entomologist, in particular as an expert on the Heteroptera or true bugs, a group that contains many pest species. His PhD on their systematics and ecology, undertaken at Rothamsted Experimental Station in Hertfordshire, UK, was very much in the mould of classical entomology; likewise the first research he did when, in 1955, he moved to Imperial College London to study the cereal pest *Oscinella*, the frit (not fruit) fly.

Although he continued to study applied problems, for example mosquito dynamics and improving the habitat for partridges, Southwood increasingly turned to the more fundamental issues in ecology for which he is best known. Here his work was invariably motivated by his encyclopaedic knowledge of insect faunas. In the early 1960s he began studying why different species of tree support remarkably different numbers of herbivorous insect species. Using many sources, he compiled a database for insects on trees in different regions, which indicated the roles of history, biochemistry and whether a tree species has few or many close relatives in Britain. Today, this method would be called macroecology, but then it was an unusual and new approach.

Over the next 20 years, studies of insect herbivore communities by Southwood and the many others he inspired became test cases in community ecology. They were used, for example, to explore the degree to which the theories of island biogeography could be applied to non-overlapping resource types and the extent to which terrestrial insect communities are structured by interactions with their environment, as opposed to being mere assemblages of species drawn at random from those that can survive in a particular habitat.

Heteropteran bugs vary greatly in their dispersal capabilities, with many being strong fliers and others completely wingless. Ever since his PhD, Southwood had been interested in the evolution of life histories, and in particular how the scale and spatial structure of the habitat of different species led to selection for varying reproductive and dispersal strategies. He summarized this approach in 1977, in a major review article, "Habitat, the templet for ecological strategies?", which became a citation classic. This work was notable for linking the traditional informal approach to studying life histories with the growing mathematical theory based on optimality arguments and trade-offs between different demands on an organism's limiting resources.

Southwood remained at Imperial until 1979, building a strong group in pure and applied ecology. For the rest of his career he was based at the University of Oxford, initially as head of the Department of Zoology, where he continued to apply his talents as a scientific leader and group builder. He eventually became vice-chancellor of the university, a post that, particularly at Oxford, requires the wisdom of Solomon. He also became increasingly involved in scientific policy, and was an adviser to the UK government on many issues involving the environment and health. In the early 1980s, he chaired the Royal Commission on Environmental Pollution that produced a report on the consequences of lead in petrol. It was this report that led to the adoption of lead-free petrol in the United Kingdom, as well as in many other countries.

In 1988, Southwood was asked to chair the working group set up to advise on control measures and the risks of bovine spongiform encephalopathy (BSE), which was ravaging UK cattle herds. This was a highly sensitive issue, with obvious risks for public health if the disease could jump the species barrier to humans, but also with serious economic consequences for British farming if the risks were overstated. Southwood's group strongly criticized the changes in rendering practices that had led to cattle and sheep products being fed to cattle, and recommended that certain parts of the cow should not enter the human food chain. Most of these recommendations were implemented, although with less urgency than Southwood wanted; he was particularly critical of the decision to compensate farmers for only half of the economic value of infected cows, a clear disincentive for farmers to report the disease.

The working group also considered that the risk of BSE jumping to humans was most unlikely, although it stressed the importance of reducing that risk further. This opinion was shared by the vast majority of scientists at the time, and was particularly influenced by the fact that scrapie in sheep, a disease with a similar aetiology to BSE, had never been a problem for human health. To Southwood's dismay, his report was used by government without equivocation to persuade people of the near impossibility of human infection. When human infections did occur, and when it was unclear how many people would become infected, Southwood's group was criticized for not warning more strongly of the possible dangers. The episode highlights the great difficulties in providing scientific advice in the face of uncertainty, and the dangers of nuanced scientific arguments being reinterpreted in the political arena.

Dick Southwood was a man of immense charm who will be remembered with great fondness, and some awe, by generations of ecologists. He never lost the love of natural history that filled his summer holidays as a schoolboy in Kent, and which informed so much of his scientific research. The handbook for the identification of British Heteroptera that he wrote in 1959 with Dennis Leston, *Land and Water Bugs of the British Isles*, is still the standard work on the group.

He was also an inspired teacher, and wrote an influential textbook on ecological methods. Students found his exuberance for science and natural history infectious. Mischievously, when teaching sampling techniques on Imperial College field courses, he would contrive that 'randomly' placed quadrats would include the most interesting plants or insects in the site — to this day, we teach our students the difference between randomized, stratified and southwoodian sampling! ■

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