

A DIALOGUE WITH DR. R. C. JOSHI

A magnanimous and an incredible journey of a village boy to Scientist at an International Institute. A determined mind and a strong will take you to greater heights. Dr. Ravindra Chandra Joshi, an overseas scientist shares his thoughts and experience with IE associate Editor Dr. Sagar D

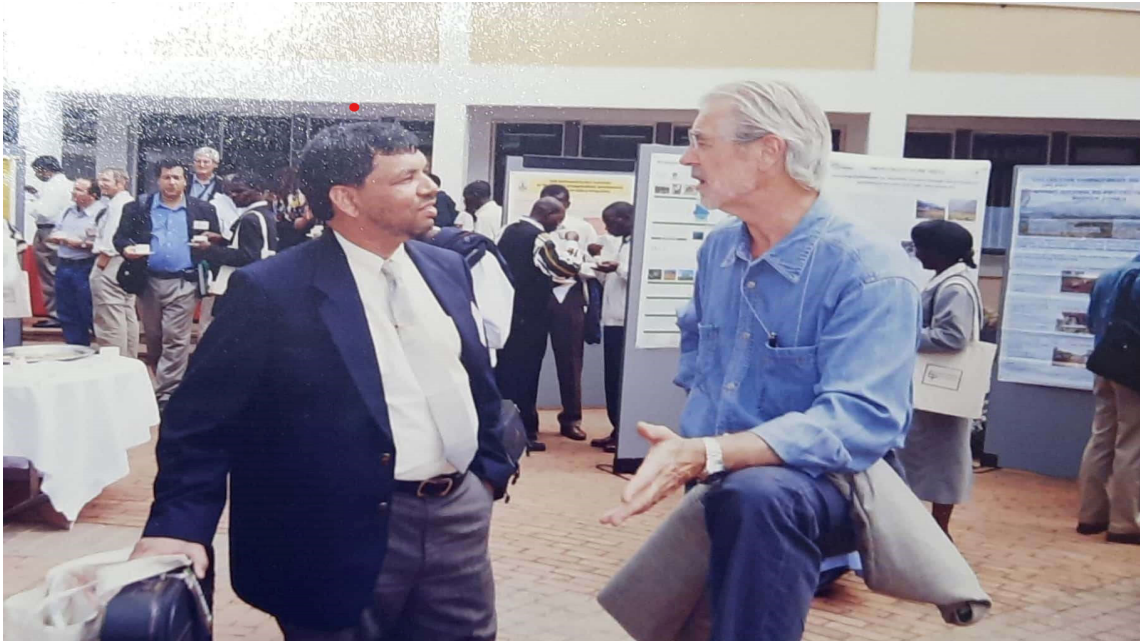


Dr. Ravindra Chandra Joshi born on 26th September 1958 in the village Chitai, Almora, Uttarakhand. He had his earlier education in India, completed B.Sc. (Ag.) in 1980 from the Andhra Pradesh Agricultural University, Hyderabad, and M.Sc. (Ag.) in 1982 (Agricultural Entomology) from Tamil Nadu Agricultural University, (Madurai Campus), Coimbatore. His passion in rice entomology blossomed during his thesis research on Rice Gall Midge which paved way to work at the International Rice Research Institute (IRRI), Philippines, and obtained Ph.D. (Entomology) from the University of Philippines at Los Baños (UPLB), Philippines in 1988. Dr. Joshi is currently serving as Senior IPM Consultant, Philippine Rice Research Institute (PhilRice), Department of Agriculture, Philippines who has four decades of rich experience in research, teaching and extension in sustainable agriculture across Asia (Cambodia, India, Japan, Philippines, Vietnam, Japan), in Africa (Nigeria), in the Pacific Islands (Fiji, Solomon Islands), in Europe (Spain), in South America (Ecuador), and in the Caribbean (Haiti, Suriname, Trinidad and Tobago).

Dr. Joshi has made great strides in the integrated management of Asian Rice Gall Midge and the African Rice Gall Midge during his tenure at the

International Institute of Tropical Agriculture (IITA), Nigeria. His work has spanned the breadth of national, regional and international organizations, research and government institutions. He served as senior adviser to the Ministries of Agriculture in both Fiji and The Solomon Islands. In each country he developed National Agriculture Sector Policy, assisted in international cooperation, worked in national research, and advised and assisted the senior directors to translate the sector policy into corporate plans. Dr. Joshi is considered as most knowledgeable persons on rice insect pests (gall midges, stem borers, planthoppers, black bugs, invasive apple snails, and rice field rats) and serpentine vegetable leaf miners in highland vegetables (cabbage, potatoes, and others), in the Philippines. In fact, his expertise on the invasive apple snail is recognized internationally as evidenced by his being consulted by other national programs in Asia, Africa, Europe and Pacific Islands.

In Fiji, Dr. Joshi revived the Fiji Agricultural Journal and the Fiji Institute of Agricultural Sciences that had previously been inactive for more than 17 and 20 years, respectively. He is a Visiting Professor in many national and regional universities in Fiji and Philippines, and examiner for universities in the South Pacific, Philippines, Australia, India and Thailand. He has edited 4 books, and published over 150 research articles with students and collaborators on crop protection, particularly regarding invasive species affecting food and nutrition security. He is a fellow of 17 professional societies, and holds



Dr. R. C. Joshi with Dr. Hans R. Herren (World renowned Biocontrol expert), Former Director General, ICIPE, Kenya

honorary positions in a number of academic, and professional networks and associations.

Dr. Joshi is well decorated scientist with many awards, he is recipient of the **Executive Director's Award** from the Secretary of Agriculture during the 18th Anniversary of Philippine Rice Research Institute in 2003, he is Fellow of Royal Entomological Society (FRES) of London, United Kingdom, Fellow of the Royal Society of Biology (FRSB), London, United Kingdom, Fellow, Entomological Society of India (FESI), India and Fellow, Plant Protection Association of India (FPPAI), India.

Dr. Sagar D (SD): *Sir, on behalf of Indian Entomologist Magazine, I profusely thank you for accepting our invitation to share your thoughts and ideas with the magazine. Sir, you are the first overseas scientist we are interviewing for Indian Entomologist.*

B. Sc (Ag) in Hyderabad, M. Sc (Ag) in Coimbatore and PhD in Philippines what inspired/motivated to do PhD overseas?

Dr. R C Joshi (RCJ): As early as my undergraduate and graduate student days, I was always interested in rice entomological research especially on biocontrol and integrated pest management. Therefore, I used to read lots of International Rice Research Institute (IRRI) publications: research papers, research projects highlight in annual reports and

books where IRRI scientists and visiting scientists published their excellent research findings. The rice entomological researches of famous rice IRRI principal entomologists/ visiting scientists starting from Dr. John A. Lowe, Dr. Peter E. Kenmore, Dr. E. A. Heinrichs, Dr. J.A. Litsinger, Dr. B. M. Shepard, Dr. K. L. Heong, Dr. O. Mochida, Dr. M. D. Pathak, Dr. R. C. Saxena, Dr. M. S. Venugopal, Dr. S. Chelliah, and many others had influenced me. I had a big dream to be like them and to work at IRRI as a crop protection specialist one day, and therefore I was determined and joined the Ph.D. programme at the University of the Philippines at Los Baños (UPLB) without any scholarship. IRRI is housed in the UPLB Scientific Community Campus and this proximity and as a UPLB Student it helped me to attend free IRRI weekly seminars every Thursday and Saturday seminars, and learn about the new research directions in the rice world from the world-renowned rice scientists.

SD: *What was the special thing that attracted to this field of tiny creatures? What initially sparked your interest in studying insects and becoming an entomologist?*

RCJ: During my undergraduate days, I used to collect many crop insect pests (various stages) and their damage symptoms to rear them individually in big glass jars in my house (originally those big glass jars were used by my mother to make pickles), to

understand their life cycle (way of life). From my field collections, I kept few individuals (adults and their immature stages) for my entomology course requirements (insect collection that we had to submit). I have borrowed all the glass big jars from my mother to rear those insects and my mother has volunteered to change the plant foods and clean each jar every day while I am at Andhra Pradesh Agricultural University (APAU) attending my classes. To my surprise, she would even observe changes in insects reared in those glass jars. On my return home every day in the evening, she would ask me to check the glass jars. One day she alerted me that some small black insects were emerging in one of the glass jars instead of the usual big adults. This caught my attention and made me interested, then I consulted my APAU Professor (Dr. P. Kameswara Rao) who was teaching us one of the entomology courses, and after few days he showed me that what I have reared is interesting and probably new. So he asked me to rear some more. While rearing them, I already started to look at CAB host-parasitoid catalogues, CAB Abstracts, and published references, and even contacting many Parasitic Hymenoptera experts like: Dr. V. K. Gupta, Dr. H. Nagaraj, Dr. S. Nagarkatti, Dr. T. C. Narendran, and many others from British Museum (London) for any information. My aim was to publish this with my mentors at APAU.

To sum up, basically it is my mother to whom I owe the most for the start of my entomological career (biocontrol), and of course to my earliest most mentors in Entomology at APAU. I published few short research papers in well renowned Journals during my B. Sc. (Ag) studies at APAU, Rajendra Nagar, Hyderabad with my APAU mentors who were renowned Indian entomologists.

Joshi R C, Rao P K, Ali M H. 1981. Preliminary studies on Jamun leaf miner (*Antispila anna* Meyr.) with two new parasite records. *Current Science* 50(8): 373-374.

Joshi R C, Rao P K, Rao B H K. 1982, New record of a chalcid pupal parasite *Brachymeria (Matsumurameria) criculae* (Kohl) on *Metanastria hyrtaca* Cr. (Lasiocampidae: Lepidoptera). *Entomon* 7(4): 499.

This sparked my interest to continue my future research in entomology with focus on IPM and biocontrol agents.

SD: You have gained recognition for your knowledge of invasive apple snails on a global scale; could you kindly narrate us how interest in snails has grown?

RCJ: The invasive apple snail (formerly referred to as the golden apple snail), was introduced in the Philippines between 1982 and 1984 to supplement sources of food protein of low-income Filipino farmers. However, in 1986, it began to damage heavily rice farms in northwestern Luzon. In 1986-1988, I was still a Ph.D. student at UPLB and also IPM Consultant at the Philippine Rice Research Institute (PhilRice). One of my professors, Dr. B. M. Rejesus was invited by Plant Quarantine and Training Institute (PLANTI), Malaysia to present a paper on the current status of this invasive snail, and so I volunteered to help her with the related literature collection. She saw the extensive information I provided and she included me as one of the coauthors.

I remember, the first Executive Director of PhilRice, **Dr. Santiago R. Obien** gave me excellent support when I told him that I want to help Philippines to manage the invasive apple snail problem as rice is the staple crop in the Philippines and rice is eaten by every Filipino. He provided me with the modest budget to kick start the snail management research, when no other agency even the International Rice Research Institute (IRRI) and Food and Agriculture Organization of the United Nations (FAO) consider snails as problem in rice. Without Dr. Santiago R. Obien and PhilRice subsequent Executive Directors (Dr. Leocadio S. Sebastian, Dr. Sailila E. Abdula, and Dr. John C. de Leon) solid support, I and my team at PhilRice would have not reached this far. Today, PhilRice is globally recognized for the invasive apple snail research especially on its integrated management. It is because of innovation and consistent hard work that makes our invasive apple snail research important to other countries either experiencing its new invasions or recurrent invasions or spreading its distribution. Invasive apple snail is one of the 100 of the World's Worst Invasive Alien Species listed in the Global Invasive Species Database that was developed and is managed by the Invasive Species Specialist Group (ISSG) of the Species Survival Commission (SSC) of the International Union for Conservation of Nature (IUCN), and our research on invasive apple snail is well documented in the GISD, CABI Invasive Species Compendium and other databases globally. This work still continues to bring me around the globe, wherever this snail has invaded and continues

to cause havoc.

SD: Since a few decades ago, invasive species have severely affected the environment and the economy across the globe. In terms of integrated pest management, how important is the research of invasive species?

RCJ: As I considerably worked on invasive apple snails, I could say that the negative impacts of these snails are at regional, national and international levels on agricultural yields (rice and many other aquatic crops), farm income, human health, biodiversity, natural ecosystems, and pesticide misuse and abuse during their management are enormous and irreversible. With the climate change, invasive apple snails are able to proliferate faster, accelerate growth rate and invade rapidly new areas because of their ability to acclimatize to winter temperatures, extreme high temperatures during summer, prolonged drought, flooding and tolerate high salinity and polluted water conditions, and other mortality factors. Based on climate models, higher temperatures from global warming will favor invasive apple snail colonization, feeding, growth, sexual activity and egg laying in many of the rice-producing countries. Thus, the research on invasive alien species and their ecological dynamics is critically important in the context of integrated pest management (IPM) to prevent, detect, and control invasions, and also for developing sound policies for decision-makers.

SD: As you have worked in different capacities in many international organizations, how was your experience working in international institutes?

RCJ: I have more than 30 years of rich experiences in research, teaching and extension in entomology in several Asian, African, Pacific Islands, Europe and Caribbean countries, with national, regional and international organizations, including private sector. In each organization, I learnt something new as their way of working, mandate, vision, mission, areas of focus and goals are different. So, I was lucky to be exposed to diverse work cultures and this made me resilient. The two international organizations (IITA, Nigeria and IRRI, Philippines) that I worked with helped me strengthen global networking, collaboration and partnerships, improved my problem-solving skills, and made me a better team player because of associating with experts from diverse backgrounds, culture and perspectives. However, in my opinion after gaining enough international experience at

international centers, one must go back and help national research and academic organizations. This is what I am currently doing, it is time to pay back and share your skills, knowledge and experience.

SD: As an overseas scientist, working away from the motherland, what are the biggest challenges you've come across in your professional life?

RCJ: Like any other international student, I have faced many challenges but one must not forget the unique opportunities that come with it. When I came to Philippines as a Ph.D. student, that was my first time to fly in a airplane, being a strict vegetarian was a big challenge in the Philippines, education system was totally different from India, wide cultural diversity, language barriers were not too much as many Filipinos speak English, away from immediate family members especially when I was hospitalized, navigating to find scholarship and renew visa was a long journey. All of this required resilience, adaptability and an open-minded approach to navigate and make meaningful contributions to the scientific community in the host country. It was because of research breakthrough, finally IRRI for the first time gave a scholarship to a student who is not employed in his home country. This paved the way for other international students who were not employed in their country. The international student experience made me stronger to work anywhere in the world as an overseas scientist. In addition, because of this I am the only foreigner working with the Philippine Rice Research Institute (PhilRice), Department of Agriculture, Philippines. Also I am one of the two foreigners as the Honorary Member of the National Research Council of the Philippines (NRCP), Philippines. The only foreigner as Fellow of the Philippine-American Association of Science and Engineering (PAASE). In short, though there were many challenges as an international scientist but it offered me unique opportunities for personal and professional growth, expansion of scientific horizons, cross-cultural collaboration, etc.

SD: What are the opportunities for young brigade of entomologists in international institutes?

RCJ: Nowadays it is easy for the young scientist (entomologist) to get connected with any international scientist (entomologist) globally because of global connectivity and access, unlike our time when there was no emails and other digital communication platforms. Currently many international institutes have funding

constraints and so one needs to have innovative ideas and cutting-edge science that is interdisciplinary, high impact, novel and must address food and nutritional security, climate change, biodiversity loss and many of the UN Sustainable Development Goals. I see there are more opportunities for young entomologists now as they are more exposed to interdisciplinary innovation researches, and are able to push the boundaries of scientific understanding, knowledge and multi-skill sets. I always say if one has an innovative research project proposal, funding is never a constraint!!

SD: Whom do you admire as a role model in your personal and professional life?

RCJ: My parents and my sister have played a big role in my personal and professional life. Especially my mother played a significant role to kick start my entomological career as early as at the undergraduate level (though she was not a scientist). I consider my father a famous plant pathologist/weed scientist. Thus, I decided to take entomology because you know in India, people would associate my success because of my father. I wanted to excel like him but in entomology. My sister was far more serious with her studies than me, and she always helped me to become better in my school years. My deepest gratitude to my wife, Elaine E. Joshi, and my two children: Ranee E. Joshi and Ranjeet Chandra E. Joshi, and my sister's family members for their superb support.

Before B. Sc. (Ag) Days: Aside from Professor Dr. M. S. Swaminathan, there were many entomologists (Indian and Overseas) that I look-up from the start of my entomological professional. I will name them in the chronological manner (earliest one's only) during my entomological journey. Some of them are still mentoring me and I have been very fortunate and grateful to them. Dr. Raymond C. Smith (Father of IPM)- I remember as a small child accompanied my father with Dr. Smith to visit Taj Mahal, Agra in a Mercedes Car.

During B. Sc. (Ag) Days: Dr. B. V. David (First Indian entomologist who influenced me to become an entomologist), during my B.Sc. (Ag) days at APAU, Dr. D. Bap Reddy, Dr. P. Kameswara Rao, Dr. K. M. Harris (Former Diptera expert on gall midges, Commonwealth Institute of Entomology, Retired as Director of International Institute of Entomology, UK)- First paper on gall midge on Jamun), Dr. N. C. Pant (Director, International Institute of Entomology, UK), Dr. V. V. Ramamurthy (IARI, New Delhi), Dr.

John Whitman (ICRISAT), Dr. W. Reed (ICRISAT)

During M. Sc. (Ag Entomology) Days: I had the thesis adviser, Professor Dr. M. S. Venugopal, who had just returned from IRRI, Philippines finishing his stint as Post Doctoral Fellow in Entomology with Dr. J. A. Litsinger, IRRI Entomologist. He has been my mentor even till today. I worked on rice gall midges for my thesis at TNAU, Madurai and I published papers with him. I worked closely with world renowned rice gall midge entomologist, Dr. T. Hidaka and also published papers with him

During Ph.D. (Entomology) studies at University of the Philippines at Los Banos/ International Rice Research Institute, Philippines: I worked with famous rice entomologists at IRRI and UPLB and published papers with them. I am in active touch with them even till to date (retired from IRRI and FAO) with Drs. B.M. Shepard, O. Mochida, J. A. Litsinger, E. A. Heinrichs (all from IRRI).

SD: How do you see the future of entomology evolving, and what potential breakthroughs or advancements do you anticipate?

RCJ: I see digital diagnostic tools, and real-time surveillance and monitoring tools, molecular taxonomy, understanding tritrophic relations, dynamics in the climate change regimes, use of remote sensing, climate models will all play a key role in future IPM programs. In addition, many countries are resorting to citizen science to collect data to identify the spread of invasive species and distribution. The science of Entomology especially the beneficial social insects (Honey bees, Stingless bees), pollinators, butterfly gardens, insects as food, etc. are introduced to high school students to create interests in insects in many countries.

SD: How do you inform the public and decision-makers about your study findings in order to raise awareness and advance conservation?

RCJ: I collaborate with Developmental Communication specialists / Science writers in the organization I work and also with media networks (TV/Radio) in the Philippines and abroad, to develop knowledge-based information materials in simple and easy to understand language for non-specialists. I use lots of photos, cartoons (science comics), infographics, short video clips, story-telling "show and tell", short drama clips, and through online *via* social media, contribute to websites, blogs, and

sharing through networks, etc. to reach public and policy/decision-makers.

I volunteer to give free presentations in training programs, workshops, conferences, symposiums, webinars, scientific societies, and community programs about invasive species, management and ecological restoration and conservation. I have introduced a special course on invasive species in the undergraduate and graduate programs at the University of the Philippines, Baguio which is now offered on a regular basis. I also prepare policy briefs for policy makers, and scientific papers to publish in referred journals.

SD: Lastly, any suggestions or specific advice you would like to give for the improvement and wider reach of 'Indian Entomologist' magazine?

RCJ: "Indian Entomologist Magazine" is a good source of information to young entomologists and one way of remembering and recognizing the pioneering Indian entomologists. India has produced eminent entomologists and some of them have settled abroad, some have retired, some are still active and many have gained global recognition. I think in my opinion, we should feature them, as their stories will motivate young generations of entomologists to be like one of them and excel. We can also request the featured entomologists to disseminate the "Indian Entomologist Magazine" -- one of the goals should be is to create more awareness of the success stories of Indian Entomologists both at home and abroad!!



The interview was conducted by Dr. Sagar D. He is working as Senior Scientist at Division of Entomology, ICAR-IARI, New Delhi. His field of specialization is insect reproductive physiology in relation to heat stress. He is one of the Associate Editors of IE.

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