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Obituary

Warwick Estevam Kerr (1922-2018)

In September 15, 2018, Prof. Dr. Warwick Estevam Kerr succumbed to cardiac arrest. He joins his wife Lygia, who died in 2017. He leaves behind a stellar legacy of research and invention, teaching, and institution building. Professor Kerr was born on September 9, 1922 in Santana do Parnaíba, in the state of São Paulo. From an early age, he showed an interest in understanding bees in the broadest scientific sense, pursuing this singular and focused goal for his entire scientific career. He majored in Agricultural Engineering at the Luiz de Queiroz College of Agriculture (ESALQ) of the University of São Paulo (USP), graduating in 1945. Due to his excellent performance he was invited by Professor Friedrich Gustav Brieger to join the staff of the Department of Genetics at USP. In 1947 he married Lygia Sansigolo Kerr, who accompanied him for 70 years. They had 7 children, and 17 grandchildren. He obtained his doctorate in 1948 with a thesis on "Studies on the genus *Melipona"*, confirming a passion for stingless bees. In 1950 he was awarded the title of "Livre Docente". Soon thereafter, in 1951, he took a leave for postdoctoral studies at the University of California Davis, and in the following year to Columbia University in New York, where he worked with Theodosius Dobzhansky and Sewall Wright, two of the most renowned geneticists of the 20th century. His work on caste determination in stingless bees became a world reference in the 1950s.

The year 1957 brought a big change in his career, when he brought *Apis mellifera scutellata* queens from Africa with the goal of improving honey production in Brazil. Genetically, this made perfect sense, since honey bees are not native to the Americas, and the *Apis mellife*ra bees that had been introduced to Brazil prior to this by European settlers were not well adapted to a tropical climate, different from the African subspecies. However, by accident some of the queens escaped from their enclosures in the colonies, and the result was, in hindview, one of the most spectacular expansion events in history of introduced species. At that time, Prof. Kerr was heavily criticized, because these bees were ferocious and their drones hybridized with honey bees of European genetic origin, outcompeting these from Brazil way up into the southern US. He had to wait for more than 20 years to be recognized as a hero for the introduction of these bees because, though more aggressive than the European bees, these "Africanized" bees, when appropriately managed, were highly productive bees, bringing honey production in Brazil up to unforeseen levels.

In 1958, he accepted the challenge of creating the academic program in Biology in the Faculty of Philosophy, Sciences and Letters of Rio Claro, which represents a history of success until the present day. In 1962, he was appointed the first Scientific Director of the São Paulo State Research Foundation (FAPESP). In 1964 he was invited to develop the Department of Genetics in the Ribeirão Preto Medical School of the University of São Paulo (FMRP). He began the program in March 1965, offering the first Genetics course ever taught in a medical school in Brazil. During this period he was appointed Full Professor at the FMRP, and in 1970, he implemented its graduate course in Genetics. In 1975, he accepted the challenge of becoming director of the National Research Institute of the Amazon (INPA) which, to his surprise, could not retain qualified researchers. So his plans for INPA included recruiting a large number of experienced researchers from abroad and requiring local researchers to obtain a doctoral degree. At the same time, he encouraged and maintained a collaborative relationship with indigenous Amazonian tribes. When he left INPA in 1979, four masters and doctoral programs had been created, and the scientific staff was now comprised of 60 PhDs and 52 masters level researchers.

He then returned to FMRP-USP, from where he retired in 1981, just to take on another challenge. He decided to drive his Kombi more than 3000 km to the Northeast of Brazil to organize the program in Biology at the State University of Maranhão. None of his colleagues really could believe that he was leaving the wealthy town Ribeirão Preto and USP, the best University in Brazil, to start a program from scratch in one of the poorest states in the country, but he relished challenges like that. He achieved such great success with the program that the governor of Maranhão invited him to be the Rector pro-tempore of the University. Thereafter, invited by Professor Ana Maria Bonetti in 1988, he moved to the Department of Biosciences of the Federal University of Uberlândia, in the state of Minas Gerais, where he created the graduate program in Genetics and Biochemistry and later the graduate course in Biotechnology. He was appointed Director of INPA again from 1999 to 2002, where he dedicated the last year of his term to the creation of a research group on stingless bees, which is now an internationally recognized center. After his return to Uberlândia where he continued to work as a collaborating professor.

Warwick Kerr was president of SBPC (1969-1973), and twice president of the Brazilian Society of Genetics

(1964-1966,1994-1996). He was a member of ACIESP (São Paulo Academy of Sciences), ABC (Brazilian Academy of Sciences), TWAS (Third World Academy of Sciences) and in 1990 he became the first Brazilian scientist elected to the US National Academy of Sciences. He was a member of the advisory committee on Genetics of the Brazilian National Council for Scientific and Technological Development (CNPq), and of the executive board of the International Genetics Federation. He was an *ad hoc* advisor for numerous journals, including Evolution, Animal Behavior, Genetics and Molecular Biology, Journal of Apicultural Research, and Acta Amazonica. He was awarded numerous honors and distinctions during his long career, but was especially proud of the many doctoral, masters, and undergraduate students, whose studies he had supervised over the many years. At the core of his teaching mentoring and research productivity was his enormous creativity, linking topics that people had not put together before,. and suggesting new paths for research. Many of his published papers addressed animal genetics, but his publications in horticulture, especially on improving fruit and vegetables are also valuable. His publications appeared in high impact journals such as Science, PNAS, Evolution, American Naturalist and many others. In fact, one of his publications, which he published in 1954 with Sewall Wright in Evolution on genetic drift, has been included in the list of the 100 most influential papers in Genetics of the first half of the 20th century (Levine, L., 1971. Papers on Genetics: A Book of Readings. C.V. Mosby Comp., St. Louis, MO, 497 p.)

Prof. Kerr is survived by 6 children, 16 grandchildren, and 17 great-grandchildren, all of whom had the privilege of his teaching and unconditional friendship.

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