

# Joseph Michael Daly, 1922–1993

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Dr. Joseph Michael Daly, retired C. Petrus Peterson Professor of Biochemistry, University of Nebraska, Lincoln, died on 18 August 1993 in Lincoln, NE. He was born on 9 April 1922 in Hoboken, NJ, and grew up in Newport, RI. His father died when he was a child, leaving his mother the sole support of the family. His mother insisted that he go to college, though he had planned to work to provide much needed financial help. With his mother's encouragement, Daly earned a

B.S. degree in 1944 from Rhode Island College, Providence, where he was influenced by botanist V. Cheadle and plant pathologist F. Howard. Daly went on to the University of Minnesota, St. Paul, where he was known as "Mike" because there were too many "Joes," and obtained an M.S. degree in Plant Pathology in 1947 after completing his thesis on rust fungi under the guidance of H. Hart.

Daly worked toward a Ph.D. in Plant Pathology and completed the course work. However, he wanted to take a more biochemical approach in his research than E. C. Stakman allowed. Though he greatly respected and admired E. C. Stakman and the other faculty in the department, Daly switched to Botany to do his Ph.D. research, using an early mass spectrometer for respiratory studies under A. H. Brown.

In 1952, Daly's first position was assistant professor of Botany at Notre Dame University, Notre Dame, IN. In 1955, Daly accepted a position in the Plant Pathology Department at the University of Nebraska, Lincoln, where he remained for the rest of his career. Daly was chairman of the Department of Plant Pathology from 1962 to 1964, when he moved to the Department of Biochemistry. He provided guidance and direction to the new School of Biological Sciences as its interim director from 1973 to 1974. He served on numerous university, government, and professional society committees and panels in which his advice was highly valued. His active career was ended by a stroke in 1986.

Daly's primary interest evolved from an early emphasis on the effect of rusts on the physiology of host plants to an emphasis on the nature of resistance or, as he preferred, the nature of susceptibility. At the University of Nebraska, Daly began a series of studies on the physiology and biochemistry of wheat, bean, and safflower plants infected with rusts that encompassed a wide variety of topics, including respiration, carbon metabolism, photosynthesis, transpiration, and growth substances. Daly demonstrated a rise in respiration and a  $C_6/C_1$  ratio drop immediately prior to the development of the uredial spore stage of these rusts, the appearance of carbohydrates foreign to healthy plants at the time of the  $C_6/C_1$  ratio change, and a change in indoleacetic acid metabolism prior to any other detectable symptom. He showed that the elongation of rusted safflower hypocotyls was associated with auxin concentrations. However, potential contributions of the rust mycelium to the physiology of the plant-rust complex hindered the rigorous interpretation Daly demanded of his results. He extended his work to resistance, using wheat lines isogenic at the temperature-sensitive *SR6* allele and careful manipulation of environmental factors.

Daly spent the last decade of his career investigating host-specific pathotoxins produced by fungi pathogenic only on hosts sensitive to their toxin. Daly and colleagues purified and elucidated the structure of "T-toxin" after the devastating southern corn leaf blight epidemic of the early 1970s. The toxin, produced by *Bipolaris maydis*, affects maize with Texas male-sterile cytoplasm. The difficulty of purifying and determining the structure of T-toxin was compounded by the fact that the toxin consists of a family of about 10 polyketols-polyalcohols. This was only the second structure determined for a host-specific pathotoxin. Daly and coworkers studied the physiological effects of the toxin

and related synthetic compounds and served as the world's supplier of T-toxin, most of which Daly isolated himself. Daly's T-toxin is still distributed for investigations.

Daly and colleagues determined the chemical identities of the "PM-toxin" family produced by *Phyllosticta maydis*, which exhibits the same host specificity as *B. maydis*. PM-toxin is similar to the T-toxin family in structure and biological activity. Daly contributed to the determination of structures of host-selective toxins produced by *Cochliobolus carbonum*, *Helminthosporium sacchari*, *H. victoriae*, and some *Alternaria* spp.

Perhaps as important as the facts Daly uncovered was the philosophy he brought to physiological investigations of plant diseases. Physiology of pathogenesis was emerging when Daly became active, and he contributed more than anyone else to the establishment of high investigative standards, not only in his own but in the research of others.

In addition to his renowned reputation in research, Daly was equally renowned as a stimulating teacher who challenged and assisted students in reaching their scholastic potential. He loved teaching and worked diligently preparing lectures and laboratory exercises he presented with enthusiasm and clarity. The hallmark of his lectures was penetrating questions that stimulated thinking and lively discussions that frequently lasted far beyond the time scheduled and continued in a more comfortable setting, such as a pub, where heated exchanges ended amicably, usually with the singing of Irish songs. And guess who led the singing?

Daly's greatest satisfaction and pleasure in academia came from letters written by former students who told him how much they appreciated his efforts in creating an environment for learning. Many indicated Daly was a very positive influence in getting them to critically read scientific literature and to be equally critical of their own work. Undoubtedly, this is the most enduring and satisfying compliment a teacher can receive.

Daly collaborated with Japanese colleagues and was coorganizer of a U.S.-Japan cooperative science seminar on host-parasite interactions held in Lincoln in 1977. This cooperative seminar was followed by several others in the area. The last he attended, in Nagoya, Japan, in 1985, especially honored him.

J. M. Daly was a Fellow of the American Phytopathological Society and received the Elvin Charles Stakman Award of the North Central Division in 1986. His other honors include the Outstanding Research and Creative Activity Award from the University of Nebraska given in 1980. He was named C. Petrus Peterson Professor of Biochemistry in 1966. Daly was elected to the National Academy of Sciences in 1984 and to the American Academy of Arts and Sciences in 1986.

Mike was intense and enthusiastic and had a wonderful sense of humor. It was a privilege and delight to associate and work with him. He was an enthusiastic sportsman and a gardener whose family looked forward to his fresh tomatoes. As a graduate student, he played on the (in?)famous plant pathology softball team at the University of Minnesota. He was a fervent fan of the Celtics basketball and Notre Dame football teams. He became an avid golfer with an incurable slice.

Mike's family and religion were important parts of his life. He served on the Catholic Social Service Board and was involved in educational efforts at the University and in the community to promote awareness of the sanctity of life. At home, he led the family's lively dinner-hour discussions and strongly encouraged and supported his children in their diverse interests. He was proud of his wife, Cecilia, who obtained an M.S. degree in Computer Science and became a faculty member in that discipline at the University of Nebraska. She earned her first M.S. degree in Botany from Vassar College, Poughkeepsie, NY.

Mike is survived by his widow, nee Cecilia Rieger; six daughters: Katherine O'Rourke, Martha, Cecilia, and Constance Daly, Anne Schmidt, and Melissa Hoy; two sons: Stephen and Timothy; and four grandchildren.