Alvaro Santos Costa, 1912 to 1998

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Alvaro Santos Costa, the most prominent plant virologist in Latin America and emeritus researcher at the Instituto Agronomico de Campinas (IAC) in Brazil, passed away on 18 August 1998 after a debilitating illness followed by heart failure.

Dr. Costa was born on 9 January 1912 in Sorocaba, Sao Paulo State (SP), Brazil. He completed his degree in 1932, with distinction, at the Escola Superior de Agricultura "Luiz de Queiroz" (ESALQ) (today the

Agricultural College of the University of Sao Paulo), in Piracicaba, SP. In 1934, he was hired by the Department of Genetics at IAC, where he started his lifelong work on plant diseases caused by viruses and virus-like agents. His studies documented symptomatology, transmission, vector relationships, diagnosis and identification, epidemiology, and control of viral and virus-related pathogens of cultivated plants. Eventually, his studies also included viruses found in weeds and native plants that could serve as a reservoir of these pathogens for economically important crops.

In 1954, he succeeded in the creation and organization of an independent Virus Department at IAC.

Dr. Costa's unmatched leadership was also marked by his willingness to share ideas with his associates, undergraduate and graduate students, and especially growers who constantly came to seek his advice on identifying and controlling virus diseases in their crops. He always considered solving growers' problems as important as an outstanding scientific discovery.

Although Dr. Costa's primary responsibility at IAC was research, from 1969 to 1990, he became deeply involved in teaching virology to graduate students in the three SP state universities (ESALQ/USP, UNICAMP, and UNESP). His strong personality and extraordinary scientific knowledge base were complemented by his considerable patience with students in answering and discussing their queries. Although not formally a member of the teaching staff of these universities, he trained 8 M.S. and 11 Ph.D. students.

His brilliant career was based on several of his personal traits: keen observation, an inquisitive and analytical mind, "elephant-like" memory, love for discussion, broad knowledge of plant pathology and related subjects, and meticulous methodology. He was also able to express, both orally and in writing, his ideas with extraordinary clarity, precision, and conciseness.

Dr. Costa was a competent administrator and superb in negotiations. For a quarter century, until his formal retirement, he directed one of the most active and productive plant virology groups south of the equator. His strategy for organizing the research activities in the Department of Virology (DV) of IAC was to create specialized areas. His organizational structure served as a model for a proposal later made in a FAO publication by Dr. L. Bos on how to organize plant virus research in developing countries.

Dr. Costa's most widely known achievement has been the use of mild strains of citrus tristeza virus (CTV) for cross-protection against severe CTV strains. This concept was developed with one of his assistants, Gerd W. Müller, and it resulted in the most extensive preimmunization program in the world.

Beyond his work with CTV, Dr. Costa made many significant scientific contributions. Some of the most notable include (i) description and identification of cotton virus diseases prevalent in the SP state, which continues to serve as a definitive reference worldwide; (ii) survey, identification, characterization, and epidemiological studies of viruses affecting horticultural crops; (iii) proper identification of carrot motley dwarf virus; (iv) dramatic increase in the productivity of strawberry culture following the discovery that degeneration of plants was due to the accumulation of at least four different viruses compounded by continuous vegetative propagation; (v) characterization of virus and phytoplasma diseases of cassava and the demonstration that the Brazilian and African cassava mosaics were caused by different viruses; (vi) pioneering work on whitefly-transmitted diseases in several cultivated and wild plants; and (vii) identification of papaya ringspot virus as the limiting production factor for papaya.

Dr. Costa always maintained close and active contacts with top plant virologists throughout the world. As a consequence of sabatinal leaves, a lifelong relationship was established with many distinguished plant virologists.

He also served as an international consultant on several occasions in Argentina, Nigeria, Colombia, and Puerto Rico. In Brazil, he was constantly asked by governmental and private organizations as well as by growers to serve as a consultant on viral problems.

Dr. Costa's research accomplishments were recognized throughout his career. The list includes member of Sigma XI (1943); first prize in a monograph contest held by the Brazilian Agriculture Ministry (1946); Fellow of the American Association for the Advancement of Science (1957); a donation by the Souza Cruz Co. in recognition of Dr. Costa's contributions (1965); a merit certificate from the USDA (1967); Award of Merit from The American Phytopathological Society (1972); a medal from the Brazilian Society for Science Progress (1973); Agronomist of the Year by the Agronomists Society of the state of Sao Paulo (1974); the Frederico de Menezes Veiga prize from EMBRAPA, recognizing his lifelong contribution to Brazilian agriculture (1975); a founding member of the Academy of Science of the state of Sao Paulo (1975); Researcher of the Year by the Sao Paulo branch of the Brazilian Society of Phytopathology (1979); and the Luiz de Queiroz medal from the ESALQ, the institution's highest distinction (1996). Just 3 months before his death, Dr. Fernando Henrique Cardoso, President of Brazil, announced Dr. Costa as recipient of the Grã-Cruz medal, the most important recognition made by the Ministry of Science and Technology.

Dr. Costa was a true "workaholic." Even after his official retirement in 1982, he continued his research, wrote papers, and advised students and associates. He only discontinued this work when his illness began affecting his eyesight. A few years ago, the head of the Campinas Experimental Station officially named the lane in front of the DV building as "Dr. Alvaro Santos Costa." Efforts now are being made to name the DV building complex after him.

Dr. Costa was a true gentleman and will be long remembered not only for his scientific achievements, but also for his wisdom, honesty, sincerity, contagious enthusiasm, friendliness, professionalism, and extreme discretion. All of us who had the privilege to share his knowledge and friendship feel indebted to Dr. Costa for his impact on our careers.

Dr. Costa is survived by his wife, Mrs. Jean Reilly Costa, and two sisters.