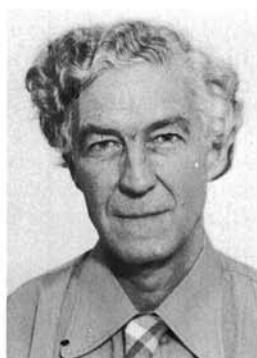


Ruth Allen Award

The Ruth Allen Memorial Fund was established in 1965 by means of gifts from the estate of Dr. Ruth Allen through the generosity of her heirs: Sam Emsweller, Mabel Nebel, Hally Sax, and Evangaline Yarwood. The award, consisting of a certificate and income from the invested fund, is given for outstanding contributions to the science of plant pathology.

Allen Kerr



Allen Kerr is awarded the Ruth Allen Award for his studies on crown gall, an important disease of stone fruit and other crops caused by the soilborne organism *Agrobacterium tumefaciens*. His research has been an interesting amalgam of practical and theoretical work. On the practical side, his studies have led to the efficient biological control of crown gall. The treatment consists of dipping planting material in a bacterial suspension of strain 84, a nonpathogenic

isolate of *Agrobacterium*. The method is now widely practiced in several countries, including Australia and the USA. It is the first commercial use of a specific microorganism to control a plant pathogen in soil and it is the first commercial use of a bacterium to control any plant disease. Strain 84 has been sent for testing to most countries where stone fruit is grown, including Nepal and Libya. Most reports are of the successful control of crown gall.

The mechanism of biological control by strain 84 has also been elucidated by Kerr and his colleagues. Strain 84 produces a nucleotide bacteriocin, now known as agrocin 84, whose chemical structure has been determined by Kerr's colleagues at the University of Adelaide. Agrocin 84 is the first nonprotein bacteriocin to be described for any bacterium. It has remarkable specificity. Only pathogenic agrobacteria possessing a certain tumor-inducing (Ti) plasmid are susceptible, and sensitivity to agrocin 84 has proved to be an exceedingly useful marker in genetical studies on the Ti plasmid. Synthesis of agrocin 84 is also plasmid encoded, but by a different plasmid. Kerr and his colleagues, both in Australia and Europe, have done some very elegant work on the transfer of this plasmid to other bacteria. New biological control agents have been produced by this method. This aspect of Kerr's work combines both theory and practice.

More theoretical is his work on conjugation in agrobacteria. In 1969, he first reported that pathogenicity can be transferred from one bacterial isolate to another. This was of crucial importance in the demonstration by Belgian workers that pathogenicity in *A. tumefaciens* is encoded by a plasmid, the Ti plasmid. Initially, plasmid transfer could only be achieved when donor and recipient strains were placed on the surface of a crown gall. This method of plasmid transfer is still occasionally used and is sometimes referred to as a "Kerr cross." However, for transfer of most Ti plasmids, a petri dish technique can now be used. This was developed by Kerr in collaboration with French colleagues. Crown gall tissues contain unusual chemicals known as opines, which occur nowhere else in the plant kingdom. Conjugation and Ti plasmid transfer can be achieved only when certain opines such as octopine are present in the conjugation substrate. This explained the "Kerr cross" phenomenon—opines are naturally present in crown gall tissue. Later work by Kerr with both French and Belgian colleagues demonstrated that opines actually induce conjugation by derepressing transfer genes. This was the first example of substrate induction of conjugation and plasmid transfer in any bacterium. The work has led to a much clearer understanding of the biology of the crown gall system.

Professor Kerr was born on May 21, 1926, in Edinburgh, Scotland, and graduated from the University of Edinburgh in 1947. He spent the next four years at the North of Scotland College of Agriculture, Aberdeen, and then accepted a position as lecturer in plant pathology at the Waite Agricultural Research Institute, University of Adelaide. Most of his early work was on soilborne plant pathogenic fungi where he made significant contributions towards an understanding of interactions between host plants and pathogenic fungi. During 1963-1966, Professor Kerr worked at the Tea Research Institute, Sri Lanka, where he undertook a highly original and successful investigation of the epidemiology of blister blight of tea caused by the fungus *Exobasidium vexans*. On returning to Adelaide, he began his studies on crown gall.

Professor Kerr is president of the Australasian Plant Pathology Society and vice-president of the International Society of Plant Pathology. In 1978 he was elected a Fellow of the Australian Academy of Science.