

Prof. M. J. Narasimhan

By M. J. Thirumalachar (Pimpri, Poona 18, India)

On September 24th. 1970, Prof. M. J. Narasimhan, emeritus scientist, one of the foremost mycologist and plant pathologist of India passed away after a brief period of hospitalisation. Born in Madras in 1891, he came from a family of intellectuals greatly devoted to research and learning. His grandfather was co-author on several oriental texts and treatises with Prof. Max Müller of Germany, and many of his works found their place in the libraries of Munich, Germany. Prof. Narasimhan's early education was in Madras Presidency College under Dr. Fyson, where he had association of his cousin Prof. M. O. P. Iyengar and other eminent botanists of India, Prof. Ekambaram and Prof. Sampathkumaran.

His first job as scientist came at the age of 22 when he moved to Bangalore, Mysore, and took the post of assistant mycologist under Dr. L. C. Coleman, the Canadian scientist who was trained under Klebahn, and had made Mysore his home land for scientific adventures in mycology and plant pathology. The dense untrodden rainy forests of Mysore with tiger infested jungles, fast flowing rivers and vast coffee and areca plantations, became their ground for mycological and plant pathological explorations.

The koleroga disease of areca palm incited by *Phytophthora arecae*, a devastating disease was the first to be taken up. It was such an epiphytotic and nightmare for the cultivators, that cultivation was being abandoned. In the years 1914 to 1922, Prof. Narasimhan started the work with a band of assistants, and introduced fungicidal control measures for the first time. This involved spraying operations in heavy downpour of rains and climbing up of the areca palm trees to height of 30 to 40 feet to reach the fruit bunches and hopping to another tree without climbing down. His own personal handling of the work brought such reputation to the Mysore State as the first to take up such modern plant protection practices. The Holder Sprayer company of Germany co-operated in devising suitable spray equipments.

The problem of sexuality in *Phytophthora arecae* was investigated early in 1930. The antheridial and oogonial mycelia were not only separate but were found on different hosts. By mating experiments, strains occurring on *Santalum*, *Bryophyllum* and others were shown to produce oospores. Even a month before his passing away, he was working diseased arecanuts collected in the fields of Mysore and estab-

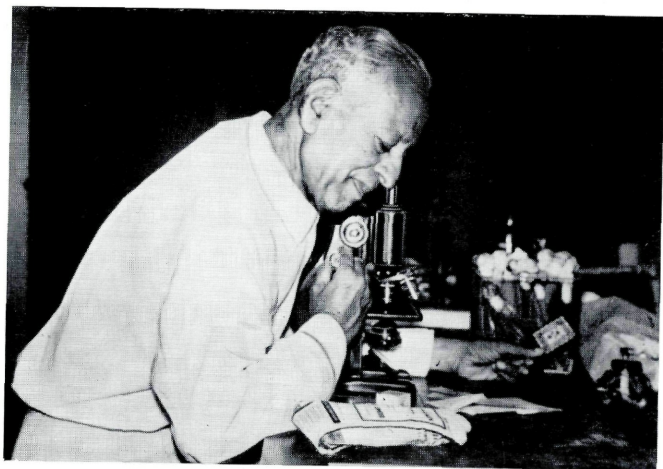
lished that the debris of the diseased nuts on the ground had oospores, which is a most important finding in the study of etiology and control of the disease.

His experience in the fungicidal control of koleroga of areca palm, made him the leader in handling plant protection programmes, and with Mr. W. W. Mayne, was responsible for planning control of leaf rust of coffee incited by *Hemileia vastatrix*. Several races of coffee rust were established on differentials, teliospores were discovered and germinated. None of the rubiaceaceous hosts with their own *Hemileia* species acted as collateral hosts. His paper on some aspects of diseases of coffee in India is being presented posthumously at the Second International symposium at Delhi in January 1971, in which he was a sectional president. It also includes his work on the new malady of coffee.

Just prior to the outbreak of second world war, he was in Europe for an year and half, meeting several of his colleagues and professors with whom he had life-long correspondence. Dr. Eduard Fischer at Bern with whom he had worked on phalloids and other mycological problems was also responsible for getting close association with his pupils notably Prof. Ernst Gäumann at E. T. H. Zurich. Dr. Alfred Ernst, Walter Rytz, W. H. Schopfer were some of the others with whom he worked. At vienna he worked at the University with Dr. Hans Molisch, and studied also the collections of Dr. Von Höhnelt for whom he had great respect. In Germany he was with Drs. Rheims, Kramer, Wollenweber, Prof. Von Faber, and spent some time with Dr. Hans Sydow and Dr. Hans Kniep and Dr. P. Dietel. His association with Dietel made him later take up cultural studies on rusts. With Dr. Johanna Westerdijk at Baarn, cultural collections and exchange were established, and with Prof. Quanjier, Dr. Van Slogteren and Dr. Thung problems of viruses, particularly sandal spike on which he did pioneering work were discussed. He had long association with the group at I. M. I., now C. M. I., with Dr. E. J. Butler, Dr. A. H. R. Buller Dr. S. F. Ashby and Dr. Henderson Smith at Rothamsted. Prof. Petri in Rome, Dr. C. Sibilio, Prof. Trotter were some of the Italian mycologists and plant pathologists with whom he had constant communication after returning from their laboratories.

After his retirement in 1946 as Director of Agriculture, Mysore State, he started intensive work in mycology and plant pathology, which only ended few days before his demise. Along with his son Dr. M. J. Thirumalachar, he worked on several new downy mildews including *Sclerospora westoni*, *S. isilematis*, *S. dichanthicola* which were new taxa, and established the genus *Sclerophthora*, which now has been validated by the recent International Downy mildew symposium in 1969. Since the conidial and sporangial stages are produced during midnight, Prof. Narasimhan used to stay awake

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for several days carefully following the developmental stages and inoculating the plants. His work on mango malformation, papaya mosaic showed how the virus-like symptoms were really due to insects or nematodes. He was the first to show the mycotoxin due to *Heterosporium* in cereals, long before the aflatoxins and interest in mycotoxins was realised.

The cultural studies on rusts made him the most renowned experimental uredinologist. His concept of epicentre for the heteroecious rusts which was postulated in the Mundkur Memorial lecture in 1969 to Indian Phytopathological society was most revealing. In his own work he had connected aecial stages of numerous graminicolous rusts such as *Uromyces setariae-italicae*, *U. clygnii*, *Puccinia versicolor*, *P. duthie*, *P. arundinellae*, *P. mysorensis*, *P. cacao*, *Dasturella divina* and others. Some of the systemic aecial stages on acanthaceous hosts in *P. cacao* and *P. duthie*, were shown to have most interesting cytological stages. Even a fortnight before he passed away, he just completed the work on the heteroecious rust *Uromyces apludae*. It was in connection with these field studies that he went to the mountains during rainy season, got drenched several times and was struck by pneumonia from which he never recovered. Even during feverish state, he kept peering in the microscope, germinating teliospores and inoculating host plants. He kept working until his ailment became severe and he passed away in peace. His cultural studies on rusts would remain an example for others, how a critical and precise work has to be done.

His work on the biological control of insect pests, with micro-organisms and other biological organismata, without disturbing the biological environment, with its ecological and pathogenic implications; were done in collaboration with his son Dr. M. J. Thirumalachar, Hindustan Antibiotics Research Centre, and his grandson Dr. M. J. Narashimhan Jr., B. J. Medical College and Sassoon General Hospitals. This, a new field for the Indian sub-continent, was the theme of his Presidential Address to the Indian Phytopathological Society in 1969. Hew showed that *Entomophthora lecani* Zimm. was a Heterobasidiomycete, with the yeast phase in the insect's body, capable of mass multiplication in submerged cultures, which could be used for the biological control of insects on a massive scale, especially the insects belonging to the 'scale-insect' group. He named the genus *Derexia*. He was the first to successfully cultivate *E. muscae*, on a very simplified medium, without the original complicated and heterogenous media; and also *Isaria stellata* on the mango hopper and several *Aschersonia* species.

His work on general mycology was extensive, with the aim, methodology and resultant conclusions based on definitive culture studies. The spore discharge in apothecia of *Sclerotinia sclerotiorum*

on *Orobanche*, the new myriangiaceous genus *Annajenkinsia*, numerous fungi imperfecti collected in different parts of India added to our knowledge of the mycoflora of the vast sub-continent. In spite of the rapid deterioration of his health, he meticulously went through the correction of the proof of his paper on the *Elsinöe* and *Sphaceloma* in Maharashtra, appearing in *Sydowia*, and several hours later, even in the stage of precomatose delirium, he talked of *Phytophthora* and his recent mycological researches.

In his honour, the genera *Narasimhania* (Ustilaginales), *Narasimhella* (Gymnoascaceae) and several species, *Tilletia narasimhanii*, *Burrillia narasimhanii*, *Physoderma narasimhanii*, *Cercospora narasimhanii* and other have been named. As one of the scientists described, "in the passing away of Professor Narasimhan, Science and Humanity have lost a leading citizen ...".

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