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M.J. Thirumalachar : His multidimensional contributions to biological sciences and technology

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I am deeply honoured to be invited to contribute an article highlighting the scientific contributions of Dr. M.J.Thirumalachar for publication in an issue of KAVAKA dedicated to him in his Birth Centenary year (2014). I wish to place on record my appreciation of the decision of the Managing committee of Mycological Society of India to honour Dr. Thirumalachar as well as Prof. C.V.Subramanian on his 90th birthday in a similar manner. The opportunity to write this article has a profound emotional effect on me as a member of his family,- being his nephew who drew inspiration while being associated with him for two decades learning Mycology and Fungal Biotechnology.

Dr. M.J. Thirumalachar
(22-09-1914 to 21-04-1999)

EARLY LIFE AND EDUCATION

Thirumalachar was born in Bangalore as the second child to Prof. M.J.Narasimhan and Smt. Vengadammal on September 22,1914 in a family of high erudition and scholarship. His paternal great grandfather Jeersannidhi Thirumalachar Swamigal headed the Yadugiri Yatiraja Mutt established by the revered Sri Ramanujacharya in Melkote, Karnataka state. A scholar of great eminence in Sanskrit he travelled all the way to Badrinath and attained Samadhi while returning at Rewa, near Allahabad. Even today there are his followers there. Thirumalachar got his name from the fact that he was born on the auspicious birth date of his illustrious great grandfather which is celebrated every year at the Yathiraja mutt.

Thirumalachar completed his school education in Malleswaram, Bangalore and graduated from the Central College,Bangalore. Prof. Narasimhan was an eminent botanist and plant pathologist and first cousin of Prof. M.O.P. Iyengar, internationally recognised for his outstanding contributions to Algalogy. Thirumalachar derived inspiration from these elders in the family, developing an emotional attachment to the study of plants and specialize in Mycology and Plant Pathology for his research career.

PROFESSIONAL CAREER

The father and son "team" of Prof. Narasimhan and Dr. Thirumalachar have published extensively over a period of twenty five years on a wide range of topics in Mycology and Plant Pathology. For me it was a proud privilege to be a co-author with both of them in several publications representing a "third generation" mycologist from the family.

Thirumalachar was the first vice president of the Mycological Society of India when it was first established in 1973. He was a veteran researcher in Biological Sciences for over six decades, whose original contributions embraced a spectrum of scientific disciplines like Botany, Mycology, Plant Pathology, Antibiotic Fermentations and Chemotherapy of human, animal and plant infections.

Internationally recognised as an outstanding mycologist, his contributions to the study of Indian fungi have been phenomenal. He has contributed extensively and significantly to the understanding of Microbial diversity of the Indian subcontinent long before the word "Biodiversity" was even coined or received widespread recognition.

Thirumalachar inspired several of his colleagues and juniors during his tenure at the Central College, Bangalore as lecturer to undertake research and publish research papers in international journals. Several eminent scientists like B.G.L.Swamy, K.Subramanian, K.S.Gopalkrishnan, K.M.Safeeulla and H.C.Govindu had started their research career with his guidance. Thirumalachar collaborated with the well known Mycologist Dr. B.B.Mundkur and published monographic accounts on the Genera of Rusts and Smuts. He named a new smut disease on a dicotyledonous tree, *Heptapleuram venulosum* (*Araliaceae*) as *Mundkurella heptapleuri* in 1944.

He studied the stripe disease smut, *Ustilago striiformis* for his doctoral dissertation under Prof. James G.Dickson at the Department of Plant Pathology at the University of Wisconsin, U.S.A. His name was well known to the mycologists and plant pathologists in U.S.A.. He established good rapport with many of them and jointly published research papers in international journals with established leaders in the field like George B.Cummins, Frank D.Kern and Anna E.Jenkins.

Following his return to India ,he worked at the Department of Botany, Banares Hindu University, Central Potato Research Institute,Patna as plant pathologist and in 1953 joined the newly established Hindustan Antibiotics Ltd., Pimpri as Chief Mycologist, serving there for over two decades and retiring as the Head of the Research and Development in 1975. Post retirement he was visiting professor at the Institute of Seed Pathology, Copenhagen, Denmark as well as at the Medical School, University of

Minnesota,U.S.A. He established the Jeersannidhi-Anderson Institute at Walnut Creek, California and was actively involved in Research and Development projects until his sad demise on April 21,1999 at the age of 85 years.

Among his several outstanding contributions in Mycology and Plant pathology, special mention may be made of the following :

Description of new genera of rust fungi *Acervulospora, Kernella* and *Hiratsukamyces*; new genera of smut fungi *Mundkurella, Franzpetrakia, Zundelula* and *Georgefischeria*; establishing the genus *Sclerophthora* for the downy mildew disease causing "crazy top" on corn and other graminaceous hosts based on its *Phytophthora*-like asexual stage; establishing the morphological basis for differentiating *Entomophthora* from *Conidiobolus* on the basis of cultural studies and studies on the life cycle of an edible rust causing malformation of floral parts on *Acacia eburnea* described by Barclay as *Aecidium esculentum* to establish its autoecious nature and identify it as *Ravenelia esculenta* (Barclay) Narasimhan & Thirum.

In the field of antibiotics Thirumalachar is well recognised for his discovery of Hamycin, Dermostatin and Aureofungin produced by novel strains of *Streptomyces* isolated by him from Indian soil. These are potent antifungal antibiotics therapeutically useful in the control of human mycoses and combating fungal infections of plants. From a new species of *Emericellopsis* with *Stilbella* conidial state an anti-protozoal, anti-helminthic antibiotic Antiamoebin was discovered and patented by him which was highly potent in controlling diverse intestinal parasites.

During the years of his stay in U.S.A. after 1975, he carried out research in several important topics obtaining significant results and getting U.S. patents granted for several of them. These include (a) developing water-soluble derivatives of several therapeutically active antifungal antibiotics with better performance and lower toxicity designated Jaimycin (b) developing Phyton 27 as a systemic fungicide highly effective in controlling tree wilts like the destructive Dutch Elm disease (c) process for production of Insulin using fungal cells transformed by incubation with pancreatic cell cultures (d) developing a formulation based on *Actinomucor elegans* for enzymatic degradation of crude petroleum products (e) process for recovering oil from oil-bearing soil as shale and tar sands and (f) chemotherapeutic control of plant diseases caused by *Mycoplasma*-like organisms with a novel tannate complex of picroammonium tartrate designated KT 198.

Thirumalachar was elected to the Fellowship of Indian National Science Academy in 1966 and served on the INSA council during 1969-1971. He has been President of the Indian Phytopathological Society and was the first vice-president of the Mycological Society of India when it was established in 1973. Among the awards received by him may be mentioned the Shanti Swarup Bhatnagar Award (1967) and the INSA Sundar Lal Hora Medal (1969). He was also awarded the Polish Academy of Sciences medal for his outstanding contributions. He was a member of the Editorial Board of the International Journal of Antibiotics. He was honoured with an Editorial plaque from the American Microbiological Society. He established the Hindustan Antibiotics Bulletin as a full-fledged scientific publication in which several eminent international scientists published their research findings.

Thirumalachar started his career as a teacher and subsequently became an accomplished researcher. He always had a great liking to interact with academia and students and in his informal discussions always provided valuable insights based on his rich experience which would not be accessible from text books or published literature. Those who had the opportunity to closely interact with him will surely cherish memories of his subtle sense of humour as well as his several interesting anecdotes on various mycologists he had met and interacted with.

He was a man with deep religious fervour and was particularly devoted to the temples at Melkote and the Sankat Vimochan temple at Varanasi. While not tolerant to sloppiness and inefficiency, he was always generous to forgive and forget past mistakes.

If one can look back and evaluate the legacy of Thirumalachar over the past five decades in order to draw inspiration from his life and scientific achievements, the most visible traits are his dedication and commitment to succeed overcoming obstacles and willingness to expand the horizons of his knowledge to build up self confidence to make his researches broad based and truly multi-disciplinary. I believe our younger generation of biologists would immensely benefit from imbibing this spirit of adventure in their work, getting inspired from the scientific contributions of Dr. Thirumalachar.