

PREFACE



Professor Clarence (Bud) A. Ryan

Professor Clarence (Bud) A. Ryan has had a tremendous influence on establishing how plants defend themselves against herbivore attack or injury, and how they interact with their environments. His work, spanning nearly four decades has resulted in the paradigm that we all use today in teaching how plants ward off pests and pathogens.

Papers from the Ryan School are eagerly received, with two fairly recent examples being used to illustrate their impact. Take his discovery in 1990 that the volatile compound, methyl jasmonate, is used as a signal molecule between plants to warn their neighbours to switch on plant defense genes. This was identified by "Science Watch" as the most cited article in world literature in Ecology/Environmental Sciences. A second paper in 1992, which formulated the existing model for systemic defense against insect attack ranging from prosystemin to the role of jasmonic acid, became a "Hot Paper" by both the Institute for Scientific Information (ISI) and The Scientist.

Professor Ryan's all encompassing interests began in the laboratory of his mentor, A. K. Balls. Over the next thirty-six years or so, Professor Ryan and his co-workers embarked upon the systematic examination and dissection of the plant defense response. Piece by piece many of the individual components of the plant arsenal were identified, characterised, and which ultimately revealed a highly sophisticated protection system. Plants couldn't run away, but they could defend themselves.

It began with the discovery of three of the eight known classes of proteinase inhibitors (chymotrypsin, Inhibitor II, a double active site inhibitor, and carboxypeptidase), and led to a collaboration with Professor Robert Huber that established the nature of the trypsin inhibitor complex. The work quickly moved back on to the biological front once again, and Professor Ryan was soon to show that the inhibitors are induced by insect attack or mechanical injury throughout both the wound site and in distal intact, unwounded areas of the plant as well. Pectic fragments were also observed to be activators of the expression of the inhibitors.

By the nineteen-eighties, Professor Ryan had discovered systemic signalling of genes for plant defense, and which ultimately led in the early nineteen-nineties to the discovery of systemin, a powerful inducer of the systemic response. This inducer was only present in plants in very low amounts (femtomoles), and soon came to be correlated with the octadecanoid pathway.

Professor Ryan's inquisitive nature did not stop here, however, and he was soon to discover yet another clue as to how plants interact with their environments: UV light was also effective in inducing proteinase inhibitor genes via activation of the octadecanoid signalling pathway as well.

His work has many broad and important ramifications to agricultural and forestry practices. Having established how plants can arm themselves for protection, his attention is being directed (at least in part) to the exploitation of these discoveries for humanity's use and benefit. Thus, over the space of just a few decades, Professor Ryan has substantially torn away at the sophisticated defense mechanisms in plants that have evolved over hundreds of millions of years.

Professor Ryan received his B.Sc. (Chemistry) at Carroll College, Montana, and his M.S./Ph.D. at Montana State University. In 1986, he was elected to the U.S. National Academy of Sciences. He is the Charlotte Y. Martin Distinguished Professor at Washington State University, and is the recipient of numerous awards, and honors, including the Stephen Hales Prize (American Society of Plant Physiologists), the Kenneth A. Spencer Award (American Chemical Society) and the Silverstein-Simione Award (International Society of Chemical Ecology) to name just a few.

Professor Ryan is a cheerful promoter of science, who works energetically and enthusiastically with young and old alike. His work is frequently covered by the popular press, and his message attracts many people into science. Yet he still finds time to pursue his long time interest in various sporting activities, such as being the University's Faculty Athletic Representative. It is a privilege for all of us to work with such an endearing individual.

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