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In Memoriam
Prof. Arun Kumar Sharma (1924-2017)

Prof. A. K. Sharma (31.12.1924 – 06.07.2017)

Padma Bhushan Professor Arun Kumar Sharma, one of the doyens of botany in general and cytogenetics and cytotaxonomy in particular, died on 6th July 2017, Thursday at an age of 92. He made a benchmark both at national and international level. His fame reached the zenith of success through his hard work but his success kept him humble as a human. Besides his own research activities on various domains of botany, he has significantly contributed to the policy, planning and formulation of scientific and technical programmes for the growth of science in India.

Prof. Sharma was born on 31st December, 1924 and lost his father Charu Chandra Sharma at a very young age. His mother Shovamoyee Sharma stood like a strong pillar through the thick and thin of his life. After completing his basic schooling from Mitra Institution (1933-1939) he obtained his B.Sc degree from Asutosh College (1941-43) and M.Sc from University of Calcutta (1943-45). He got his initial training in chromosome from Prof. P.N. Bhaduri. He started his career as an Assistant Professor (1948) at Department of Botany, University of Calcutta and also gradually became the Professor and also as the Head of the department. For his outstanding research contributions he was honored with D. Sc. degree in 1955. In the year 1969 Prof. Sharma became the 'Sir Rashbehari Ghose

Chair Professor' in the Department of Botany, University of Calcutta. Prof. Sharma was an extraordinary teacher, scientist and held exorbitant knowledge in all branches of botany. Prof A.K. Sharma has guided 60 students for Ph. D. and 10 of his eminent students have been honored with the D. Sc. degree.

Prof. Sharma made significant contributions in Science and Technology and was involved in various scientific related work post independence era. Prof. A.K. Sharma initiated and with constant rigor made an excellent mark in the chromosome study. In the study of plant genetics he made significant contributions in the research on chromosomes. He established the chromosome research centre in the Calcutta University where several new areas of chromosome research were initiated.

Prof. A. K. Sharma was a member of the team constituted for the reorganization of the Botanical Survey of India (BSI) by Govt. of India in the year 1948 under the leadership of Dr. K. P. Biswas along with other members namely R. S. Rao, Dilwar Hossasin, D. D. Awasthi and Sunil K. Mukherjee (all were research fellows of BSI and A. K. Sharma was a registered fellow of Botany Department, C.U.). Later Dr. E. K. Janaki Ammal took the charge and succeeded Dr. Biswas in the year 1952.

Prof Sharma along with his students were engaged in developing innovative methods for chromosome study, noteworthy amongst them are aesculine, isopsoralene and umbelliferone for chromosome analysis as well as Orcein banding technique for repeated DNA sequences. Water as a pre treatment agent and the cause of breakage or clarification of chromosome were also resolved.

Prof. Sharma and his team made significant contributions to the field of systematic and evolutionary trends in different Monocotyledons and Dicotyledons taxa on the basis of cytological data. A digital account of plant chromosome work done by Prof. AKS and his group since 1950 on more than 1500 species was released by the Department of Biotechnology during the 100th session of the Indian Science Congress on 5 January 2013 at Kolkata. Prof. Sharma has great contribution on the cytotaxonomy study of Himalayan plants under the "US PL 480 project". All materials related to this study have been incorporated in CUH recently.

In asexually reproducing species like lilies, amaryllids, aroids and other families of monocotyledons, it was revealed that such species show dynamic differential chromosome behaviour. Such species continually produce new genotypes and cultivars despite the absence of the regular method of reproduction and fertilization, indicating that they have developed alternative methods of generating variability.

These findings drive Prof Sharma to establish 'A new concept of speciation'. The concept defines that in asexually reproducing species, the somatic tissue represents a chromosome mosaic in which the normal complement occurs in highest frequency.

He had immense contribution in the fields like induction of cell rejuvenescence and control of differentiation, repeated DNA sequences and dynamic DNA, concept of chromosome dynamism, chromosome chemistry. Prof. Sharma contributed a lot as pioneer in the chromosome painting research.

AKS also worked on problems related to environment, originally emanating from his studies on genetic effects of physical and chemical agents. His Presidential Address at the 68th Session of the Indian Science Congress on "The impact of development of science and technology on environment" provided incentives for the introduction of a number of programmes for conservation of environment and abatement of pollution in India – so much so, the creation of the Department of Environment of Government of India owes much to the recommendations based on this focal theme. At this stage Indira Gandhi, the then Prime Minister of India wanted him to become the first Secretary of the newly created Department of Environment. However, he could not undertake the same because of his commitment to the Department of Botany, University of Calcutta.

He authored over 600 research papers including 6 in *Nature*, several papers in *Chromosoma*, *Naturwissenschaften*, and hosted top notch specialized journals and contributed invited reviews/articles to *Botanical Review*, *Chromosome Today*, *The Cell Nucleus*, *International Review of Cytology*, *Encyclopedia of Microtechnique*, *Biology International*, etc.

In 1958 only at an age of 34 Prof. Sharma started to publish the international journal named "*Nucleus*". Prof. Sharma along with his wife Prof. Archana Sharma together published the classic book named' Chromosome Techniques: Theory and Practises' published by Buttorworth, London in the year 1965. Till date this is a remarkable book and is followed widely by most of the laboratories. The Nucleus is running in the 60th year of its publication

and is published by Springer. He also served on the Editorial boards of many journals including *Cytologia, Proceedings of the Indian National Science Academy, Journal of Cytology and Genetics, Preceedings of the Indian Academy of Sciences and Indian Journal of Experimental Biology*, etc.

Due to his significant research work and incredible impact in Science he was honored with the Greatest award of all time, the 'Padmabhusan'. For his outstanding contributions in the field of chromosome research he was honoured as the Jawaharlal Nehru fellow, National Lecturer UGC (1972-76) and later on as the golden Jubilee Professor of the Indian Science Academy from 1985-1990 at the University of Calcutta. Apart from this he was also awarded S.S Bhatnagar (1976), Paul Bruhl Memorial Medal (1974), Asiatic society, Birbal Sahni Medal –Indian Botanical Society (1974), First JC Bose award –UGC (1976), Silver Jubilee Medal – INSA (1976), VASVIK Award (2003), Eminent Teacher of Distinction-University of Calcutta (2006), Rathindra Puraskar-Visva Bharati (2008), Life Time Achievement Award-Indian Botanical Society (2010).

He was chairman of National Science Academy, New Delhi (1983-84), National Academy Of Sciences, India (2010-2012) and Federation of Asian Scientific Academics and Societies (1984-1989). Prof. A. K. Sharma also served as a chairman of the Bioresearch committee of CSIR and ICMR. He was also a member of the Life Science Panel of UGC and DST's Science and Research procedure. He was also the chairman, co-chairman and trustee of various research institutes. Indian National Committee of IUBS-INSA (1978), Man and Biosphere Committee, Department of Environment (1981-89), FASAS Commission On Science And Technology For Development in Asia (1990), Chairman Biological Sciences, Fellowship Committee of the World Academy of Sciences (TWAS), Trieste (1991-1998), Co-chairman, Global Continuing Committee On Role of Scientific and Engineering Societies in Development (AAAS-INSA-ISCA) (1980), Birla Industrial and Technological Museum, Kolkata (1990-98), Plant Biotechnology Committee, DBT (1997-till Death), Chairman, Steering Committee, National Bioresource Development Board, Government of India (2000-till date), Plant Sciences Research Committee, CSIR (1998-2004); Member, Executive Committee, IUBS, Paris (1982-85), IUBS Steering Committee on Biological Monitoring of the State of Environment (1983), trustee International Foundation of Science, Stockholm (1984-87). He has also served as the chairman of the research council of Birbal Sahan Institute of Palaeobotany, Lucknow. National Botanical Research Institute, Lucknow and National Institute of Plant Genome Research, New Delhi.

Prof. Sharma's contribution to Science and Technology was recognized worldwide. He was invited to act as the chairman and panel specialist of various sessions and International Scientific Meetings namely chairman of the section on Chemical Mutagens at the International Congress of Genetics at Montreal (1958), Tokyo (1968), Leader of the Indian delegation to the International Congress of Genetics at the Hague (1963), International Congress of Cell Biology at Berlin (1980), Chairman of the section Newer Concepts of Structural Organization of Chromosomes, New Delhi (1983). He attended the International Congress of Cyto and Histochemistry at Frankfurt (1964) as Panel Expert. Invited speaker at the Oxford Chromosome Conference (1967,1970,1977), International Botanical Conference at Seattle (1969), Tropical Botanical Conference at Denmark (1978), visited Norway as official delegate to the IUBS General Assembly (1973), UNCSTD conference at Vienna (1978). Prof. Sharma had been to Washington (1980) as the chairman of the Joint Organization Committee of the Global Seminar on the Role of Scientific Societies in Development, jointly organized by the American Association of Advancement of Science, Indian Science Congress Association and Indian National Science Academy, the final conference being held in Delhi on December 1-5, 1980, in which about 50 countries were represented. As President of Indian National Science academy and later as Founding President, FASAS. Prof. Sharma visited a number of Academies in different countries of Asia, Europe and USA, on invitation of giving lectures (1995-1999).

He was a great teacher, eminent scientist and a pioneer in the modern chromosome research. His contributions were internationally acclaimed and appreciated. It was a mere fortune for all those who got to know a personality like him. He ignited the light of scientific temper and was humble to the core.

D. Maity
Botany Department, Calcutta University
P. Singh
Botanical Survey of India

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