

Japanese Expedition to Eastern Himalayas in the summer of 1960. He was President, Palaeobotanical Society (1983), was Editor-Secretary and Chief Editor, *Palaeobotanist* (1976–1984) and Chief Editor, *Geophytology* (1971–1973). He was a recipient of the Birbal Sahni Medal of the Indian Botanical Society (1983) and of the XII International Botanical Congress Medallion presented to him at the Congress in Leningrad in 1975.

I first met Lakhanpal at the International Botanical Congress at Edinburgh in 1964. I had the pleasure of meeting him again at the International Botanical Congress in Seattle in 1969, where he had been invited to participate in the Congress Symposium on Interfaces between

Botany and Geology. The high esteem in which he was regarded by the international community of botanists and palaeobotanists was obvious to me even then. In later years during my close association with Lucknow, I saw a great deal of Lakhanpal: I saw in him a gentleman and scholar of dignity, modesty and friendliness. In summation of his contributions I should say that much of it has a direct bearing on angiosperm phylogeny, which is a subject as fascinating as it is intriguing, and of great current (and, indeed, perennial) interest. His long and classic innings at BSIP from the time he joined the Institute at the time it was founded (1949) until 1988, is a genuine measure of the beauty of interaction, of how well

he got on with his colleagues. Interestingly, Lakhanpal was a Founder Member of the Society for Scientific Values, whose objective was to promote integrity, objectivity and ethical values in the pursuit of science. There is much to learn from the science and humanism of Lakhanpal for those in the pursuit of not only botany and palaeobotany but also other disciplines, many of which are closely related.

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## Sardul Singh Guraya (1930–2012)

Sardul Singh Guraya, born on 12 October 1930 at Kotmajlis, Gurdaspur District, Punjab breathed his last on 8 July 2012. He is survived by his wife Surinder Kaur, two sons and a daughter. He graduated from Punjab University and obtained the doctoral degree under the supervision of Vishwa Nath. He carried out postdoctoral research with G. S. Greenwald at Kansas University Medical Center, USA (1962–64). My first encounter with Guraya was in 1969 when I was attending a six-month training workshop in 'Reproductive biology' organized by the Indian Council of Medical Research, New Delhi. He delivered lectures and demonstrated some histochemical techniques to the participants.

During the course of my doctoral research on amphibian reproduction I came across a large number of his contributions that ranged from invertebrates and protochordates to all classes of vertebrates (fishes, amphibians, reptiles, birds and mammals) including man. He wrote many reviews and published them in reputed journals like *Physiological Reviews* and *International Review of Cytology*. In the latter alone, he contributed over 20 reviews. Many of his publications are single author contributions.

Guraya studied comparative aspects of vertebrate reproduction by elucidating the ultrastructural, cytochemical and histochemical changes occurring during oogenesis, folliculogenesis, oocyte maturation, follicular atresia and origin of interstitial gland cells in vertebrate ovaries,

spermatogenesis, sperm capacitation, acrosome reaction, Leydig cell and Sertoli cell functions and, localization of steroid synthesizing cellular sites in the



gonads of different groups of chordates and some invertebrates. Being in an agricultural university, he also made in depth studies on the reproduction of farm animals like, goat, sheep and buffaloes. Though he used simple histological and histochemical techniques available then, his understanding and interpretations were most modern.

Guraya authored the following books: *Biology of Ovarian Follicles in Mammals* (Springer-Verlag, 1985), *Ovarian Follicles in Reptiles and Birds* (Springer-Verlag, 1989), *Biology of Spermatogenesis and Spermatozoa in Mammals*

(Springer, 1987), *Cellular and Molecular Biology of Gonadal Development and Maturation in Mammals* (Springer, 1998), *Ovarian Biology in Buffaloes and Cattle* (ICAR, New Delhi), *Cellular and Molecular Biology of Gonadal Development and Maturation in Mammals: Fundamentals and Biomedical Implications* (Narosa, 1998) and *Comparative Testicular Biology in Animals* (Oxford & IBH, 1999).

I had the good fortune of having personal interaction with Guraya. His coming to Dharwad had a special meaning to me. In the early 1980s the situation in Punjab was such that people felt unsafe to move freely from place to place. Yet, he visited Dharwad twice on official work. He firmly believed, and rightly so, that delays in filling faculty positions and awarding doctoral degrees can harm the interests of institutions and individuals.

During one of his visits, I proposed to Guraya that we jointly edit a book on *Reproductive Cycles of Indian Vertebrates*, he readily endorsed the idea and suggested that I edit the book. His encouragement formed the backbone of my efforts in publication of this book (Allied Publishers, 1989). Working in a small state university where academic atmosphere is often missing my interaction with Guraya enlightened me and gave the needed inspiration and encouragement to pursue higher research. He provided purpose and meaning to my academic life.

It was a matter of great pleasure having Guraya in scientific meetings. He invariably brought vibrancy with ques-

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tions, comment and suggestions. He made it a point to visit each poster presentation with great zeal and interact with young researchers giving them advice, appreciating their work and motivating them. During an endocrinology conference in Delhi, power failed soon after the inauguration. The scheduled speaker could not present his lecture without the slide projector. To my great surprise, Guraya spontaneously volunteered to deliver his next day's talk if organizers and participants had no objection. All agreed. And, Guraya delivered a brilliant talk using chalk piece and black board! His message was that in India power failure being very common one should be prepared to face such eventualities.

Guraya served as Assistant Professor at Gorakhpur University (1960–62), as

Reader at University of Udaipur (1966–71) and as Professor and Head, Department of Zoology at Punjab Agricultural University (1971–1990), Ludhiana, from where he retired. He served on many high power committees, funding agencies and apex bodies. He used these opportunities to promote teaching and research in animal sciences in the country. He was a Fellow of Indian National Science Academy (New Delhi), National Academy of Sciences of India (Allahabad) and National Academy of Agricultural Sciences, New Delhi. He was a recipient of the Shanti Swarup Bhatnagar Prize (1973), UGC National Lectureship (1976–77), M.S. Randhava Award (1985) and Basanti Devi-Amar Chand Prize (1990).

Guraya was a man of great conviction and commitment. He was an inspiring

teacher and a researcher. His was a strong personality with a compassionate heart filled with love and affection towards family and friends. In his demise the community of zoologists, farm and veterinary biologists, those working in the area of animal reproduction and all those who knew him will greatly miss him. The country has lost a doyen, an acknowledged expert on vertebrate reproduction and a classical zoologist par excellence.

S. K. SAIDAPUR

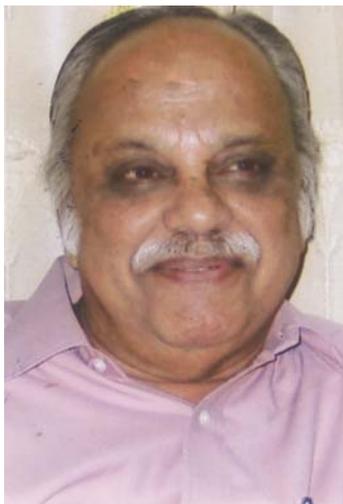
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## P. S. Rao (1939–2012)

P. S. Rao, one of the most eminent plant biotechnologists of India, passed away in Bangalore on 26 July 2012. He was a brilliant researcher, dexterous experimenter, inspiring orator, teacher and an efficient administrator. He was born on 3 August 1939 at Mysore. He did extremely well from the beginning in his academic career. After his postgraduation from University of Mysore, he joined the Department of Botany, University of Delhi, for his doctoral degree under the supervision of N. S. Rangaswamy. The thesis work of Rao was on sandalwood tissue cultures and *in vitro* fertilization of tobacco. After receiving his PhD degree in 1966, he joined the Biology Division at the Bhabha Atomic Research Centre (BARC), Mumbai, as a scientist. After an illustrious career at BARC, he retired as Head, Nuclear Agriculture and Biotechnology Division in 1999. Subsequently, he worked as a senior executive in Reliance Industries, Mumbai and Indo American Hybrid Seeds, Bangalore. Later on he joined as Director, PES Institute, Bangalore and afterwards Biotechnology Department in Dayanand Sagar Institutes, Bangalore.

During the period of his energetic and motivated leadership, the plant biotechnology group at BARC carried out wide-ranging studies on plant morphogenesis,



micropropagation, anther and protoplast culture, somatic embryogenesis and synthetic seeds, secondary biosynthesis and mutations. His main interest was on the development of viable technologies for high-valued crops. As a visiting scientist, Rao had conducted advanced research in plant morphogenesis during 1971–1973 at CNRS laboratories in Gif-sur-Yvette, France and in protoplast culture during 1981–1982 at the Max Planck Institute, Germany. Among his various research contributions, the work on sandalwood biotechnology has received tremendous appreciation and recognition.

Rao has guided several students for their M Sc, M Tech and Ph D degrees and has more than 200 research publications to his credit. Many of his students are working as senior scientists, professors and executives in private companies in India and abroad.

Rao was elected as a Fellow of National Academy of Sciences, Allahabad and National Academy of Agricultural Sciences, Delhi. He was a member of several professional societies in India and abroad and was serving on the editorial board of three scientific journals.

Rao welcomed innovative ideas and a wonderful modest person always listened patiently to his colleagues. He encouraged all and never failed to appreciate when his colleagues or students did well. He had the rare ability to identify and draw on the strengths of his subordinates so that they could achieve excellence in their work. Rao is survived by his wife, son, and a very large extended family of friends, colleagues and students.

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