

Tsune Kosuge, 1925-1988



Tsune Kosuge, professor of plant pathology at the University of California, Davis, and an associate editor of *MPMI*, died of cancer on March 13, 1988.

Kosuge was born on November 28, 1925, in Merino, Colorado. He was raised and worked on his parents' farm in Colorado, fished for trout in the nearby streams, and, despite these distractions, graduated from Kersey High School in 1944. He was drafted

into the famous 442nd Infantry Regiment, serving in it for two years, including a period of combat in Italy. After the war he returned to Colorado with the notion of taking up farming. With a brother-in-law he rented 20 acres to grow fresh market vegetables.

Kosuge's interest in plants, combined with adverse agricultural market conditions, influenced his decision a year later to study horticulture at Colorado State University. He was fond of recounting his experiences of one summer during his undergraduate career, a summer of days worked in a very hot wool-packing house followed by a few hours of sleep and an early rise to be off to the trout stream. He earned a B.S. degree from the University of Colorado in botany and an M.S. from Washington State University in plant pathology. He was awarded a PhD in biochemistry from the University of California, Berkeley, in 1959.

While researching his PhD thesis on coumarin metabolism in *Melilotus alba* with Professor Eric E. Conn, Kosuge obtained the first experimental evidence for the existence of phenylalanine ammonia lyase, the key regulatory enzyme controlling the flow of carbon into phenylpropanoid metabolism. The several papers resulting from his doctoral thesis were among the first enzymic studies performed in the field of secondary metabolism of plants. After obtaining his PhD he moved to the University of California at Davis as a postdoctoral associate of Professor Conn in the Department of Biochemistry and Biophysics. He joined the Davis plant pathology faculty in 1961 as one of the first PhD biochemists appointed to any faculty of plant pathology in the U.S. Thus he returned to the discipline of plant pathology and applied his skills toward understanding plant-microbe interactions in molecular terms. He advanced to professor in 1971.

Dr. Kosuge's considerable accomplishments in the biochemistry and developmental physiology of plant disease are evidenced most plainly by significant contributions in the area of mechanisms of pathogenicity. He was a pioneer in investigating the role of secondary metabolism in the expression of virulence by procaryotic plant pathogens. His demonstration of association of indoleacetic acid (IAA) with the tumorigenic diseases of olive and oleander caused by *Pseudomonas syringae* subsp. *savastanoi* in 1962 laid the foundation for a series of pioneering studies on the role of IAA as a virulence factor for this pathogen. His laboratory discovered the pathway for IAA production by the bacterium, in which tryptophan is converted to IAA via indoleacetamide. Later this research group showed that the IAA genes are encoded on a plasmid in oleander strains but

are chromosomal in olive strains. When the genes of IAA production by *P. s. savastanoi* revealed significant homology to corresponding genes in the T-DNA of *Agrobacterium tumefaciens*, the more than two decades of work by Professor Kosuge's laboratory in this area came to the attention of many investigators of crown gall and related phenomena of plant-bacterium interactions.

Most recently, Dr. Kosuge's research was on the mechanism regulating IAA production by the *Pseudomonas* species, especially the evolutionary origin and ecological significance of the IAA genes. He also continued to explore mechanisms of regulation of secondary metabolism in plants and was involved in numerous collaborative studies in this area throughout his career. He was the author of more than 90 research publications and numerous invited book chapters. He co-edited six books and was the co-editor with Dr. Eugene Nester of the book series *Plant-Microbe Interactions*.

Dr. Kosuge made additional important contributions to plant pathology through his extensive teaching in both biochemistry and plant pathology not only by formal lectures but also in discussions with graduate students and peers. He is remembered for his unusual ability to convey concepts through rigorously organized lectures, easy manner of presentation, and approachability. In all of his personal interactions, he was universally respected for his enthusiasm, dignity, and a disarming sense of humility. Dr. Kosuge was highly generous of his time and research ideas; he made his experience benefit others.

In 1976, Professor Kosuge was elected a Fellow of the American Phytopathological Society. His contributions to our understanding of the fundamental concepts of plant disease were recognized by the announcement of his election to the National Academy of Sciences on April 25, 1988. He was told of his pending election one day before his death by representatives of the academy. It was additionally rewarding to Dr. Kosuge to learn that his friend and former major professor, Dr. Conn, was to be accorded the same honor at the same time.

Professor Kosuge was the chairman of the Department of Plant Pathology from 1974 through 1980. He served as a senior editor of *Phytopathology* and was on the editorial board of *Plant Physiology*. He was the program manager of the Biological Stress Program of the Competitive Research Grants Office (CRGO) for the first two granting years, 1978 and 1979. He served as chief scientist of CRGO in 1983-84 and continued on the Policy Advisory Committee of CRGO until his death. He also was a member of the Advisory Panel on New Developments in Biotechnology of the Congressional Office of Technology Assessment and served on the Board on Basic Biology of the National Research Council.

Professor Kosuge was the driving force behind, and acknowledged leader of, the McKnight Foundation Training Grant program on the Davis campus. This interdisciplinary research and graduate education program on the biochemistry and genetics of pathogen-plant interactions received \$1.5 million over a six-year period from the McKnight Foundation of Minnesota. Professor Kosuge also was the organizer and first coordinator of the biotechnology program of the Davis campus.

Professor Kosuge's research contributions stand as a

testimonial to his creative intellect, tenacity, and skill. We who knew him both personally and professionally remember his humanity as equal to his science and sorely miss his wisdom and leadership. He is survived by his wife of 36 years, June, his son Byron, his daughter Becky, and seven sisters. He was preceded in death by a brother and a sister. The Tsune Kosuge Memorial Fund has been established in his memory. Contributions may be made by check, payable

to the Regents of the University of California and sent to the Department of Plant Pathology, University of California, Davis, CA 95616.

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