



IN MEMORIAM

Noel T. Keen
Distinguished Professor of Plant Pathology
Riverside
1940 — 2002

Noel T. Keen passed away at his home on April 28, 2002, from the effects of leukemia. Noel was born in Marshalltown, Iowa on August 13, 1940, where he was raised on a farm and attended a small rural school. Much of his folksy manner and self-deprecating personality was probably a result of this upbringing in rural, middle America. Noel was intrigued by science from the beginning of his school days and he spent much of his free time hanging around the science labs.

Noel arrived in Riverside in 1968 after receiving a B.S. in botany and an M.S. in plant pathology at Iowa State University, followed by his Ph.D. in plant pathology from the University of Wisconsin. He hit the ground running at UCR. The graduate curriculum was in the periodic process of evaluation. He reorganized the department's graduate course in physiology of plant disease bringing it up to date and obtaining excellent reviews from students and faculty. He continued to teach this course throughout his career.

From the beginning, Noel was interested in the chemical and biochemical characterization of the host-parasite interaction. His early contributions were in characterizing the toxic complex produced by *Verticillium albo-atrum*, which was responsible for the wilting symptoms in cotton, and in characterizing an endopolygalacturonase from the fungus. He entered the Phytoalexin field with his work on the phytoalexin from soybeans induced by *Phytophthora megasperma* var. *sojae*. This became a major theme of his research. He was the first to coin the term "elicitor" for the chemicals that are produced by a pathogen and recognized by the host resulting in the initiating of host defense responses, such as the production of phytoalexins.

When he was thwarted in his quest to biochemically characterize the gene-for-gene hypothesis in soybean by the complex genetics of *Phytophthora megasperma* var. *sojae*, he switched to another system where he could utilize the genetics of the bacterial pathogen of soybean, *Pseudomonas glycinia*. This was an example of Noel's ability to keep at the forefront of developing fields. He was one of the few early pioneers of application of molecular biology to plant science in the College of Natural and Agricultural Sciences at UCR. His switch to the bacterial pathogen opened the door to the newly developing techniques of molecular biology and led to his characterization of the single gene involved in the production of the elicitors from *Pseudomonas syringae* pv *tomato*, unprecedented secondary metabolites, the syringolides. The syringolides are responsible for the hypersensitive response of soybeans carrying the resistance gene, *Rpg4*. His work with another bacterial pathogen, *Erwinia chrysanthemi*, led to the cloning of its pectate lyase genes and their insertion into *E. coli* thus converting a non-pathogen into a soft-rotting plant pathogen. Further collaborative work with X-ray crystallographers led to a discovery that the pectate lyase structure contained a new folding of the protein, the first discovered since the description of the alpha-helix and beta-sheets. The unique tertiary structure discovery has again opened new doors to the study of the active site of these enzymes and led to the finding by others of the generality of the new folding termed the "parallel beta-helix." The genomic sequencing and functional genomics work on *Erwinia chrysanthemi* that he initiated recently will be continued at UCR while his students finish their degrees, so we can look forward to additional contributions from Noel's program for several years to come.

From the beginning, Noel had an unusual ability to grasp the important ideas of biology, biochemistry and chemistry and to use that understanding to design innovative approaches in plant pathology. His work has influenced the direction of numerous research laboratories worldwide. The total package of his publications, ideas, discussions, and leadership is already recognized as being a major contribution in bringing biotechnology to agriculture. On a more personal level, Noel served as M.S., Ph.D. and postdoctoral mentor to many. The rigor of his training is evident with the placement of his trainees in prominent institutions across the nation and throughout the world. In this context, his scientific impact will be felt for decades to come. Noel's passion for communicating science went well beyond his own research. He was instrumental in helping establish the Alpha Center at UCR, a unique facility that coordinates math and science outreach to K-12 youth. As chair of the Chancellor's Advisory Committee (CAC), Noel worked laboriously to implement a major overhaul of how the biological sciences were organized in our College of Natural and Agricultural Sciences. While some of his ideas did not meet with unanimous approval, none doubted his intention to move the College forward. His actions always supported his convictions: he was among the first Citrus Experiment Station faculty to help deliver the basic biology curriculum when he volunteered to teach undergraduate molecular biology (Biology 107) and to help advise biological sciences undergraduates. Moreover, he was a valued and contributing member of multiple graduate programs including Plant Pathology, Genetics, Microbiology, and Biochemistry and Molecular Biology. Noel helped develop several of these programs and served as director of the Genetics Program. His international research visibility helped attract numerous graduate students to each of these programs.

A large part of Noel's success was hard work; he regularly worked nights and weekends during his whole career. If he was in town, he could be found sitting on his lab stool at the research bench. Even when he traveled, he often took petri dishes of cultures along and finished experiments in his hotel room. Noel was always a patient listener to crazy scientific ideas, always suggestive of technical ways to circumvent the inevitable problems, always knowledgeable about other scientific studies that could impact the work, always generous with his time, always willing to share research cultures and clones, and always contributing directly, at the bench, to the research.

Noel became a fellow of the American Phytopathological Society in 1991 followed by numerous honors and lectureships among which were: Presidents Endowed Chair, University of California, 1990-2; Keynote Speaker, Annual Retreat, Center for Molecular Biology, University of Georgia, 1991; Gatsby Traveling Fellow Lectureship, John Innes Institute, Norwich England, 1992; Keynote Speaker, 5th International Meeting of Plant- Microbe Interactions Group, Seattle, 1992; Keynote Speaker 2nd European Federation of Plant Pathology Conference, Strausbourg, 1992; Plant Biology Distinguished Lectureship, Texas A&M University, 1993; Keynote Speaker, Israel Phytopathology Society, Bet Dagan, Israel, 1994; Distinguished Lecturer, Boyce Thompson Institute, Cornell University, 1994; Garrett Memorial Lecture, Annual Meeting British Society for Plant Pathology, University of Warwick, 1995; Ruth Allen Award, American Phytopathological Society, 1995; UC Riverside Faculty Research Lecturer, 1996; USDA Secretary's Honor Award for Personal and Professional Excellence, 1996; Award of Merit, CSREES, USDA, 1996; William and Sue Johnson Endowed Chair in Molecular Plant Pathology, 1997; Fellow, American Academy of Microbiology, 1997; Elected Member, National Academy of Sciences, USA, 1997; Distinguished Lecturer, Japan Society for the Promotion of Science, 1998.

Beginning as chair of the Department of Plant Pathology at UCR from 1983 to 1989, he took on many administrative tasks: chair, Genetics Graduate Program, UCR, 1994-1997; acting director, UCR Biotechnology Center, 1997-2001; member Board of Directors, CORE21, UCR, 1998-2002. He served as vice president, 1999-2000, president- elect, 2000-2001 and was serving as president of the American Phytopathological Society 2001-2002 at the time of his death. True to form in his role as president of APS, he was leading a campaign to obtain more federal funding in agricultural biotechnology.

Noel served on the editorial boards of Phytopathology, Molecular Plant- Microbe Interactions, Journal of Bacteriology, Journal of Phytopathology, Annual Review of Phytopathology, Plant Physiology, and Applied and Environmental Microbiology. In addition, he served on the following Scientific Advisory Boards: External Advisory Board, NSF Center for Engineering Plants for Resistance Against Pathogens, UC Davis; Life Sciences Review Panel, National Research Council, Associate Program; Noble Foundation, Ardmore, OK; National Research Council Committee on the USDA/ NRI Grants Program; US- Israel Binational Agricultural Research and Development Fund, Technical Advisory Committee.

In any department, there are people who are leaders in the social events; Noel was one of these. Those who have visited or been a part of the UCR Plant Pathology Department over the years will remember many

events where Noel was usually an organizer and always a participant: Fridays at the “Barn” and “Bull and Mouth,” Chicken Liquor parties, St. Patrick’s Day wakes, wine tasting, cribbage games, hikes up the “C” mountain, oyster parties with chili, picnics, softball, volleyball, tennis, badminton, Halloween costume parties and the departmental coffee hour. He was always at the center of departmental social activities.

In later years Noel developed several passions outside of the lab. He became an appreciator of fine wines. Two of his favorites were California cabernets and French white burgundies. He hosted numerous wine tasting events at home and attended others with friends. He became totally involved with fine stereo equipment and could easily surpass most people’s common knowledge on the subject in a few minutes. He went so far as to write reviews of various new stereo speakers, cables and other peripherals. Listening to music on his system at home was like being in a concert hall. His interest in fast cars probably came from the muscle cars of his youth. He enjoyed fast sports cars and owned several, which he kept in showroom polish.

Noel passed away at 61 years of age and at the pinnacle of his career. His wife, Dianne, and sister, Judy, survive him.

Noel Keen will always be remembered as a friend, a colleague, and a man who dedicated his life to science. He is missed.

J. J. Sims, Chair
D. A. Cooksey
D. D. Focht
B. C. Hyman
L. L. Walling
F. A. Jurnak