Sheehy, John Edward

(1942–2019)

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John Sheehy (1942–2019), by Ariel Javellana, 2005

IRRI

Sheehy, John Edward (1942–2019), crop modeller and plant physiologist, was born on 9 October 1942 at 150 Westcott Place, Swindon, the eldest of the three children of Bernard Joseph Sheehy (1914–1961), then serving as a leading aircraftman with the RAF, later an accounts clerk for British Railways and an electrician, and his wife Bridget Josephine, *née* O'Connor (*b.* 1917), a nurse. After spending the Second World War years with his O'Connor grandparents on their farm near Ballinasloe, co. Galway, Ireland, John Sheehy moved with his family to Newport, Monmouthshire, where his father had been born, and where he attended St Mary's Catholic primary school. He then transferred to St Illtyd's Grammar School in Cardiff (1953–62), followed by the University College of Wales, Aberystwyth, graduating with a BSc in physics in 1965. He completed his MSc on the telemetry of electrocardiograms for athletes in 1967.

Joining the Welsh Plant Breeding Station as a Nuffield research fellow, Sheehy completed his PhD in 1970 on the interception of light in herbage canopies under developmental geneticist John P. Cooper. Thus began his lifelong interest in the engine of life: photosynthesis. He was appointed environmental physicist and head of microclimatology at the Grassland Research Institute in Hurley, Berkshire, in 1971, to strengthen the institute's work on the micro-environment of forage crops. On 17 July 1971 he married, at Laleston Church near Bridgend, Glamorganshire, Margaret Gaynor Bellis (*b.* 1946), a primary school teacher. She was the daughter of Randle John Bellis, electrical engineer, and his wife, Margaret Aileen. They had two daughters, Rhiannon (*b.* 1973) and Isabel (*b.* 1976).

After the merger, in 1985, of the Grassland Research Institute with the Welsh Plant Breeding Station to form the Institute for Grassland and Environmental Research, Sheehy was the institute's biomathematician. His research focused on the effect of architecture on the distribution of light and temperature in canopies of different species and varieties of forage grasses. Crop modelling was his main passion in crop-environment interactions (and also making instruments to measure those environments), based on the assumption that leaf canopy structure could be described by a simple mathematical function.

Sheehy also worked on nitrogen fixation in legumes. His group uncovered a major error in the technique widely used for measuring nitrogen fixation, followed by the discovery of a mechanism controlling gaseous diffusion in root nodules. In 1978 he spent a year as a visiting lecturer in the Department of Agronomy at the University of California, Davis, working with Donald A. Phillips on photosynthesis and nitrogen fixation in alfalfa. In 1986 he built a theoretical model of a legume nodule with Fraser Bergersen at the Commonwealth Scientific and Industrial Research Organisation in Australia while on a Nuffield-Royal Society travelling fellowship.

Sheehy resigned from the Institute for Grassland and Environmental Research in 1989, declining to move to Aberystwyth, and set up his own consultancy company, Creative Scientific Solutions, as well as lecturing part-time in systems and information analysis in the business school at the Buckinghamshire College of Higher Education, Brunel University (1989–95).

In 1995 the International Rice Research Institute (IRRI) in the Philippines (one of fifteen centres of the Consultative Group on International Agricultural Research) recruited Sheehy as a crop modeller. He set up the Applied Photosynthesis and Systems Modelling Laboratory. He was also head of IRRI's Climate Unit and Systems Modelling Group, and adjunct professor in the Agronomy Department at the University of the Philippines, Los Baños. He remained at IRRI until his retirement in 2009, and was a consultant for several years thereafter.

The early 1990s were a critical time for IRRI. Rice yields had begun to plateau. The challenge of climate change and its impact on agricultural productivity was reshaping the institute's research agenda. IRRI set about producing the next generation of high-yielding rice varieties known as the New Plant Type, with more erect leaves. Studying their yield potential, Sheehy concluded that these varieties were not a long-term solution, and that a completely new approach was needed if rice yields were to be increased significantly. Photosynthesis in rice (known as C3 photosynthesis) is inefficient compared to its C4 counterpart in other tropical cereals such as maize and sorghum. Sheehy developed a concept to 'turbocharge' photosynthesis by introducing C4 traits into rice, with the aim of increasing photosynthetic efficiency by 50 per cent, as well as improving nitrogen use efficiency, and doubling water use efficiency. In December 1999 he brought together many of the best crop modellers, systems analysts, ecologists, and environmental and crop physiologists worldwide to brainstorm how to reduce hunger by redesigning rice photosynthesis. The C4 Rice Project was launched in 2008, and was funded from its inception by the Bill and Melinda Gates Foundation. Before Sheehy's retirement from IRRI, his group screened hundreds of wild rice lines from the IRRI genebank for C4-like leaf anatomy as well as evaluating the evolution of C3 to C4 photosynthesis in a huge sorghum mutant population. The C4 Rice Project was undoubtedly one of Sheehy's chief scientific legacies.

Sheehy left behind a significant body of published research: more than 130 scientific papers, books, and book chapters. Marshalling his prodigious quantitative skills and deep understanding of photosynthesis and yield potential, he never shied away from controversy when he encountered poor science or even non-science such as the claims for the so-called ‘System of Rice Intensification’, whose proponents he described as ‘advocates of nonsense’ and of ‘non-science’ (J. E. Sheehy, T. R. Sinclair, and K. G. Cassman, ‘Curiosities, Nonsense, Non-Science and SRI’, Field Crops Research, 91, 2005, 355).

Sheehy was made an OBE for services to agricultural research and development in 2012, and in 2014 was honoured as a fellow of Aberystwyth University. He was passionate about rugby: as a player, as first XV coach at Marlow Rugby Union Football Club, and as spectator. Irish by descent, Welsh by nurture, and English by birth and residence, he was never short of a team to support in the Six Nations championship. He became an enthusiastic golfer while in the Philippines, a pleasure curtailed in his latter years by poor health. He lived on Barley Way, Marlow, and died at the Sue Ryder care home, Nettlebed, near Henley-on-Thames, on 7 June 2019, having battled Parkinson’s disease and multiple system atrophy for several years; he was survived by his wife and daughters.

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Likenesses

A. Javellana, photograph, 2005, IRRI [see illus.]

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